



# WG Balancing of 16<sup>th</sup> May 2023

Hybrid meeting

16/05/2023



## For a smooth teleconference with 30+ people ... Some rules apply

- Please put yourself on mute at any time that you are not speaking to avoid background noise.
- If you receive a call, please ensure that you do not put this meeting **on hold**.
  - You can quit and reconnect later on.
  - You will be muted or kicked out of the session, if necessary.
- You will be requested to hold your questions for the end of each presentation.
  - Should you have a question, please notify via Teams or speak out if you are only via phone.
  - Share your question (with slide number) in advance so all participants may follow
  - Before you share your question, please announce yourself.
- If you have a poor internet connection, please dial-in.
- Finally, please be courteous and let people finish their sentences.
  - It is practically impossible to follow when 2 people are speaking at the same time in a teleconference.

## Agenda

### *Slight changes:*

- 14:00 – 14:30 Overview of the 2022 balancing volumes & costs
- 14:30 – 14:50 EU & BE Balancing Program Update
- 14:50 – 15:30 T&C BRP / Imbalance Price
- 15:30 – 16:00 Incompressibility
- 16:00 – 16:20 Winter Plan Balancing
- AOB – 16:20 – 16:30 Public Consultation aFRR LV



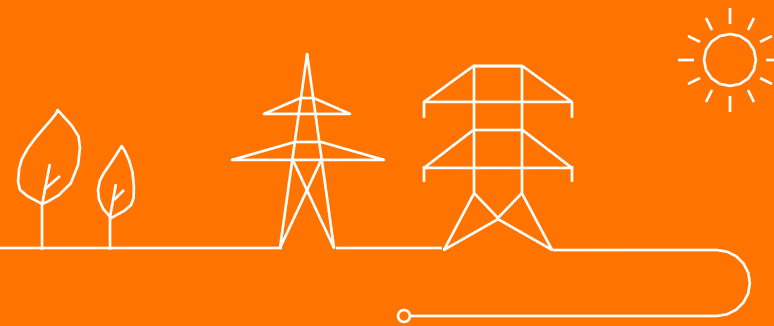
# Minutes of Meeting for approval

Minutes of Meeting of WG Balancing of 22<sup>nd</sup> March 2023

- **Suggestion to approve:**
- The MoM of 22/03/2023

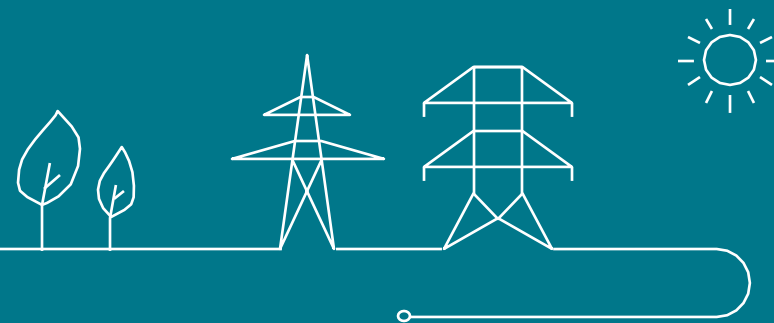


# Overview of the 2022 balancing volumes & costs

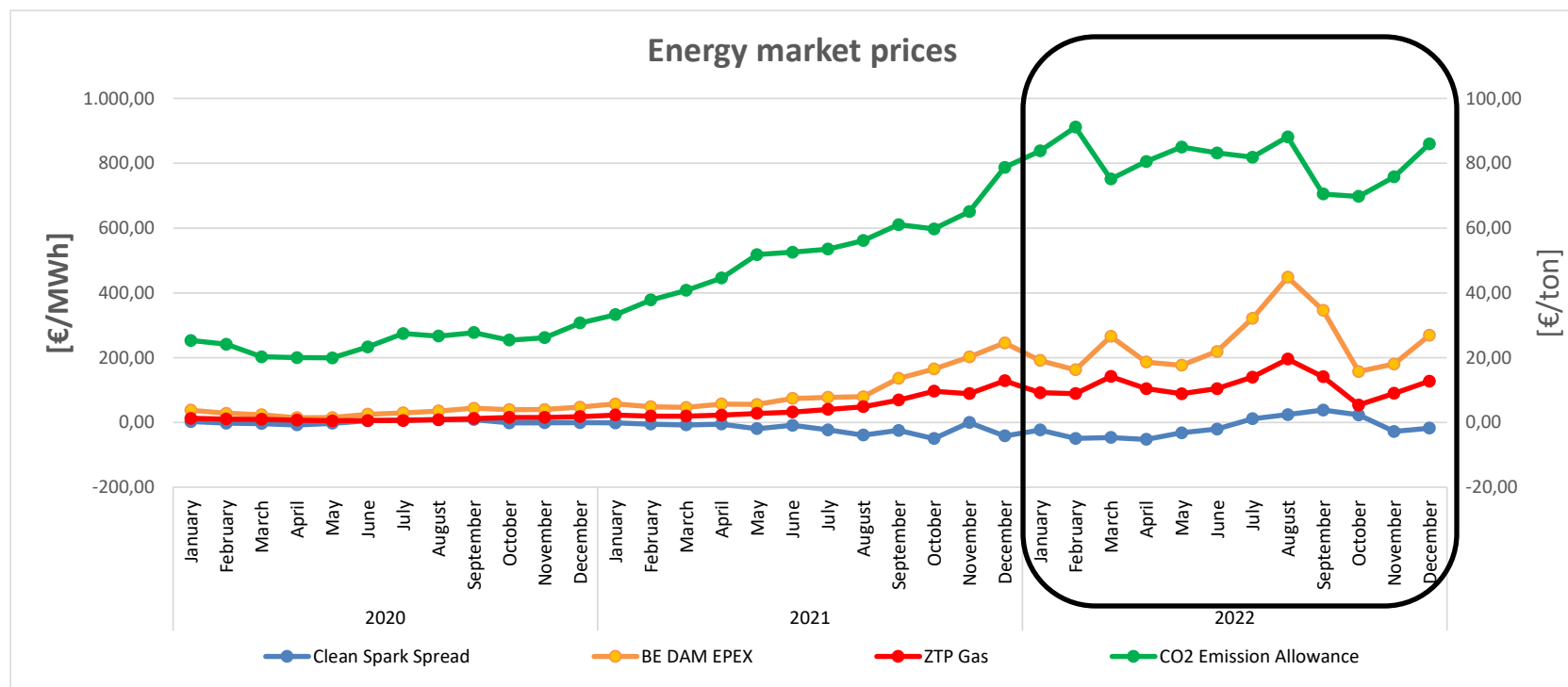


# Market Conditions

2022



# General market evolution – unprecedented energy prices



In 2022, energy prices soared at historical levels, continuing the increase already observed in H2 2021. Gas prices are the main driver for electricity prices, but also CO2-price was at a high level.

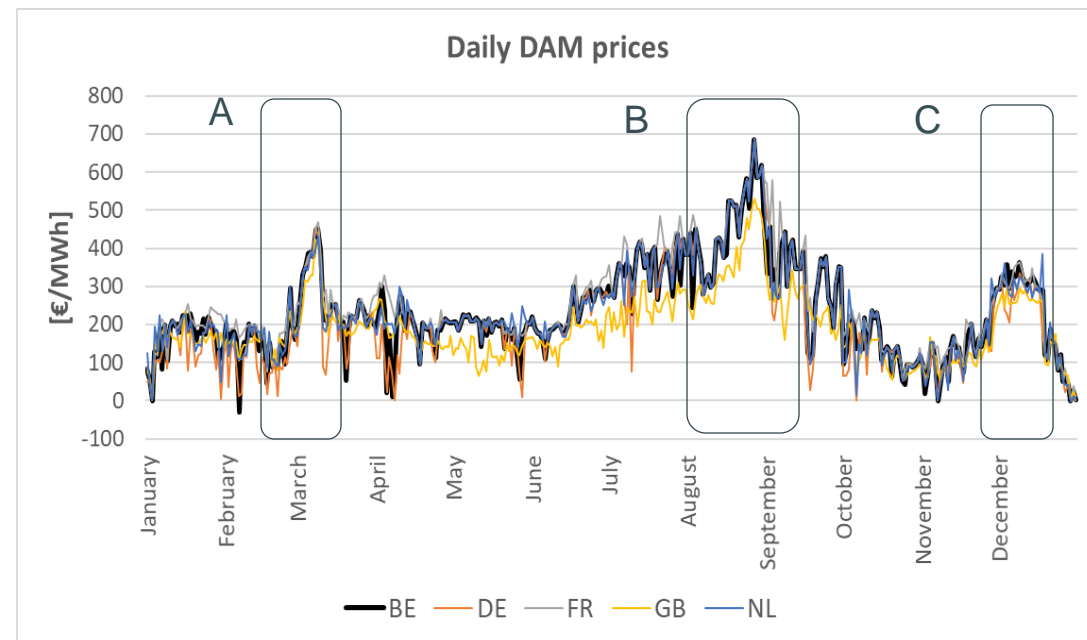
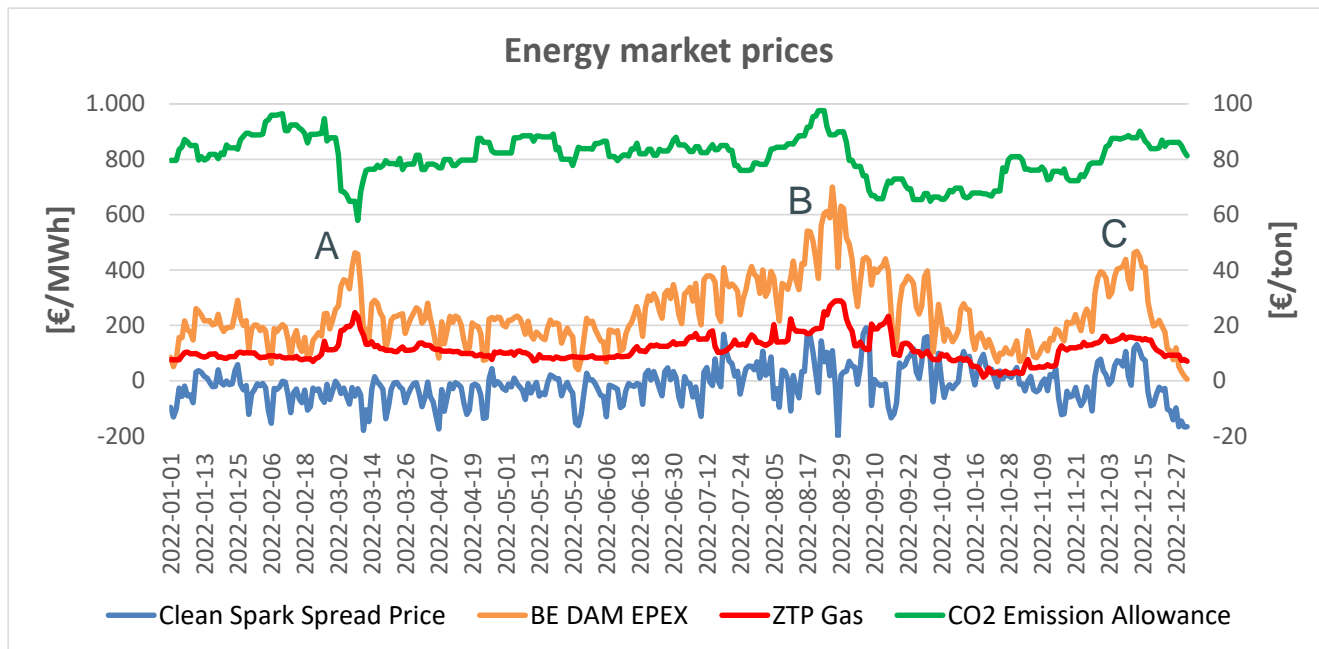
Several events left an impact on (European) power markets, such as:

- Russian invasion, issues around Nordstream-supply
- Strong unavailability of the French nuclear power plants (Outages).
- Weather: drought during the summer period, cold snap in December

➔ Also AS markets have felt the impact of those events.



# General view on market prices



- A. March (Russian invasion started)
- B. August(/Summer): Nordstream troubles
- C. December: cold snap

| Market Average DAM (€/MWh) | FR  | BE    | NL  | DE   | GB  |
|----------------------------|-----|-------|-----|------|-----|
| <b>2021</b>                | 109 | 104,1 | 103 | 96,9 | 146 |
| <b>2022</b>                | 276 | 245   | 242 | 235  | 207 |

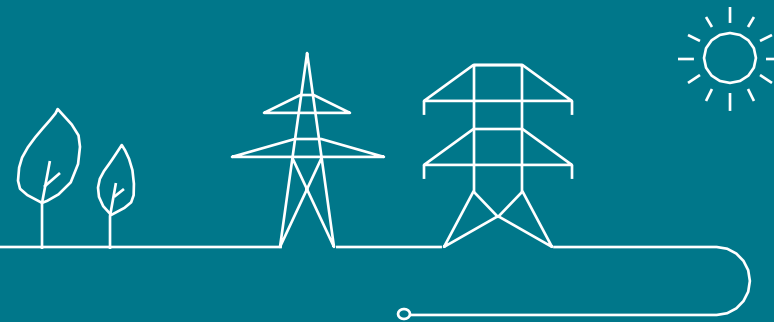
Energy market prices in 2022 has been characterized by

- Very high wholesale DA power prices
- CSS was mainly negative but with a temporary increase over the summer period and during the cold snap.

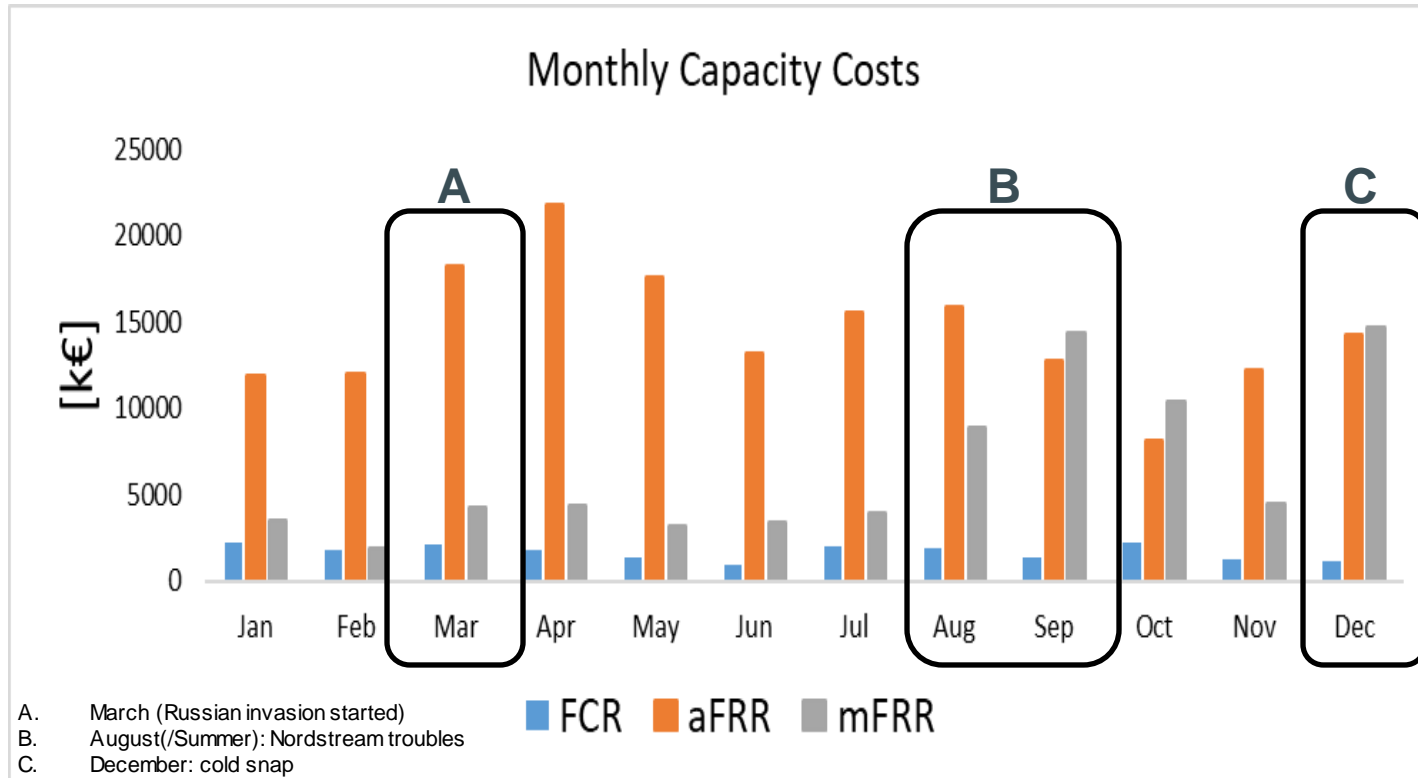




# FCR – aFRR – mFRR



## Wrap-up of capacity costs in 2022

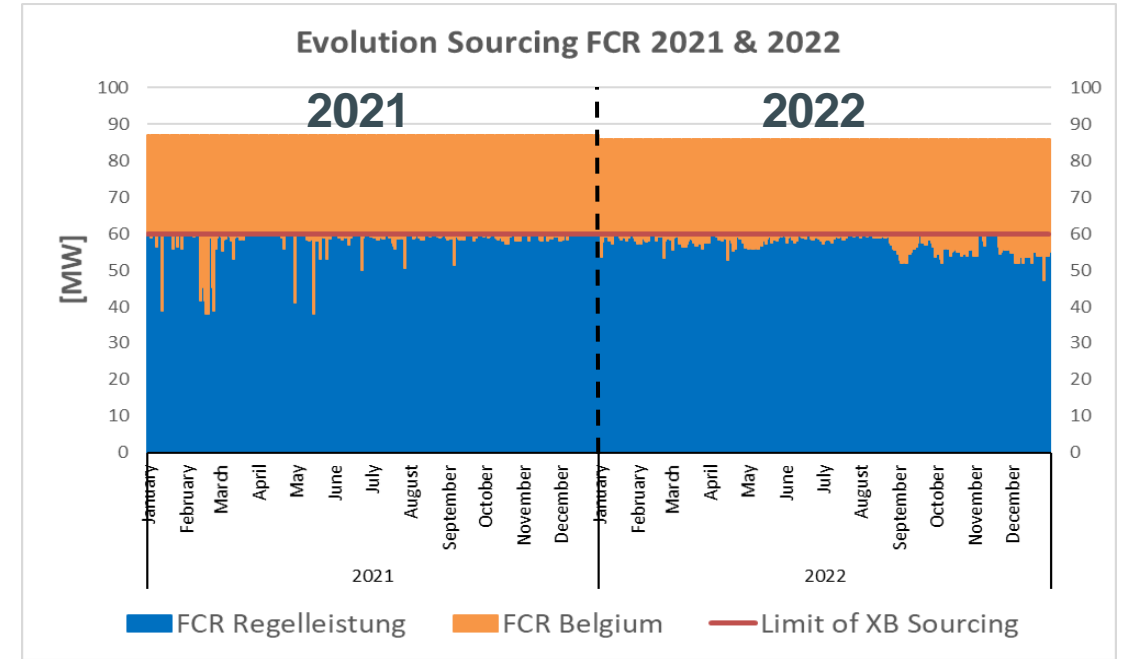
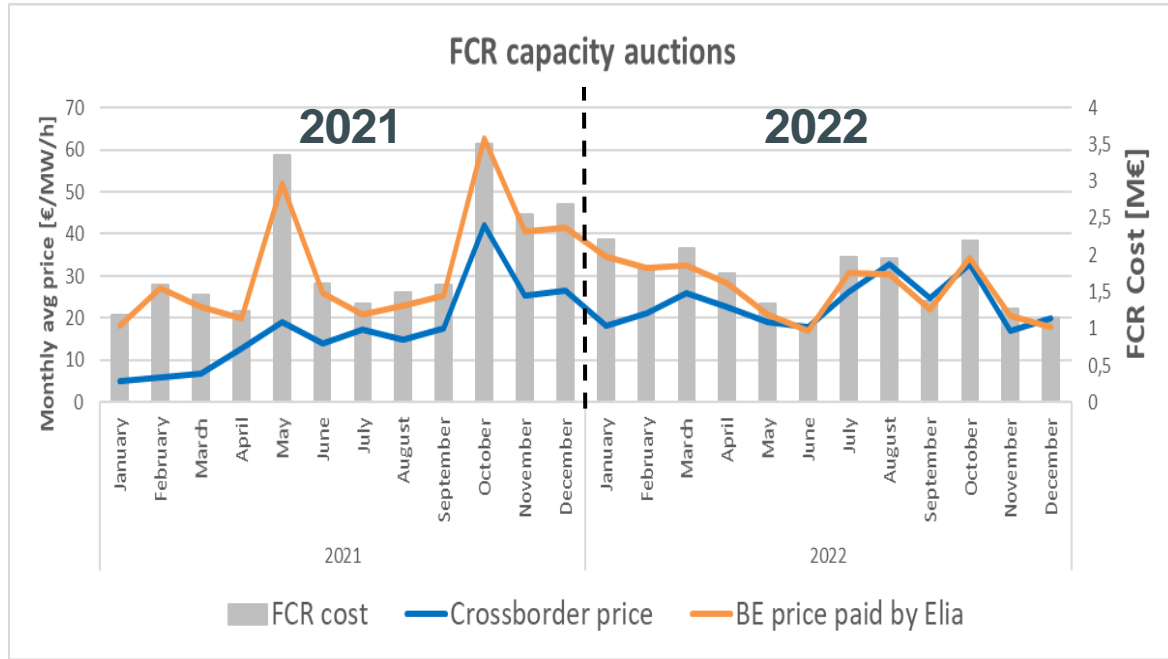


### Total capacity costs in 2021 & 2022

| [Costs in M€] | FCR  | aFRR  | mFRR |
|---------------|------|-------|------|
| <b>2021</b>   | 23,6 | 120,9 | 36,9 |
| <b>2022</b>   | 20,1 | 174,7 | 75,6 |

- Increase in balancing capacity costs with respect to 2021, obviously linked to the general market evolution
- Increase in aFRR / mFRR costs: not surprising given the correlation with market fundamentals such as DA price and Clean Spark Spread (CSS)

# FCR capacity auctions



➔ Belgian FCR capacity price more and more couples with the ‘cross-border’ price.

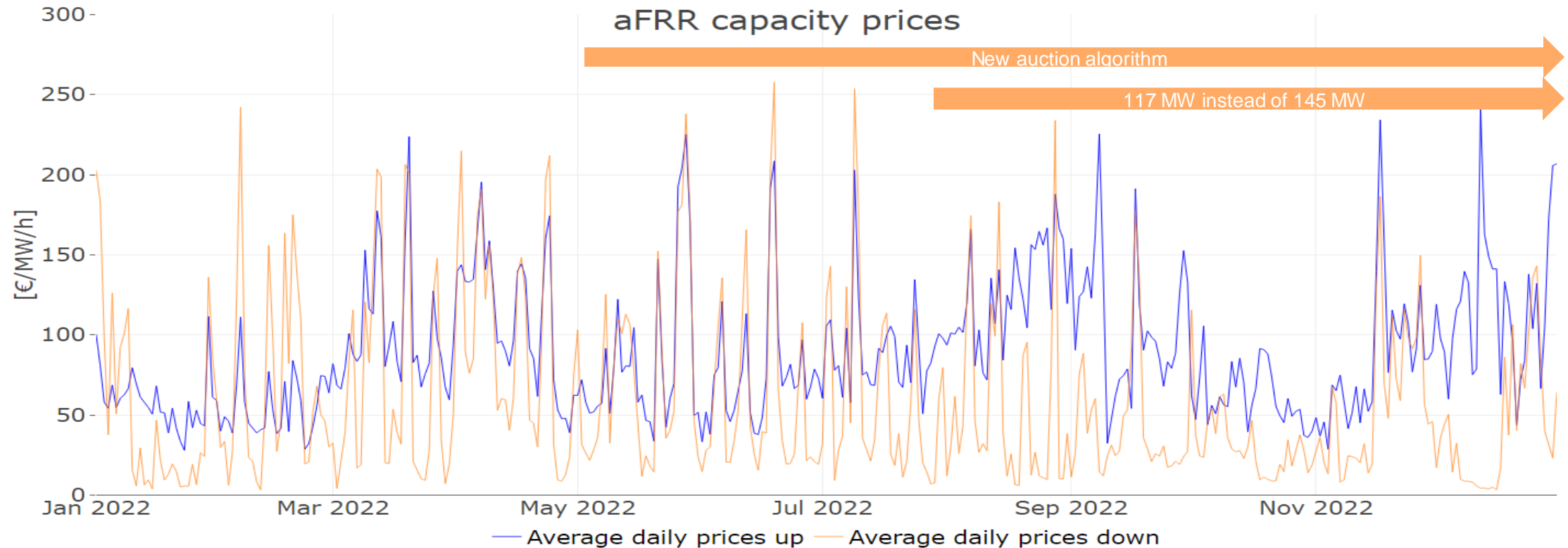
➔ FCR capacity in 2021 & 2022 is procured by

- Cross-border
- Typically DP<sub>Pg</sub> for the core share (BE)

➔ Newly Prequalified FCR volume in 2022 amounts 26 MW.

| Year | FCR to procure (BE) | Core Share (BE) | Avg BE price (€/MW/h) | Avg XB price (€/MW/h) |
|------|---------------------|-----------------|-----------------------|-----------------------|
| 2021 | 87 MW               | 27 MW           | 31,6                  | 17,3                  |
| 2022 | 86 MW               | 26 MW           | 26,8                  | 23,3                  |

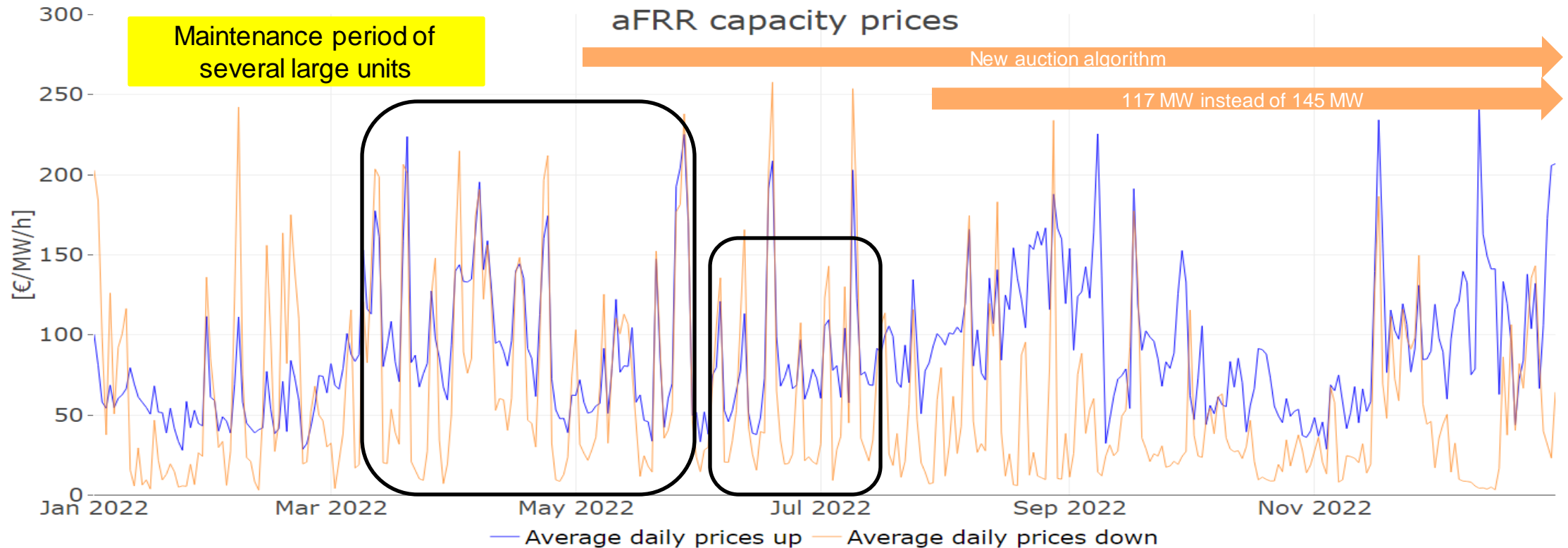
# aFRR capacity prices also keep trend with the main market evolutions during the year



➔ aFRR costs have reached high levels in 2022.  
Underlying market fundamentals (CSS) are at the root, which is also reflected in how up/down costs evolve respectively

➔ The liquidity in aFRR evolved positively in 2022.  
Newly prequalified volume in 2022 amounts 193 MW (UP) and 261 MW (DOWN).

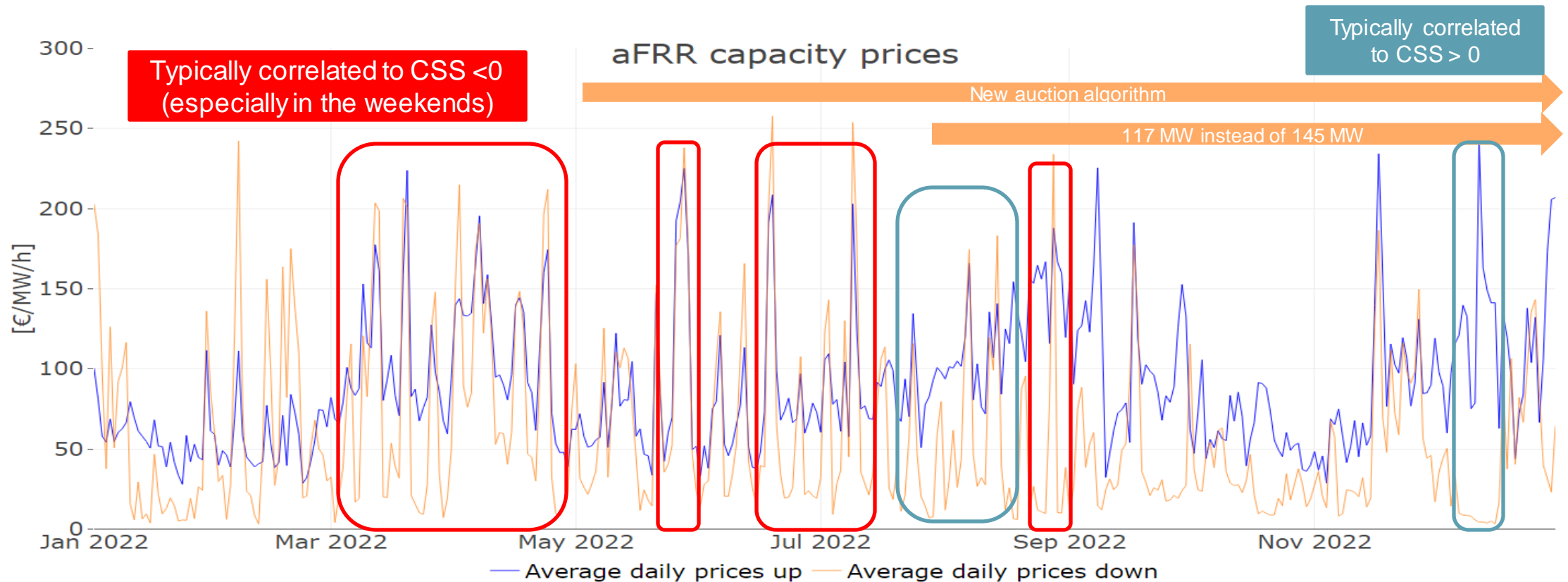
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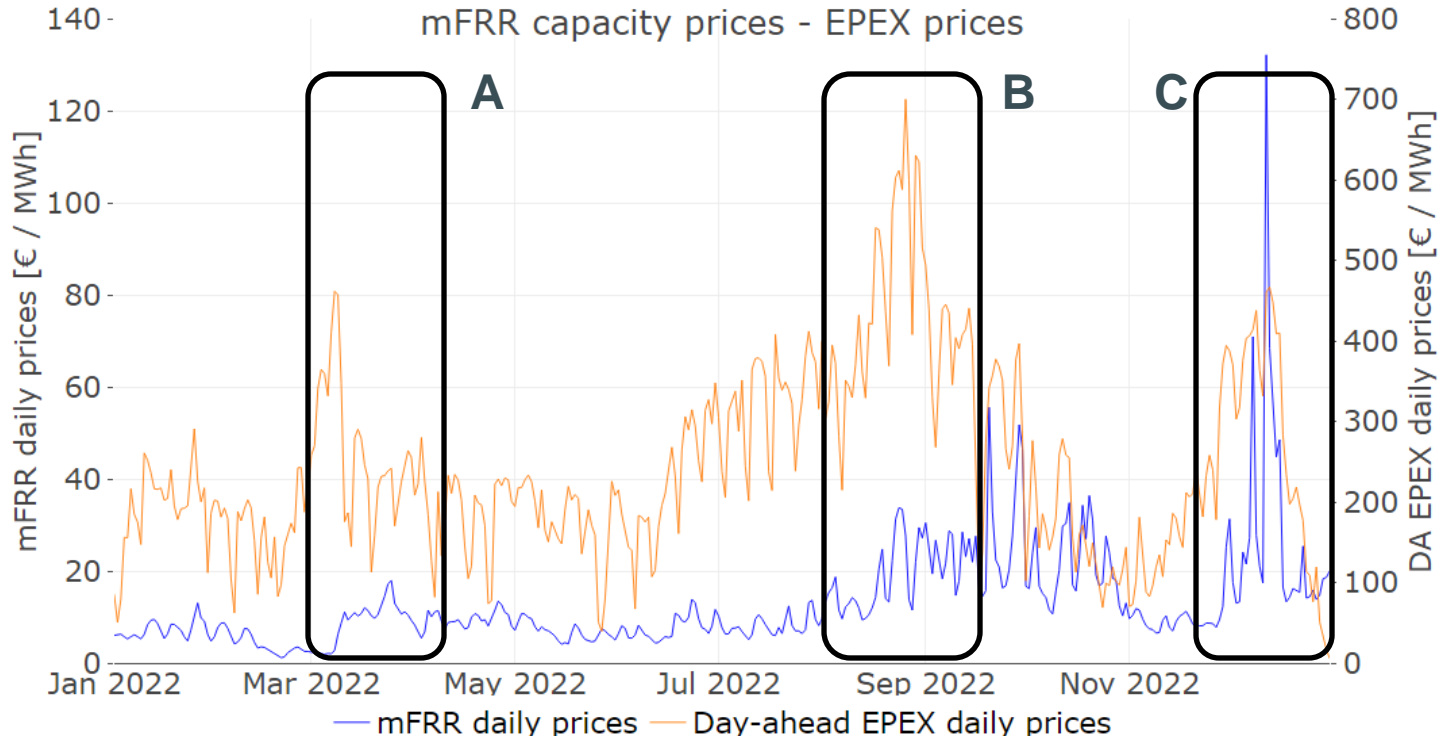
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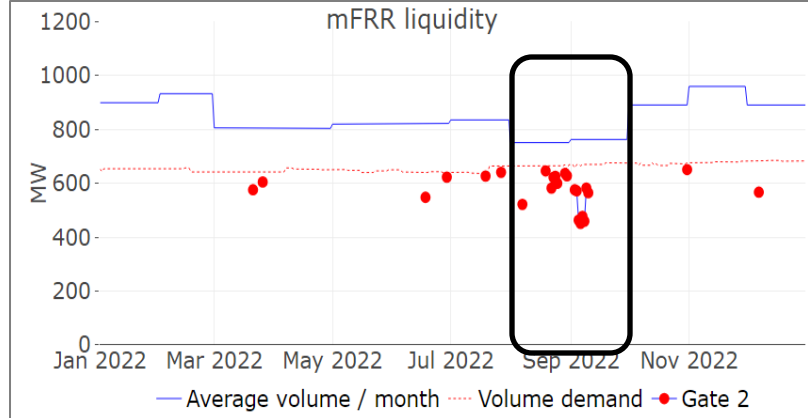
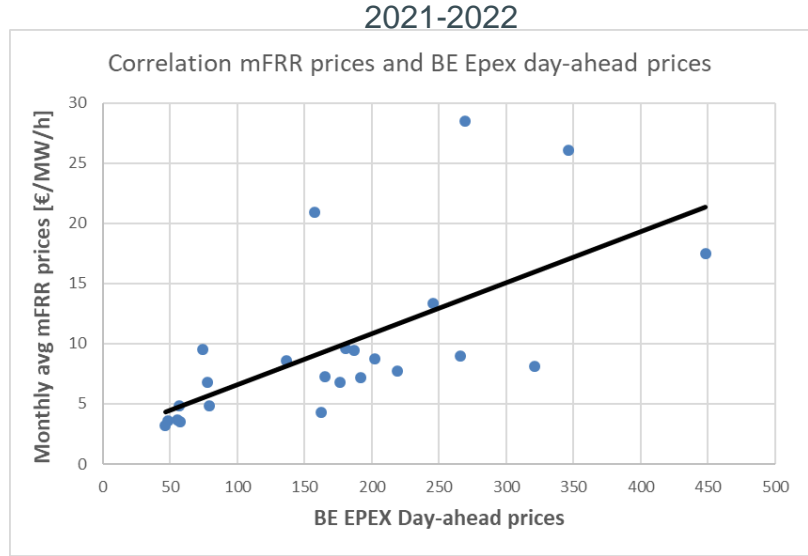
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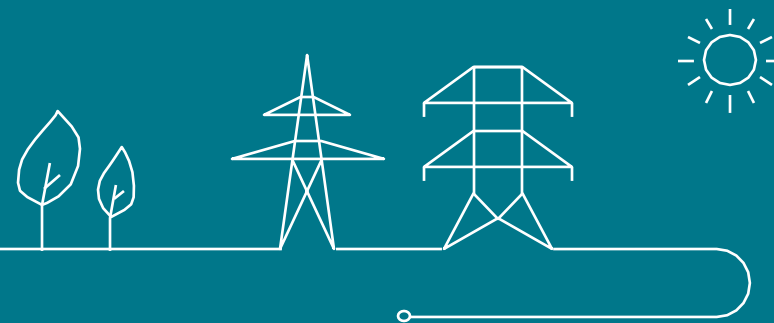
Also mFRR capacity prices strongly follow the market price (mainly DAM power).  
 In August/September there was also a particular drop in liquidity.



➔ The newly prequalified volume mFRR in 2022 is 47MW.

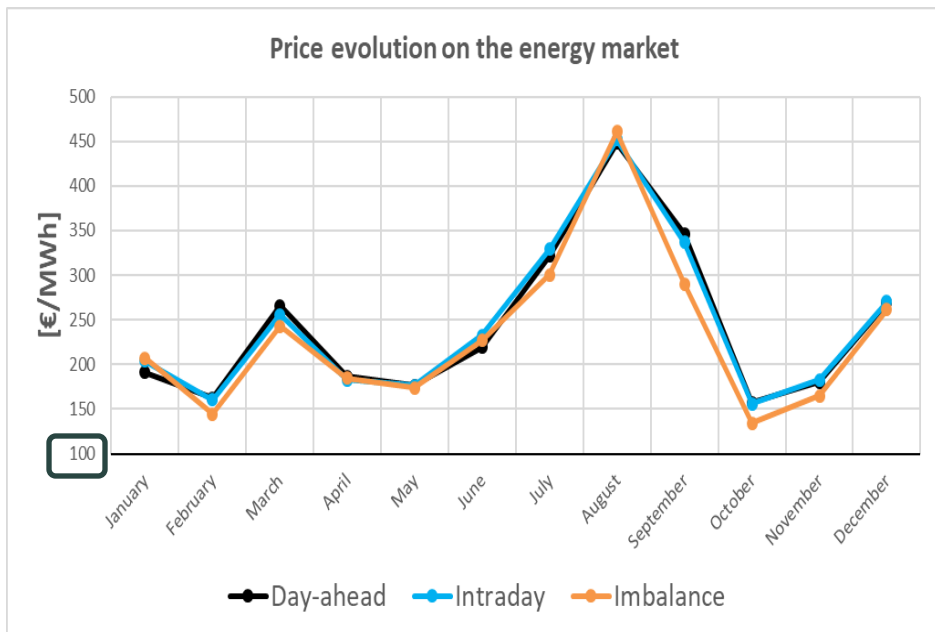
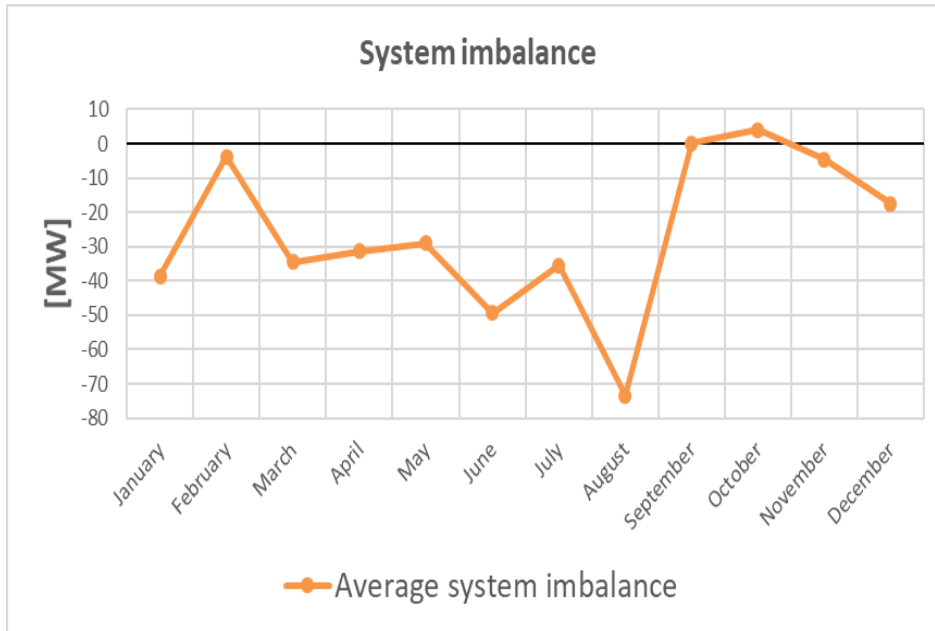


# System imbalance and imbalance prices



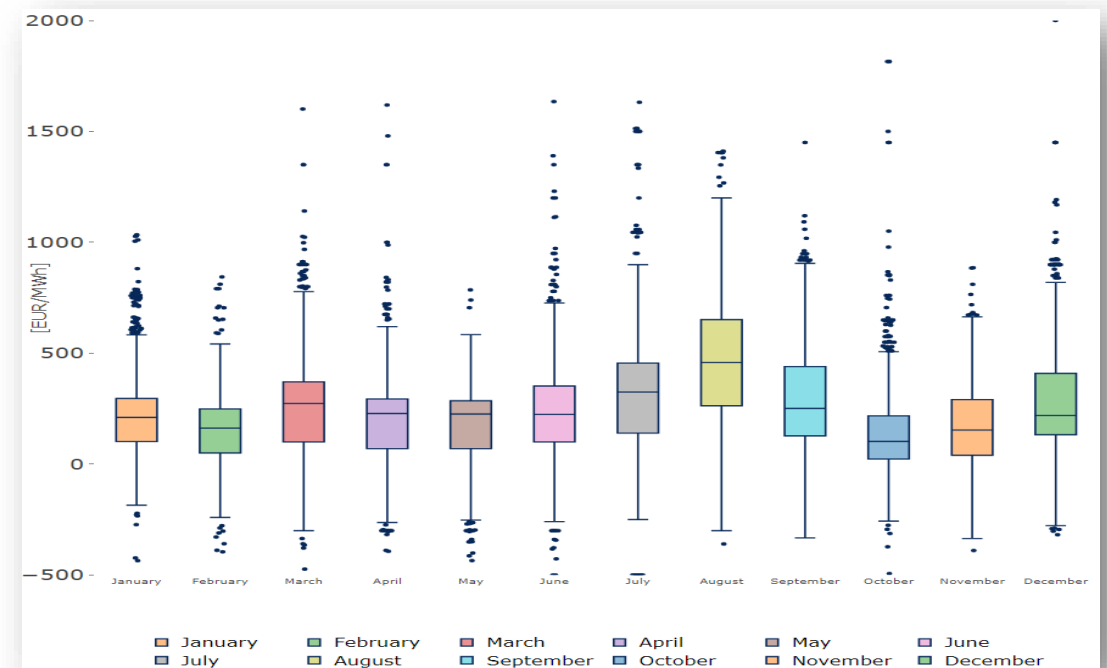


# System imbalance and imbalance prices



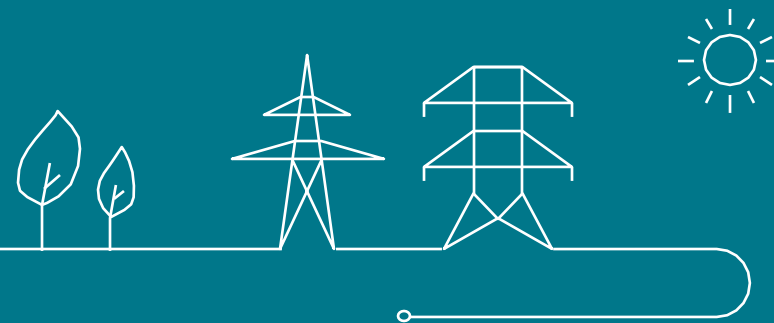
- **System imbalance** (on average) has evolved over the year from structurally negative to closer to zero.
  - Highly negative at the peak of the energy crisis (August)
- **Imbalance price trend (logically) follows the overall average energy price trend.**
- **Volatility has sometimes been very high**, with swings within a single day from very negative (down to -500 €/MWh) to very positive (up to 1000 to 2000 €/MWh)

Distribution per month of 2022 of the imbalance prices



# Transfer of Energy

Statistics 2022



## ToE statistics – mFRR DP<sub>PG</sub>

|                                | ToE  |      | Opt-Out |      | Pass Through |      | Total |      |
|--------------------------------|------|------|---------|------|--------------|------|-------|------|
|                                | 2021 | 2022 | 2021    | 2022 | 2021         | 2022 | 2021  | 2022 |
| <b># Delivery Points</b>       | 30   | 25   | 231     | 223  | 6            | 0    | 267   | 248  |
| <b>Sum DP mFRR,Max,Up (MW)</b> | 255  | 128  | 1020    | 1292 | 205          | 0    | 1481  | 1420 |
| <b>% Sum DP mFRR,Max,Up</b>    | 17%  | 9%   | 69%     | 91%  | 14%          | 0%   | 100%  | 100% |

Situation December 2022:

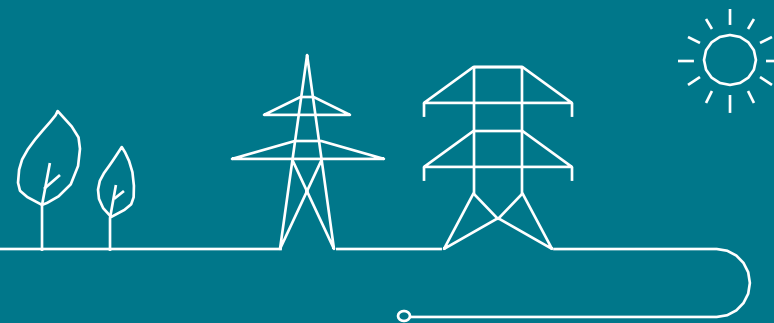
- Number of BSPs with mFRR DP<sub>PG</sub>: 7
- Number of Suppliers: 17

| mFRR DP <sub>PG</sub> PQ Volume | mFRR Standard & Flex | mFRR Flex only |
|---------------------------------|----------------------|----------------|
| <b>Dec 2021</b>                 | 528 MW               | 35 MW          |
| <b>Dec 2022</b>                 | 604 MW               | 7 MW           |

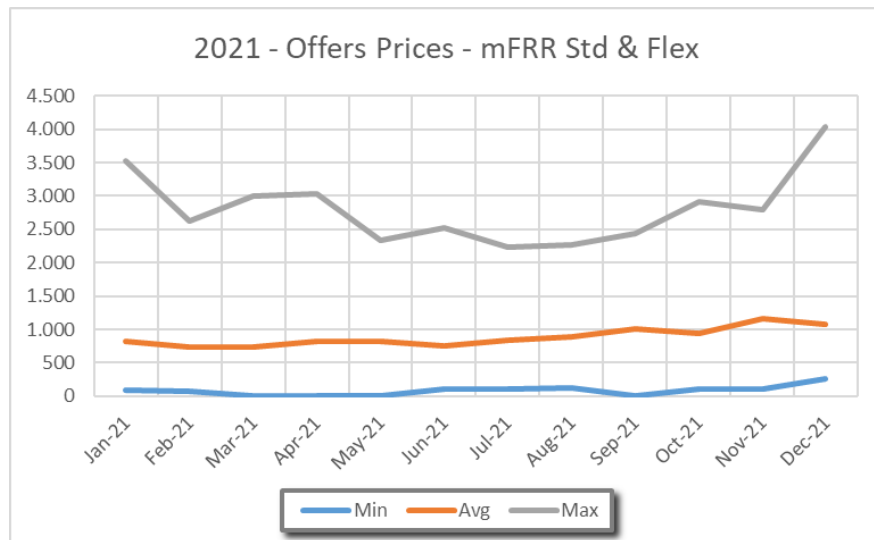
➔ Over the past years we observe a decrease of ToE DPs, and more Opt-Out agreements provided by the BSP.

# Balancing Energy

Statistics 2022



## Contracted mFRR Standard & Flex Energy Bids (offered)



| mFRR Std & Flex | Min (€/MWh) | Average (€/MWh) | Max (€/MWh) |
|-----------------|-------------|-----------------|-------------|
| 2021            | 0           | 891             | 4.038       |
| 2022            | 0           | 1.400           | 4.670       |

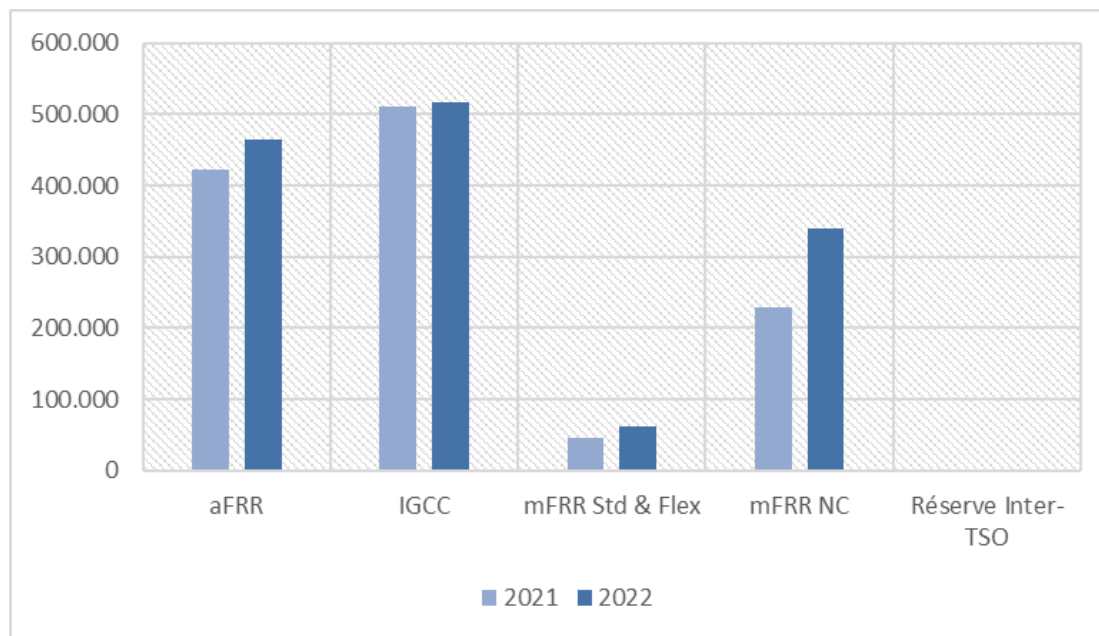
➤ Important increase of average price for both mFRR Std and mFRR Flex

## Non-Contracted mFRR - Energy Bids DP<sub>PG</sub>

**Like in 2021, no offers in 2022**

- No energy bids mFRR NC submitted in 2022 from delivery points DP<sub>PG</sub>.

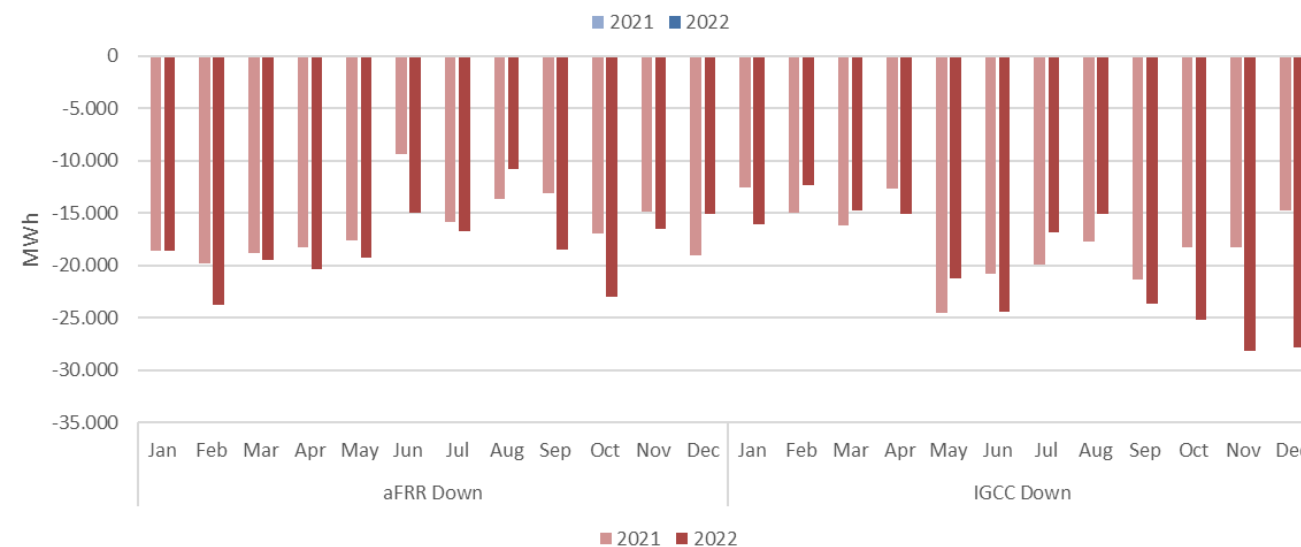
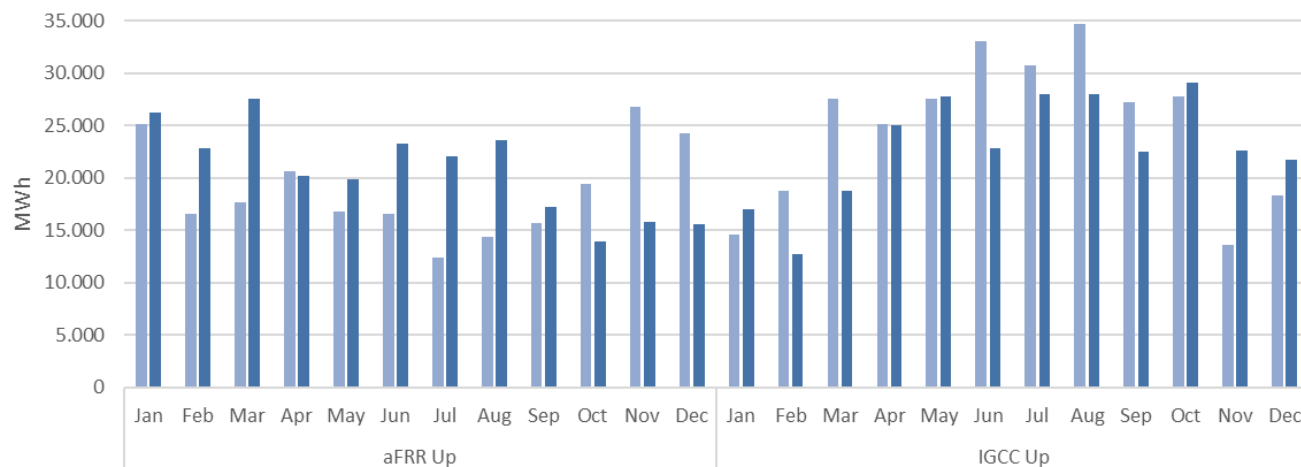
## Balancing Energy Activated



| Total balancing energy activated |                 |
|----------------------------------|-----------------|
| 2021                             | 2022            |
| 1.209.948 [MWh]                  | 1.383.441 [MWh] |

**Total balancing energy activated is slightly higher than previous year**

## Balancing Energy - automatic activation

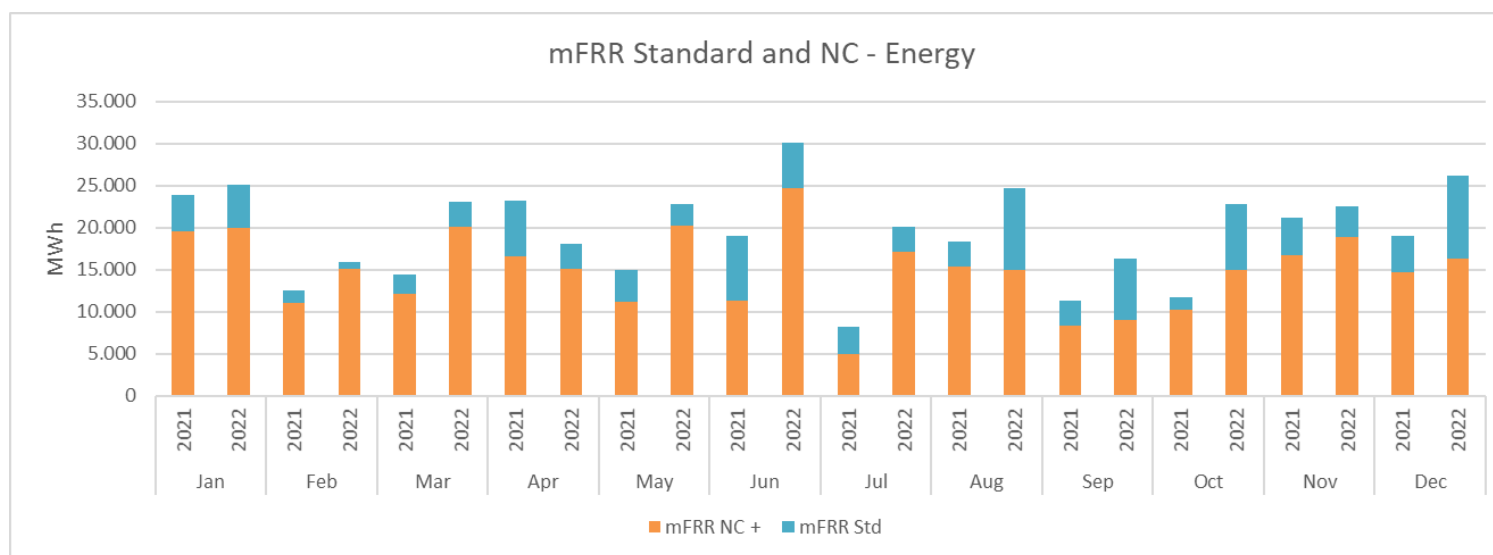


| Balancing Energy in MWh | aFRR +  | aFRR -   | IGCC +  | IGCC -   |
|-------------------------|---------|----------|---------|----------|
| 2021                    | 225.956 | -196.008 | 298.703 | -211.768 |
| 2022                    | 248.308 | -216.886 | 276.154 | -240.505 |

- Higher aFRR activated than previous year.
- Higher IGCC activated with regards to aFRR, in 2022.



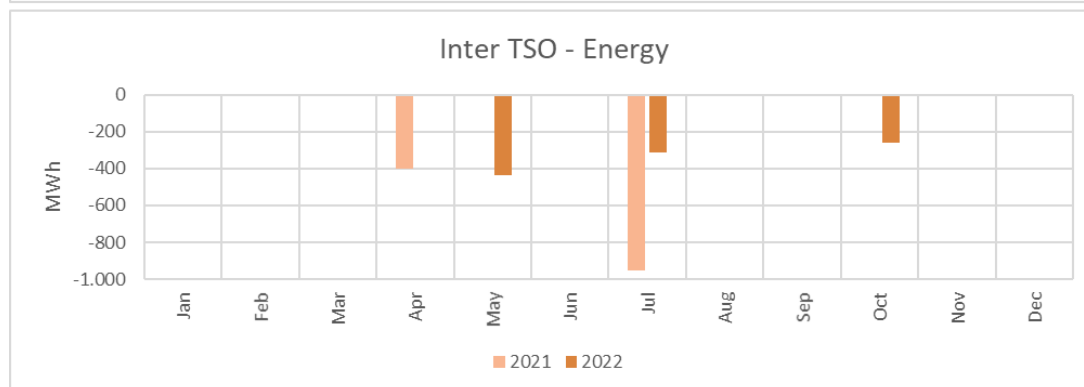
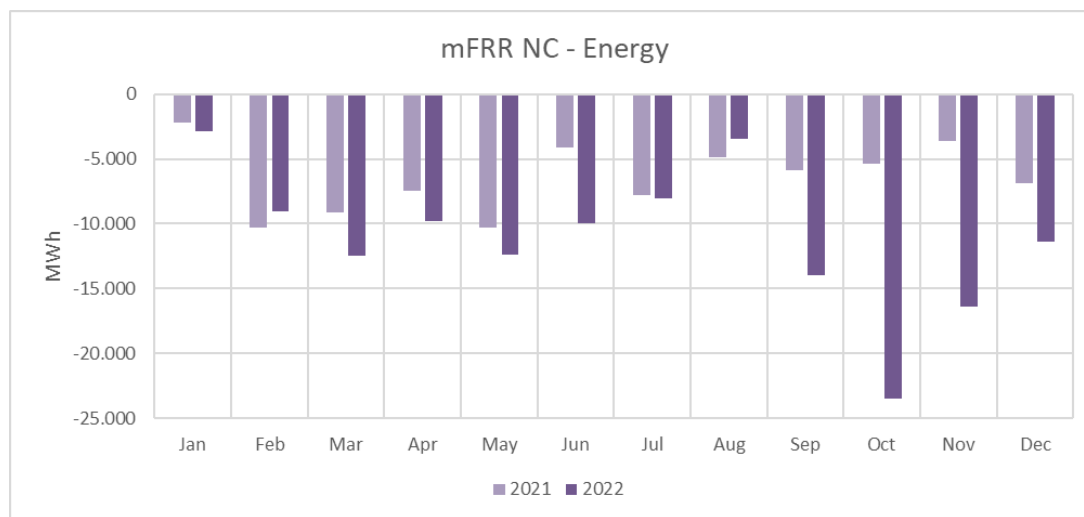
## Balancing Energy - Manual activation Upwards (mFRR UP)



| Balancing Energy in MWh | mFRR NC+ | mFRR Std |
|-------------------------|----------|----------|
| 2021                    | 151.642  | 46.087   |
| 2022                    | 205.906  | 61.564   |

➤ **No mFRR flex and InterTSO activated upwards in 2022.**

## Balancing Energy - Manual activation Downwards (mFRR DOWN)

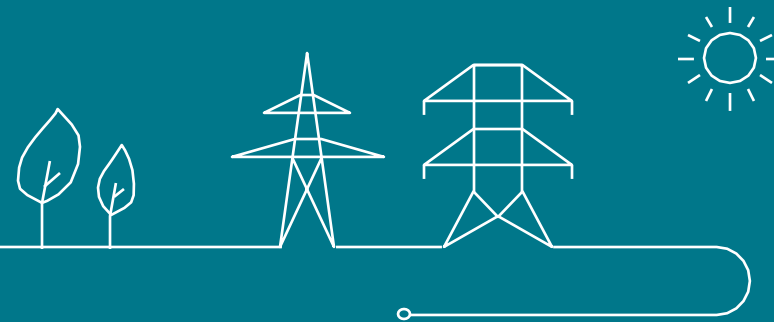


| Balancing Energy in MWh | mFRR NC- | InterTSO Export |
|-------------------------|----------|-----------------|
| 2021                    | -78.031  | -1.350          |
| 2022                    | -133.107 | -1.011          |

➤ **Significant increase in volume activated downwards at the end of 2022 with respect to previous year.**

# Activation control

Statistics 2022



## FCR Activation Control

- Maximum 6 controls and 2 controls per CCTU per month
- Failure factor =  $(\text{FCR Requested} - \text{FCR Supplied}) / \text{FCR Requested}$
- Criteria of classification in table below:
  - If failure factor  $\leq 0\%$  → Sufficient
  - If  $0\% < \text{failure factor} \leq 30\%$  → Lightly insufficient
  - If failure factor  $> 30\%$  → Largely insufficient

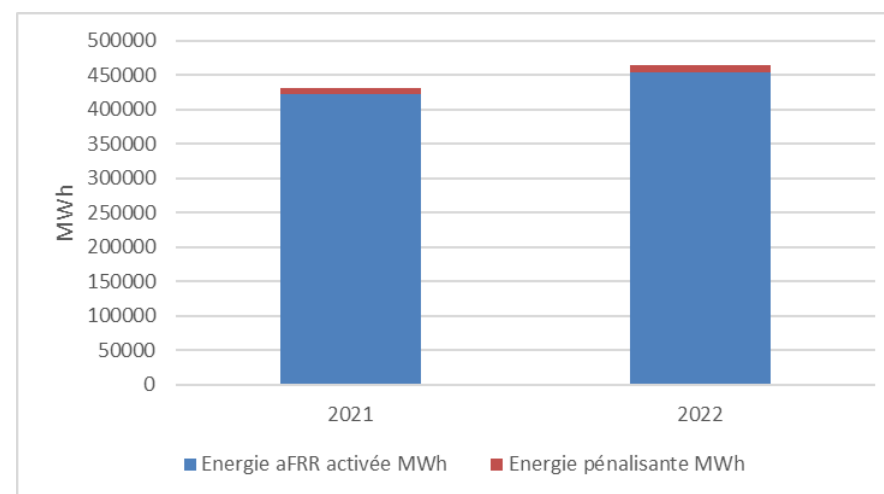
- **Most of the controls are performed on BSP providing FCR with pool of DP PG**
- **Increase of performance compared to last year**

|              | Sufficient reaction |      | Lightly insufficient reaction |      | Largely insufficient reaction |      | Total |      |
|--------------|---------------------|------|-------------------------------|------|-------------------------------|------|-------|------|
| Year         | 2021                | 2022 | 2021                          | 2022 | 2021                          | 2022 | 2021  | 2022 |
| FCR controls | 183                 | 200  | 28                            | 4    | 3                             | 7    | 214   | 211  |
| %            | 86%                 | 95%  | 13%                           | 2%   | 1%                            | 3%   | 100%  | 100% |

## aFRR Activation Control

- Continuous control based on telemeasures
- Penalized energy equals to the difference between the aFRR Supplied and aFRR Requested taking into account a tolerance of 15% of energy bid volume

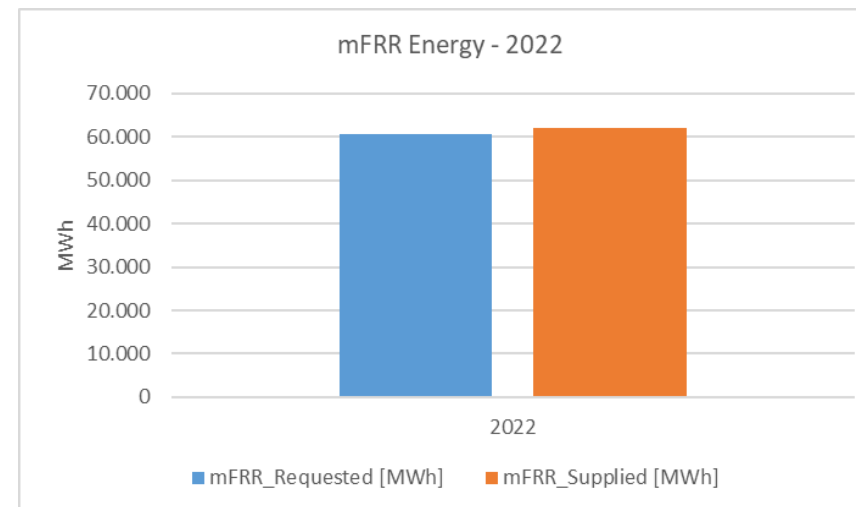
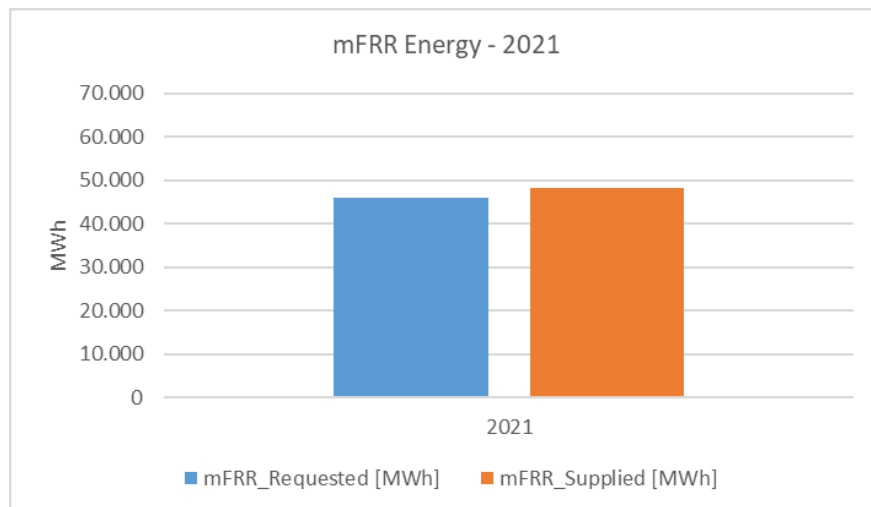
| Penalized energy MWh |  | Total   |
|----------------------|--|---------|
| 2022                 | Penalized energy MWh                   | 10.903  |
|                      | aFRR energy activated MWh              | 465.193 |
|                      | % Penalized energy / energy activated  | 2,3%    |
| 2021                 | Penalized energy MWh                   | 10.222  |
|                      | aFRR energy activated MWh              | 421.964 |
|                      | % Penalising energy / energy activated | 2,4%    |



**Situation dec 2022: Similar level of penalized energy compared to last year**

## mFRR Activation Control

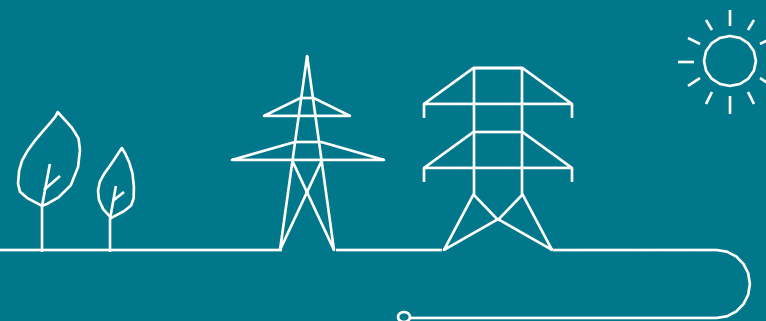
- Control based on metering data.
- Missing energy equals to the difference between the mFRR Supplied and mFRR Requested.



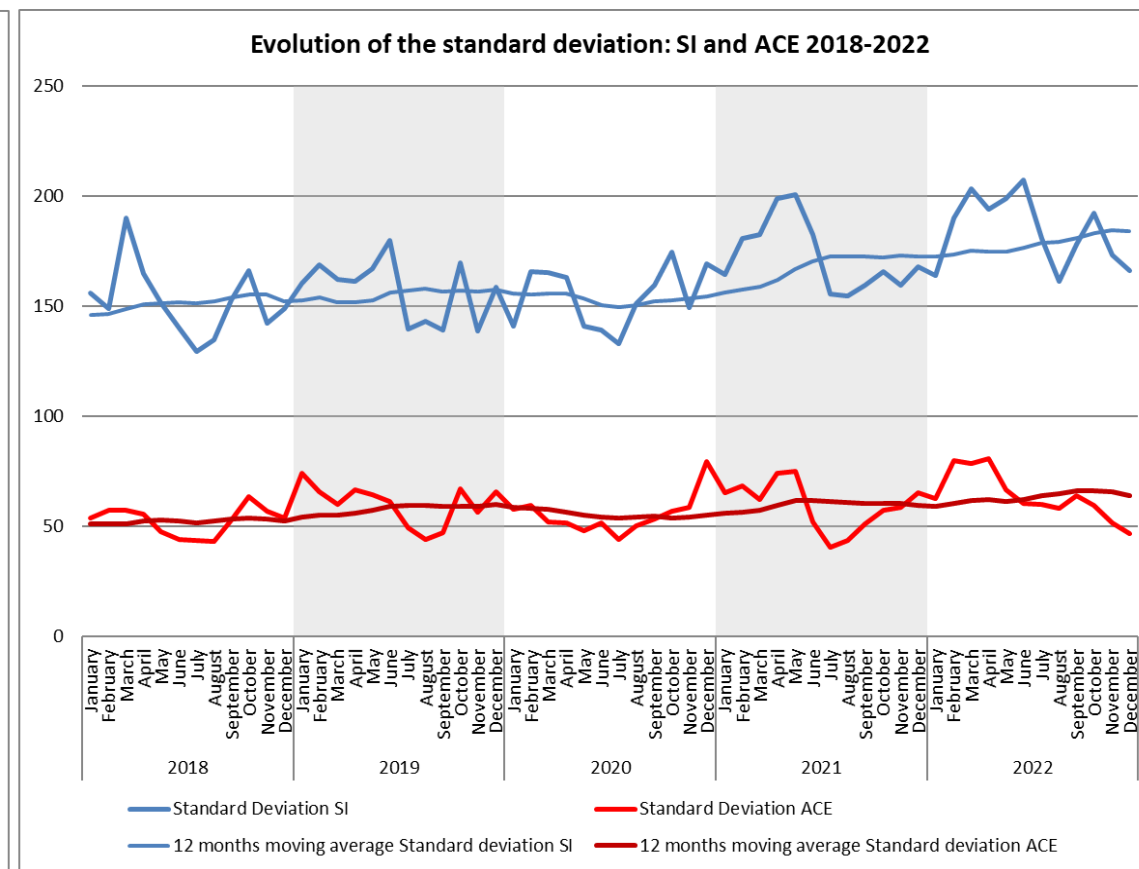
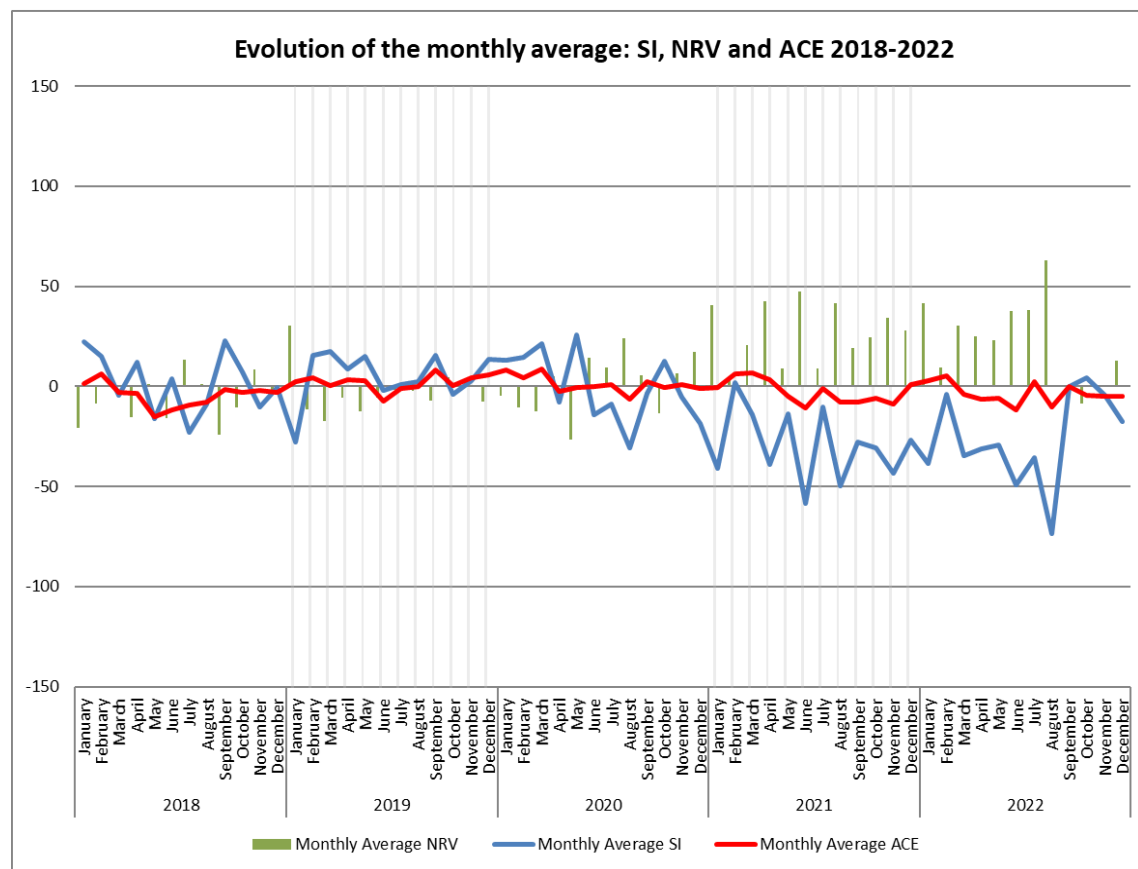
**In general we observe a good delivery of the service.**

# Quality

Statistics 2022



# Evolution System Imbalance (last 5 years)





## Quality Results

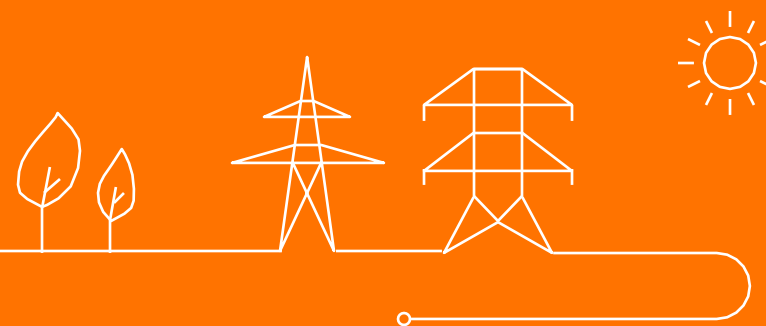
- Limits established in SOGL for FRCE (or ACE)
- Level 1 is similar to prior ACE Std Deviation indicator
- Level 2 is used for the extreme values (prior sigma 90, 99)
- For 2022, we are below the 30% and 5% required for Level 1 and Level 2 respectively

| Monitoring FRCE<br>Levels 1 & 2 |        | Niveau 1            |       | Niveau 2            |       |
|---------------------------------|--------|---------------------|-------|---------------------|-------|
|                                 |        | Ref Niveau 1 (MW):  | 90    | Ref Niveau 2 (MW):  | 169   |
| Period                          | # QH   | Cible % Ref         | 30%   | Cible % Ref         | 5%    |
|                                 | Period | # QH > Ref Niveau 1 | % Ref | # QH > Ref Niveau 2 | % Ref |
| JAN                             | 2.976  | 291                 | 9,8%  | 71                  | 2,4%  |
| FEB                             | 2.688  | 410                 | 15,3% | 118                 | 4,4%  |
| MAR                             | 2.972  | 440                 | 14,8% | 123                 | 4,1%  |
| APR                             | 2.880  | 351                 | 12,2% | 121                 | 4,2%  |
| MAY                             | 2.976  | 334                 | 11,2% | 97                  | 3,3%  |
| JUNE                            | 2.880  | 266                 | 9,2%  | 86                  | 3,0%  |
| JULY                            | 2.976  | 269                 | 9,0%  | 76                  | 2,6%  |
| AUG                             | 2.976  | 256                 | 8,6%  | 81                  | 2,7%  |
| SEPT                            | 2.880  | 261                 | 9,1%  | 63                  | 2,2%  |
| OCT                             | 2.980  | 276                 | 9,3%  | 67                  | 2,2%  |
| NOV                             | 2.880  | 188                 | 6,5%  | 49                  | 1,7%  |
| DEC                             | 2.976  | 154                 | 5,2%  | 42                  | 1,4%  |
| YEAR                            | 35.040 | 3.496               | 10,0% | 994                 | 2,8%  |

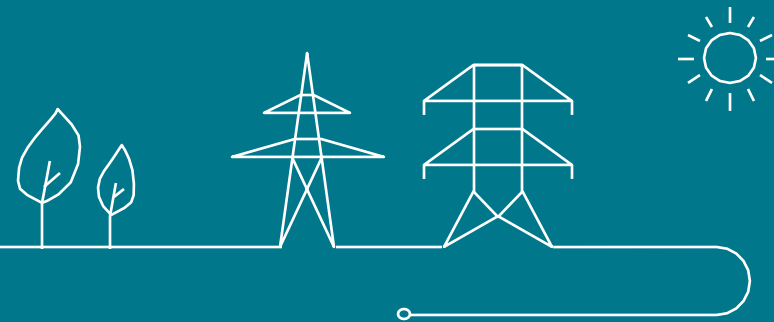
**Respect in 2022 of limits of SOGL requirement for FRCE levels 1 and 2**

# EU & BE Balancing Program Update

Cécile Pellegrin & Arno Motte



# Stakeholder management interactions



# GENERAL ORGANIZATION

## Proposed planning

REMINDER: Development slots foreseen until go-live:

- 1st Thursday of every month
- 3rd Friday of every month

May 23 - Jun 1 → Operational Readiness Testing protocol for OPA

Oct 10 - Nov 6 → Operational Readiness Testing protocol for OPA & SA

Nov 7 - Nov 20 → Operational Readiness Testing protocol for BSP

Nov 28 - Dec 18 → Operational Readiness Testing protocol for BSP, OPA & SA

Finalization individual tests for Energy Bidding (SA/BSP) including Communication Test

Oct 9

Finalization individual testing for scheduling including Communication Test

Sep 4

Finalization individual testing for outage planning

May 19

Latest date for Go Live iCAROS phase 1 - mFRR local

Feb 15

Discussion proposal common test protocol with service providers

Mar 9

2023

Mar

Apr

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

2024

Jan

Feb

Follow-up

Bilateral individual testing sessions can be organized

# BUSINESS TESTING PROTOCOLS WITH MARKET PARTIES DEFINED

| Tests                                  |          | Type                                  | What   | Who       | When   |            |
|--|----------|---------------------------------------|--|-----------|--------|------------|
| iCAROS                                 | iCAROS_1 | Reproduction of <b>real situation</b> | <b>Update</b> of an Availability Plan                  | OPA       | Day I  | 23/05/2023 |
|  | iCAROS_2 |                                       | <b>Initialization</b> of Schedules & RD Energy Bids    | SA<br>OPA | Day II | 25/05/2023 |
|  | iCAROS_3 |                                       | <b>Updates</b> of Schedules & RD Energy Bids           | SA<br>OPA | Backup | 01/06/2023 |
|  | iCAROS_4 | <b>Simulation</b> of scenario's       | <b>Activations of RD, Return to Schedules Requests</b> | SA        | Day I  | 10/10/2023 |
|  |          |                                       |  |           | Day II | 11/10/2023 |
|  |          |                                       |  |           | Backup | 16/10/2023 |
|  |          |                                       |  |           | Day I  | 17/10/2023 |
|  |          |                                       |  |           | Day II | 18/10/2023 |
|  |          |                                       |  |           | Backup | 23/10/2023 |
|  |          |                                       |  |           | Day I  | 24/10/2023 |
|  |          |                                       |  |           | Day II | 25/10/2023 |
|  |          |                                       |  |           | Day II | 26/10/2023 |
|  |          |                                       |  |           | Backup | 06/11/2023 |
| <b>Back-up week 30/11 - 03/11/2023</b> |          |                                       |  |           |        |            |



# BUSINESS TESTING PROTOCOLS WITH MARKET PARTIES DEFINED

| Tests                                  |               | Type                                  | What   | Who              | When   |            |
|--|---------------|---------------------------------------|--|------------------|--------|------------|
| MARI                                   | MARI_1        | Reproduction of <b>real situation</b> | <b>Initialization &amp; updates</b> of mFRR Energy Bids                      | BSP              | Day I  | 07/11/2023 |
|  | MARI_2        | <b>Simulation</b> of scenario's       | <b>Activations of mFRR</b>   | BSP              | Day II | 08/11/2023 |
|  |               |                                       |  |                  | Backup | 13/11/2023 |
|  |               |                                       |  |                  | Day I  | 14/11/2023 |
|  |               |                                       |  |                  | Day II | 15/11/2023 |
|  |               |                                       |  |                  | Day II | 16/11/2023 |
|  |               |                                       |  |                  | Backup | 20/11/2023 |
| <b>Back-up week 20/11 - 24/11/2023</b> |               |                                       |  |                  |        |            |
| iCAROS/MARI                            | iCAROS/MARI_1 | Reproduction of <b>real situation</b> | <b>Initialization</b> of Schedules & RD/mFRR Energy Bids                     | BSP<br>SA<br>OPA | Day I  | 28/11/2023 |
|  | iCAROS/MARI_2 |                                       | <b>Updates</b> of Schedules & RD/mFRR Energy Bids                            | BSP<br>SA<br>OPA | Day II | 29/11/2023 |
|  | iCAROS/MARI_3 | <b>Simulation</b> of scenario's       | Combination of <b>activations</b> of mFRR, RD & Return-to-Schedules Requests | BSP<br>SA        | Backup | 04/12/2023 |
|  |               |                                       |  |                  | Day I  | 05/12/2023 |
|  |               |                                       |  |                  | Day II | 06/12/2023 |
|  |               |                                       |  |                  | Backup | 11/12/2023 |
|  |               |                                       |  |                  | Day I  | 12/12/2023 |
|  |               |                                       |  |                  | Day II | 13/12/2023 |
|  |               |                                       |  |                  | Day II | 14/12/2023 |
|  |               |                                       |  |                  | Backup | 18/12/2023 |



# Market parties implementation follow-up - Status & next steps

## STATUS

- Implementation plans received for the 94% of technical units in OPA/SA contract
- Finalized documentation on Business testing protocols shared with service providers
- OPA's informed on 9th of May 2023 of ICAROS\_1 "Update of an Availability Plan" testdate

## Next Steps

- ICAROS\_1 "Update of an Availability Plan" testing:

*Day 1: Tuesday 23rd of May (for Business Day of Wednesday 24th of May)*

*Day 2: Thursday 25th of May (for Business Day of Friday 26th of May)*

*Back-up day: Thursday 1st of June (for Business Day of Friday 2nd of June)*

- Feedback required by 3<sup>rd</sup> of June on business testing protocols and dates

Contact your KAM Energy by 17/5  
to pick a day

# Coming stakeholder management interactions



## - Next interactions

- Regular follow-up of implementation plans
- More information regarding the content and organization of the business testing protocol with service providers, where still applicable, will be communicated in due time directly to service providers and through WG Balancing
- Training/information session:
  - 25/05/23: mFRR bidding activation selection
  - “BSP Facilitations”
- Public consultation for aFRR cap on TCO degradation (public consultation to be launched on 24/5)
- Public consultation for T&C OPA, SA and coordination rules (target date for start unofficial public consultation : End of MAY/ Early JUNE 2023)
- Public consultation for T&C mFRR, BRP and Balancing rules (target date for start unofficial public consultation : Early JULY 2023)





## Contact persons



### **KAM Energy**

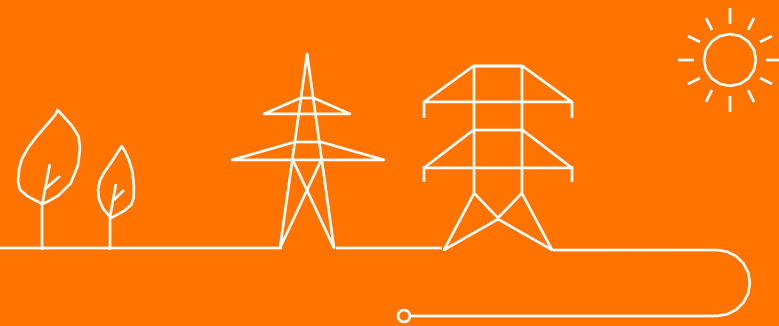
Amandine Leroux / Arno Motté / Nicolas Koelman

### **Implementation ad hoc sessions (on request)**

- Q&A sessions dedicated to design and implementation questions
- IT questions & Live debugging sessions with ELIA IT-team



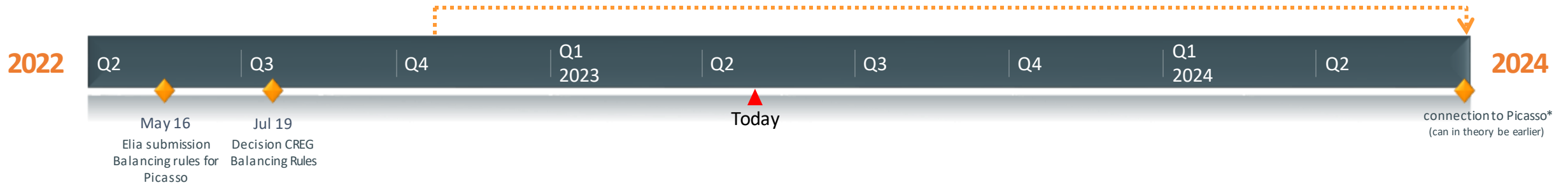
# T&C BRP / Imbalance Price



# Agenda

- Context
- CREG decision of 9 march
- Way forward for coming evolutions
- Next Steps: focus on content of evolutions for MARI\*





- In prevision of a connection to the Picasso Platform, initially foreseen in Q4 2022, Elia proposed evolutions of the MIP/MDP described in the Balancing Rules.

- EIF with connection to Picasso (which is in the meantime postponed to *à priori* 2024)
- aFRR contribution to the MIP/MDP: *weighted average price of CBMP<sub>oc</sub>* taking into account *all optimization cycles*
- Introduction of a *CAP/FLOOR* in order not to provide incentives to aggravate SI and hence to preserve operational security
- Introduction of a *Deadband* to avoid extremely volatile prices when Belgian system is close to balance

$$IP_{oc} = \frac{\sum_{oc} [(abs(aFRR SD_{oc,j})) \times CBMP_{oc,j}]}{\sum_{oc} (abs(aFRR SD_{oc,j}))}$$

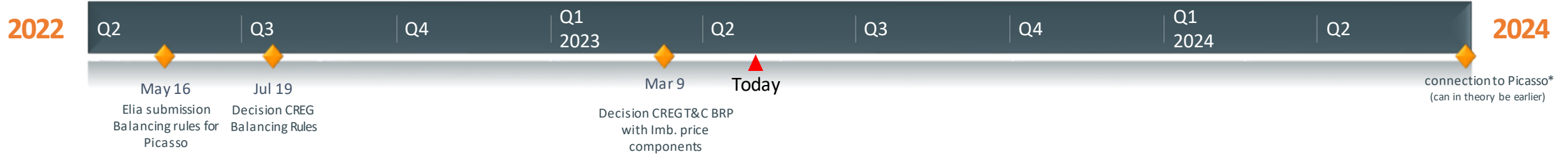
- In her decision of 19 July CREG approved the proposal but requests Elia :

- to move by 7/10 the Imbalance price components and alpha in the T&C BRP
- to remove the CAP/Floor & the Deadband

In the meantime the decision of 3 October and hence of 19 July have been cancelled by court.  
Exact implications are currently analyzed and next steps evaluated.



# Decision CREG 9 march



## CREG takes the pen and adapts T&C BRP by decision B4794 of 9 march

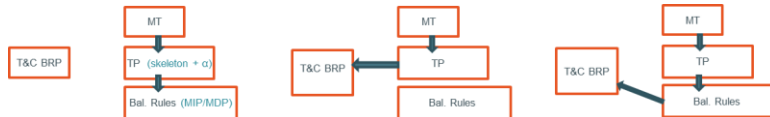
- 2 situations are described



- CAP/FLOOR are maintained for a period of 12 months\*
- No Deadband



- “no additional component” (conform CREG the alpha currently described in the Imbalance tariffs continues to apply as far as it is described in the tariffs)
- EIF of those changes together with next evolution of Bal. Rules referring to T&C BRP for the definition of MIP/MDP or with tariff proposal referring to T&C BRP for MIP/MDP/alpha. Exact way forward left to Elia’s discretion:



- Request to propose a roadmap to “periodically evaluate and relax of CAP/Floor” by the first connection to a EU balancing platform (MARI or Picasso)

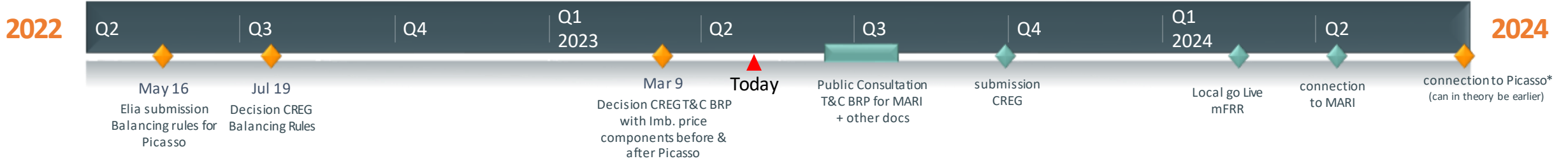
- Introduction of parameter SI+/SI- → CAP/FLOOR apply outside this interval
- SI+ and - = 0 for the first 12 months after 1<sup>st</sup> connection to a EU balancing platform and gradually increase after

- Situations described won’t apply in practice or for a very limited period
- CAP/FLOOR: Elia welcomes the fact that, in a first stage, red lines linked to operational security are recognized
- Elia deplores the deletion of the Deadband which ensures stable price signals around zero and reduces entry barrier for RES
- Art. on the additional component is confusing and seems in contradiction with the alpha in the tariffs. Elia believes it should be aligned in both documents or described in only one.
- EIF à priori with next revision of Balancing Rules depending on CREGs upcoming decisions

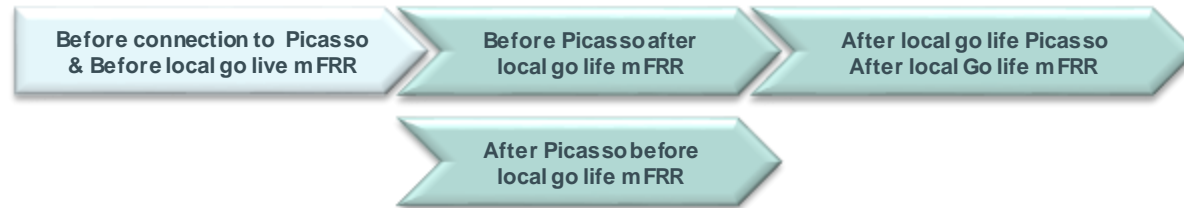
Not in scope of very next revision of T&C BRP, and hence not in scope of today’s presentation

- Elia agrees to propose, discuss and submit an action plan to evaluate the effectiveness of the starting formula with regards to various criteria and, if deemed safe, to propose evolutions. Elia, whose mission is to reliability, efficiency and safety of the network, cannot follow the boundary conditions of this plan (SI+, SI-, no return possibility, trial and error) .

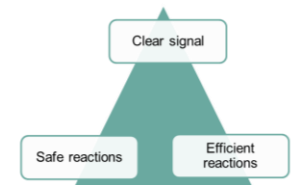
# Next Steps: MARI track



- In the coming months Elia will consult a proposal for modifications of the T&C BRP in order to, among others, describe the evolutions of the imbalance price components MIP/MDP in prevision of the connection to MARI
- This proposal for amendment of the T&C BRP will be accompanied by amendment of the Balancing Rules. The latter will be cleaned of from the MIP/MDP
- 4 situations will be described



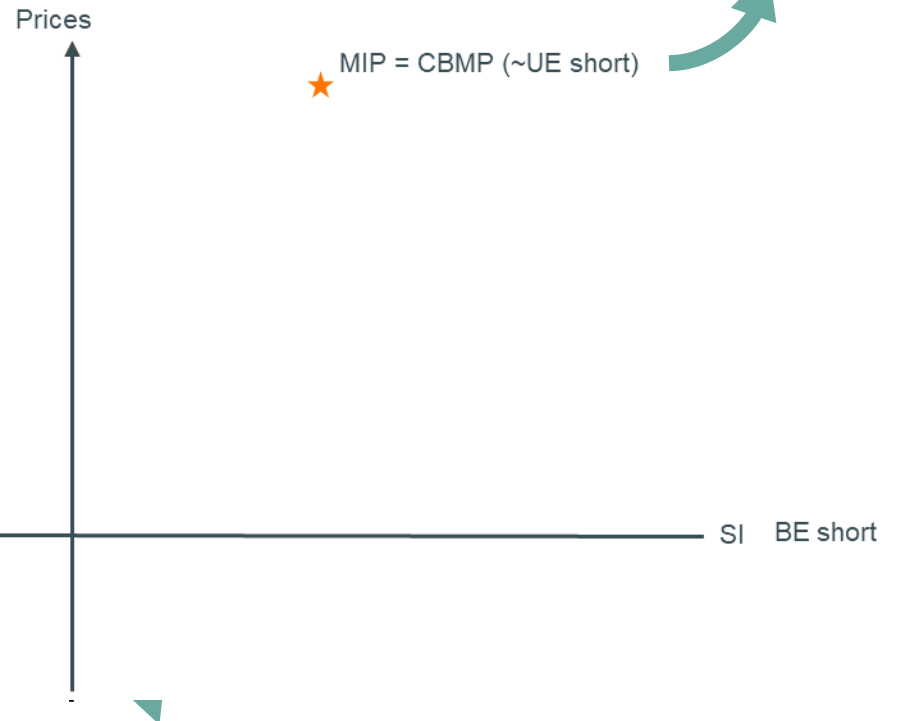
- Objectives : in a context of EU integration of balancing platforms, provide clear price signals that are safe and efficient for the system
- Assumptions:
  - The formula that defines the "aFRR component" has been agreed and approved and is therefore not debated
  - CAP/FLOOR concepts (approved as starting point in decision of 9 march) are also not extensively debated



# IP Formula after connection to EU balancing platforms

**1 Objective 1 - Benefiting from EU integration**

The price is based on the Cross-Border Marginal Prices of the uncongested area as long as the resulting price signal does not incentivize BRPs to aggravate BE SI



**3 Objective 3 – provide clear signals that enable reactive balancing of market parties**

A concept of “dead band” is introduced to moderate the price signal when a (strong) implicit reaction from the BRPs is not necessary.

## Inputs to determine MIP/MDP are, according to ISH:

- CBMP from Picasso & Mari
- VoAA

## Objective 2 – Without jeopardizing grid security

If the resulting price signal incentivizes BRPs to aggravate BE SI (meaning that the flex available abroad is cheaper than the flex available in BE), this price is capped (resp. floored) at VoAA down (resp. up) depending on the direction of the BE zone.

Purpose of the resulting price signal (CAP/FLOOR) is to be “neutral” (i.e. no strong incentive for BRPs to deviate from their position)

\*Simplified representation of CBMP  
In practice MIP/MDP= max/min (aFRR component, mFRR component)  
aFRR component  $f(\text{CBMP aFRR})$  and mFRR component  $f(\text{CBMP mFRR})$

## New proposed imbalance price formula compatible with MARI/PICASSO

- IP = deadband value if  $-25 \text{ MW} < \text{SI}(\text{QH}) < 25 \text{ MW}$
- MIP =  $\max ( \text{floor} , \text{aFRR component} , \text{mFRR component} )$  if  $\text{SI}(\text{QH}) \leq -25 \text{ MW}$
- MDP =  $\min ( \text{cap} , \text{aFRR component} , \text{mFRR component} )$  if  $\text{SI}(\text{QH}) \geq 25 \text{ MW}$

✓ IP formula should not incentivize to aggravate the local SI => cap & floor (detailed proposed formula below)

✓ aFRR component should reflect the value of aFRR => formula already agreed :  $\text{aFRR component} = \frac{\sum_{oc} [(abs(aFRR SD_{oc,j})) \times CBMP_{oc,j}]}{\sum_{oc} (abs(aFRR SD_{oc,j}))}$

✓ mFRR component => should reflect the marginal value of mFRR

✓ IP formula should provide a neutral price signal in case BE is close to balance ( |SI| smaller than 25 MW) => deadband





# Decomposing the formula: Cap and floor

Imbalance pricing with MARI (and/or PICASSO)

# Proposed cap and floor

## General principles

- On the one hand, MARI and PICASSO enable access to **supplementary cross-zonal FRR resources** (incl. via netting) which **improves economic efficiency of short-term dispatch**
- On the other hand however, IP based exclusively on the CBMP may provide (when the later is < that the last “clearing price in BE”) incentives for BRPs to aggravate the Belgian SI hence creating congestions and increasing reservation needs
- Adding a Cap and a floor to the IP formula is meant to provide a **neutral price signal in those circumstances, allowing BRPs to maintain their last position and to profit from ‘cheaper’ resources** abroad without jeopardising system security

## Rationale

- ELIA’s view is that – in the longer-term – the Imbalance Price should be set to provide BRPs with an incentive to “keep their plans” in case the Belgian system is “reasonably balanced”
- “Keeping the plan” means that the Imbalance Price should not incentivize to deviate from the intraday equilibrium, hence that IP should equal to the last “intraday index” (e.g. ID1)
- Unfortunately, in the short-term, no sufficiently robust “intraday index” exist to support such an approach. This being said, VoAA, which is a proxy and which is a parameter foreseen by ISH, will be used.

## Value of Avoided Activation (VoAA)

- Imbalance Settlement Harmonization ([ISH](#)§10) introduces the notion of VoAA which is commonly understood as **the price of the first bid available in a given merit order**, based on **local merit order list** that provides local incentives
- NB: Price of the locally available first bid in the “avoided direction” is easy to manipulate: it “suffices” to submit a dummy bid (e.g. 1MW) at abnormal price



## Proposed cap (when $SI > 0$ ) and floor (when $SI \leq 0$ )

The proposal is to take the most extreme « price of the first bid » on any of the 4 merit orders

- $\text{floor} = \max(\text{VoAA}_{\text{aFRR\_up}}, \text{VoAA}_{\text{aFRR\_down}}, \text{VoAA}_{\text{mFRR\_up}}, \text{VoAA}_{\text{mFRR\_down}})$
- $\text{cap} = \min(\text{VoAA}_{\text{aFRR\_up}}, \text{VoAA}_{\text{aFRR\_down}}, \text{VoAA}_{\text{mFRR\_up}}, \text{VoAA}_{\text{mFRR\_down}})$

With

- $\text{VoAA}_{\text{aFRR\_up}}$  = the price of the first aFRR Energy Bid in the local MOL available for the upward regulation
- $\text{VoAA}_{\text{aFRR\_down}}$  = the price of the first aFRR Energy Bid in the local MOL available for the downward regulation
- $\text{VoAA}_{\text{mFRR\_up}}$  = the price of the first mFRR Energy Bid in the local MOL available for the upward regulation
- $\text{VoAA}_{\text{mFRR\_down}}$  = the price of the first mFRR Energy Bid in the local MOL available for the downward regulation

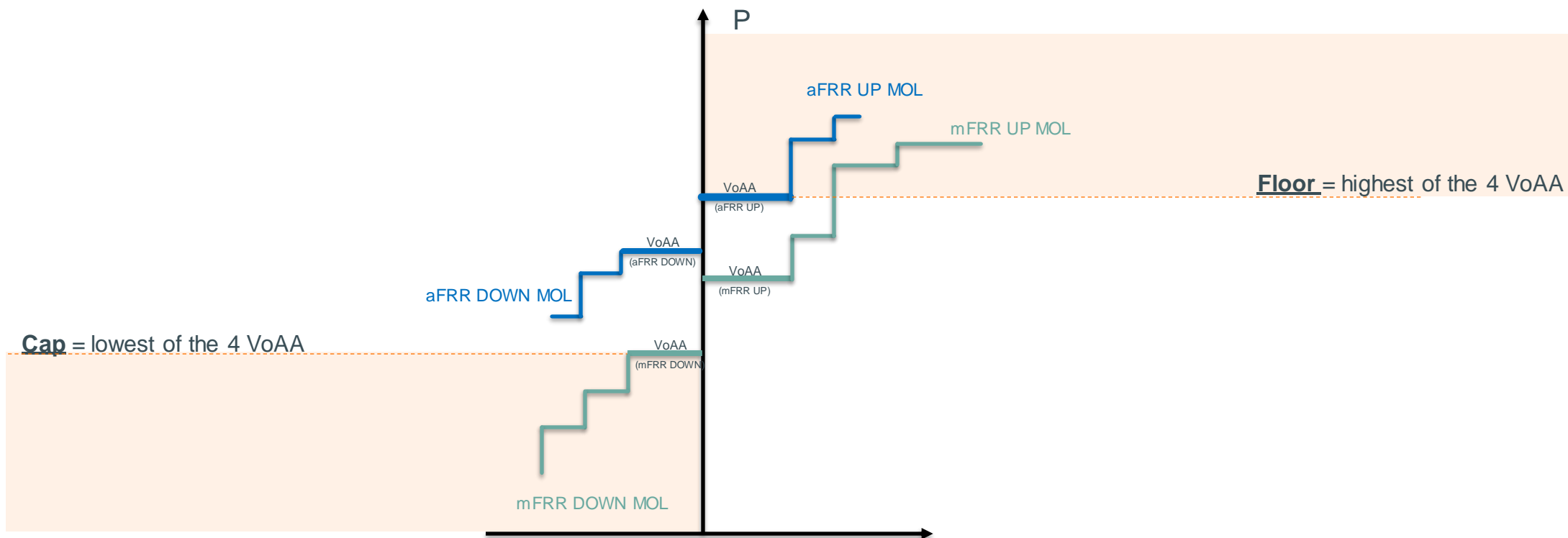
This proposal is appropriate to mitigate manipulation through « dummy-bids » (such behaviors becoming counter-productive)



## Illustration: Normal case

In general (i.e. when the first upward bids are more expensive than the first downward bids),

- the upward VoAA set the floor and
- the downward VoAA set the cap



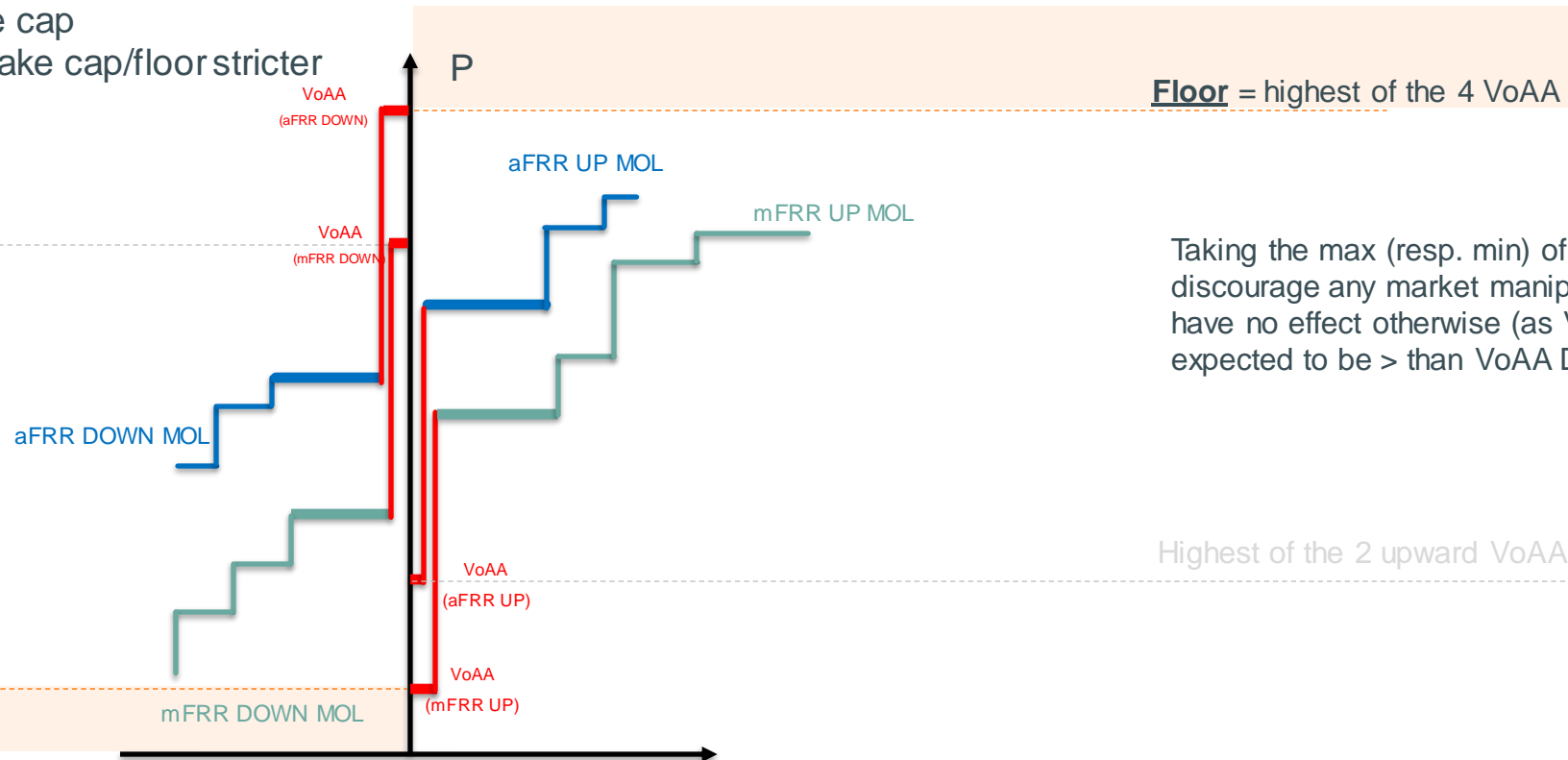
## Illustration: Upward and downward dummy bids

In case the first upward bids are lower than the first downward bids (and /or vice versa),

- the downward VoAA may set the floor and
- the upward VoAA may set the cap

This ensures that dummy bids make cap/floor stricter and not weaker

Lowest of the 2 downward VoAA



Taking the max (resp. min) of both VoAA should discourage any market manipulation while it should have no effect otherwise (as VoAA up is normally expected to be > than VoAA Down)

Highest of the 2 upward VoAA



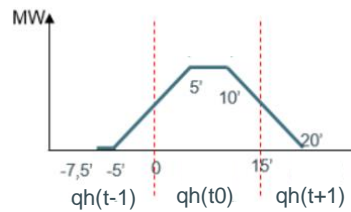
# Decomposing the formula: mFRR component

Imbalance pricing with MARI (and/or PICASSO)

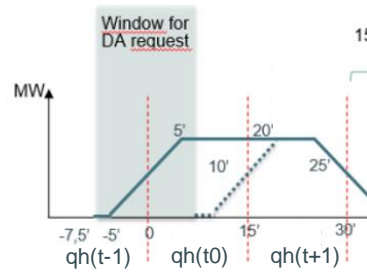
# mFRR component – important mFRR characteristics

## 1. Concept of Scheduled activation and Direct activation

### Scheduled activation



### Direct activation (DA)



If we consider a given quarter hour  $qh_{t0}$ :

- A Scheduled Activation for one quarter hour  $qh_{t0}$  is requested in  $qh_{t-1}$  at min 7,5min (“point of scheduled activation”) and refers to  $qh_{t0}$
- A Direct Activation for the same qh is requested after the point of SA (7,5min in  $qh_{t-1}$ ) and up to the next point of and refers to  $qh_{t0}$  &  $qh_{t-1}$

## 2. As a consequence, the MARI platform might calculate up to 5 different CBMP per ISP for one uncongested area\*:

|                                 | QH (t-1)            | QH (t0)            | QH (t+1) |  |  |
|---------------------------------|---------------------|--------------------|----------|--|--|
| SA requested for QH (t-1)       | SA delivery QH(t-1) |                    |          |  |  |
| DA - POS requested for QH (t-1) | DA delivery QH(t-1) |                    |          | => 1 Clearing price for positive Direct Activation started in previous quarter-hour  | Clearing_price <sub>SA_Qh(t0)</sub><br>Clearing_price <sub>DA_positive_Qh(t0)_Qh(t0)</sub>   |
| DA - NEG requested for QH (t-1) | DA delivery QH(t-1) |                    |          | => 1 Clearing price for negative Direct Activation started in previous quarter-hour  | Clearing_price <sub>DA_negative_Qh(t0)_Qh(t0)</sub>  |
| SA requested for QH (t0)        |                     | SA delivery QH(t0) |          | => 1 Clearing price for Scheduled Activation (POS + NEG)                             | Clearing price for Scheduled Activation (both positive and negative direction) requested for and delivered in Qh(t0)<br>= max [ Clearing_price <sub>SA_Qh(t0)</sub> ; Marginal_bid_price <sub>DA_positive_Qh(t0)</sub> ] |
| DA - POS requested for QH (t0)  |                     | DA delivery QH(t0) |          | => 1 Clearing price for positive Direct Activation started in concerned quarter-hour | Clearing_price <sub>DA_positive_Qh(t0)_Qh(t-1)</sub>   |
| DA - NEG requested for QH (t0)  |                     | DA delivery QH(t0) |          | => 1 Clearing price for negative Direct Activation started in concerned quarter-hour | Clearing_price <sub>DA_negative_Qh(t0)_Qh(t-1)</sub>   |

Up to 5 different clearing prices for QH(t0)

Theoretical situation where Elia has requested on MARI:

for  $qh_{t0}$

- 1 SA and
- 1 DA up & 1 DA down

+  
for previous quarter hour  $qh_{t-1}$

- 1 DA up & 1 DA down

## 3. Optimization of SA foresees netting but optimization of DA is performed per direction (→ no netting opportunity in DA)

\*: See [Design note mFRR balancing service – ELIA – 7 march 2022](#) for more information

## mFRR component

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

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

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

Such that:

- In case there are no mFRR activation  
=> no mFRR component
- In case there is only one activation price per QH  
=> use this price as mFRR component
- In case a DA in previous ISP precedes a SA in the current ISP  
=> use the max (resp. min) price between DA in previous ISP & SA
- In case either a DA in previous ISP or a SA in current ISP is followed by a DA in current ISP  
=> use the max (resp. min) price between all applicable CBMPs [SA; DA in previous ISP; DA in current ISP]





# Decomposing the formula: Deadband

Imbalance pricing with MARI (and/or PICASSO)

# Proposed deadband

## General principles

- The BE grid is deemed to be balanced when the |SI| is smaller than 25 MW
- In such cases, the IP incentives should be as neutral as possible to signal to BRPs that they correctly did their job and that no implicit reaction is expected

## Reasoning behind the concept of deadband

- Generally speaking, IP should be reasonably predictable – especially if the situation is "as planned"
- With MARI/PICASSO, CBMPs are not necessarily correlated to the BE SI => CBMP can potentially take extreme values even though BE is balanced
- Without deadband, the IP formula is subject to a "max" function in case  $SI \leq 0$  and subject to a "min" function in case  $SI > 0$ .  
If SI oscillates close to 0, IP can then take either (potentially very) large values or (potentially very) small values despite the necessary neutral price signal
- ⇒ Dead Band smoothens discontinuities (between CAP/Floor and potentially extreme aFRR component) when SI oscillates around zero. ==> this avoids to discourage reactive balancing
- ⇒ Dead Band reduces entry barriers for RES that usually contribute to the imbalance of the system by avoiding a too punitive IP when Belgian BRPs correctly did their job
- ⇒ It smoothens non convexities introduced by aFRR when the SI is close to zero and avoids over reactions in case of high CBMP while the Belgian system is close to zero

## Proposal

- As the cap and the floor are meant to provide a neutral signals in case of negative or positive SI respectively, the proposal is to fix the deadband at the average of this cap and floor.
- $IP = (cap/floor)/2$  if  $-25 \text{ MW} < SI(QH) \leq 25 \text{ MW}$



# Graphical examples

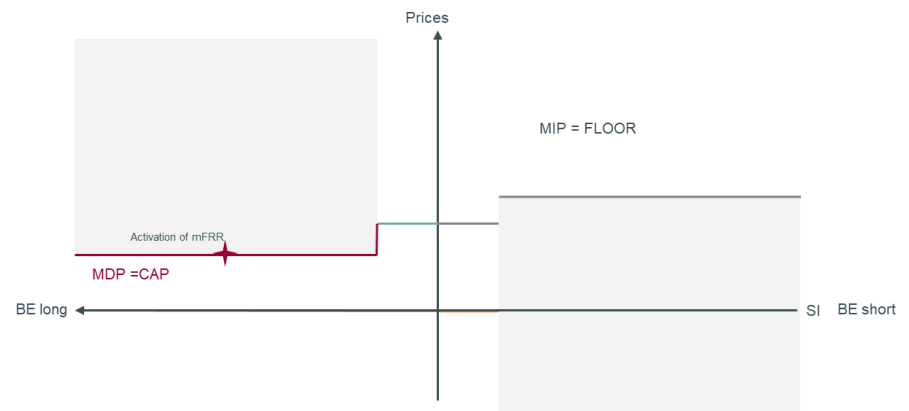
## Summary

# IP Formula after connection to EU balancing platforms

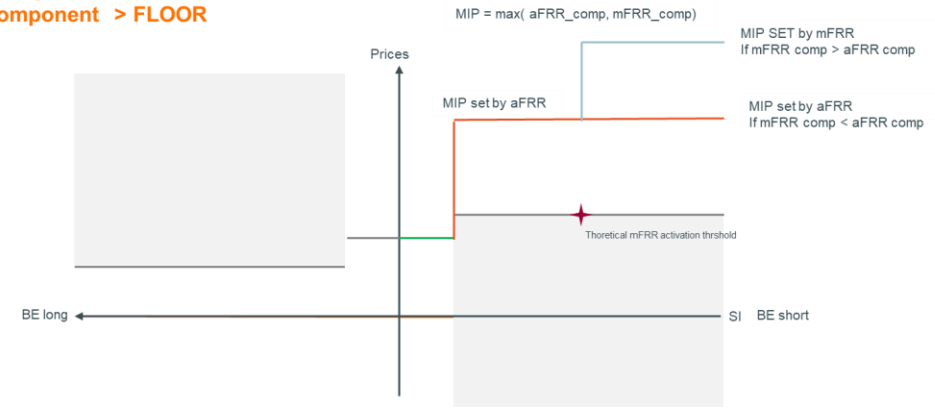


## 1) mFRR component is > than CAP

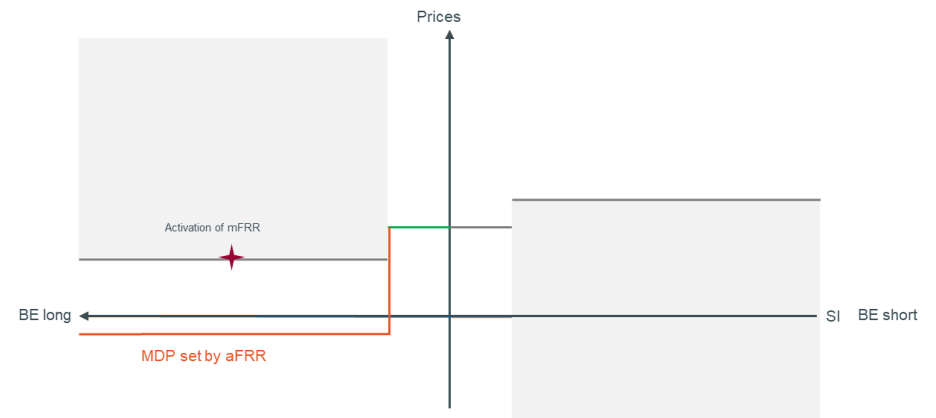
**BE SI > 0**  
 mFRR\_component > CAP  
 aFRR\_component > CAP



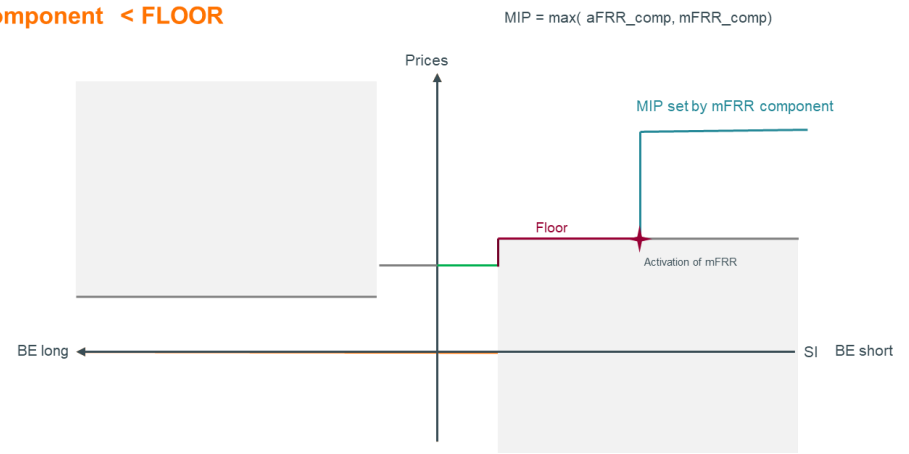
**BE SI < 0**  
 mFRR\_component > FLOOR  
 aFRR\_component > FLOOR



**BE SI > 0**  
 mFRR\_component > CAP  
 aFRR\_component < CAP



**BE SI < 0**  
 mFRR\_component > FLOOR  
 aFRR\_component < FLOOR



# IP Formula after connection to EU balancing platforms

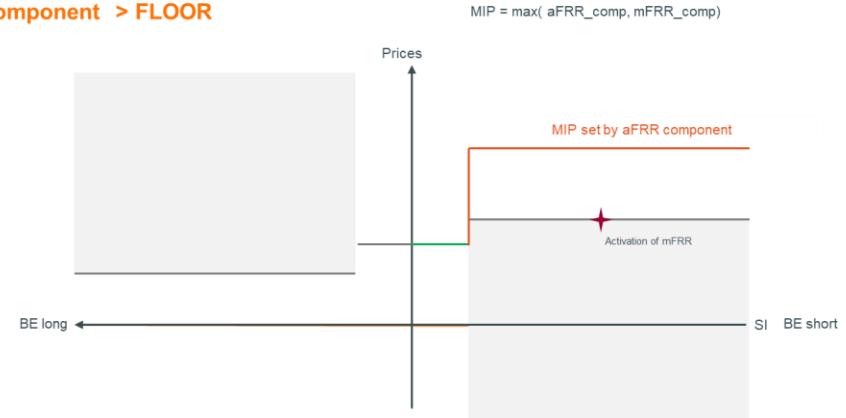
## 2) mFRR component is < than FLOOR



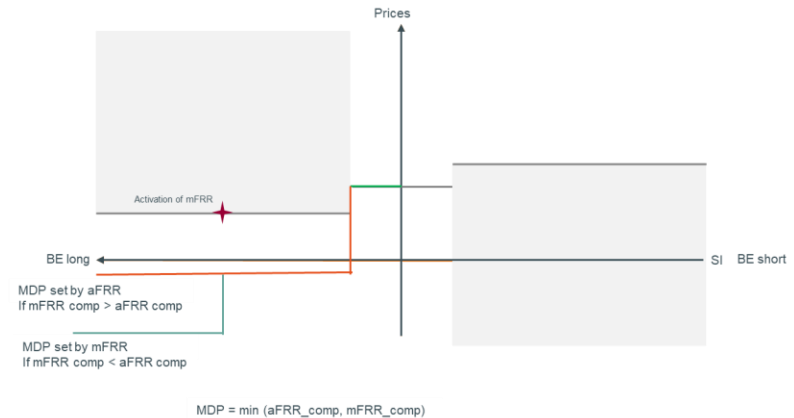
**BE SI > 0**  
 mFRR\_component < CAP  
 aFRR\_component > CAP



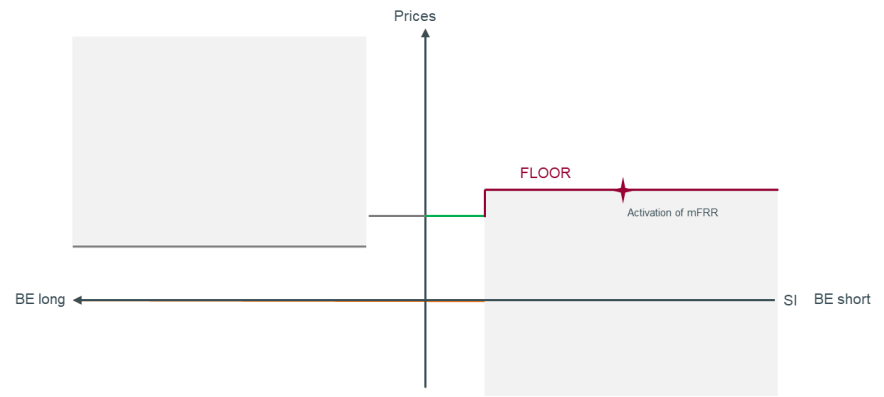
**BE SI < 0**  
 mFRR\_component < FLOOR  
 aFRR\_component > FLOOR



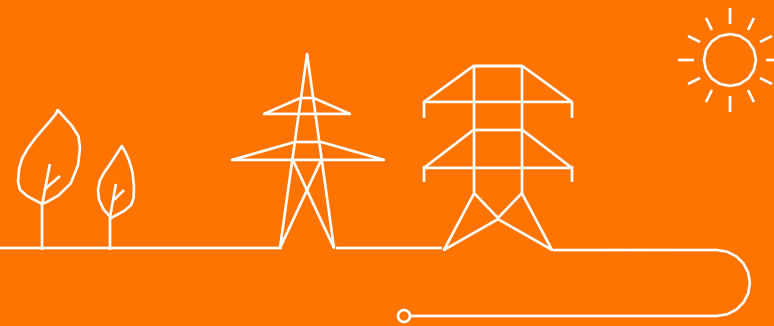
**BE SI > 0**  
 mFRR\_component < CAP  
 aFRR\_component < CAP



**BE SI < 0**  
 mFRR\_component < FLOOR  
 aFRR\_component < FLOOR



# Incompressibility



## Agenda

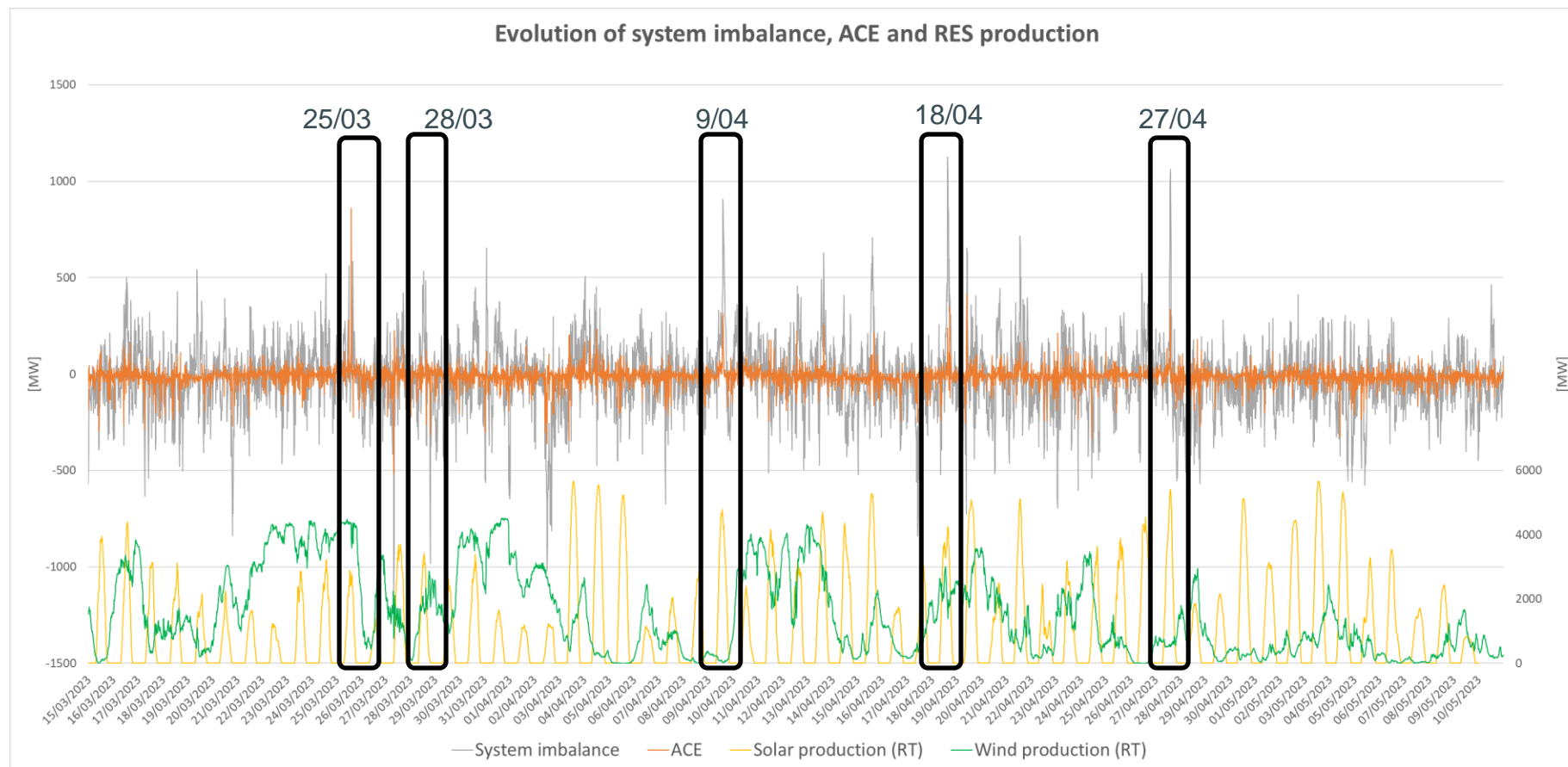
- **Looking back:** a few interesting case studies occurred over the last few weeks
- **Looking forward:** incompressibility outlook for the upcoming months



# Looking Back



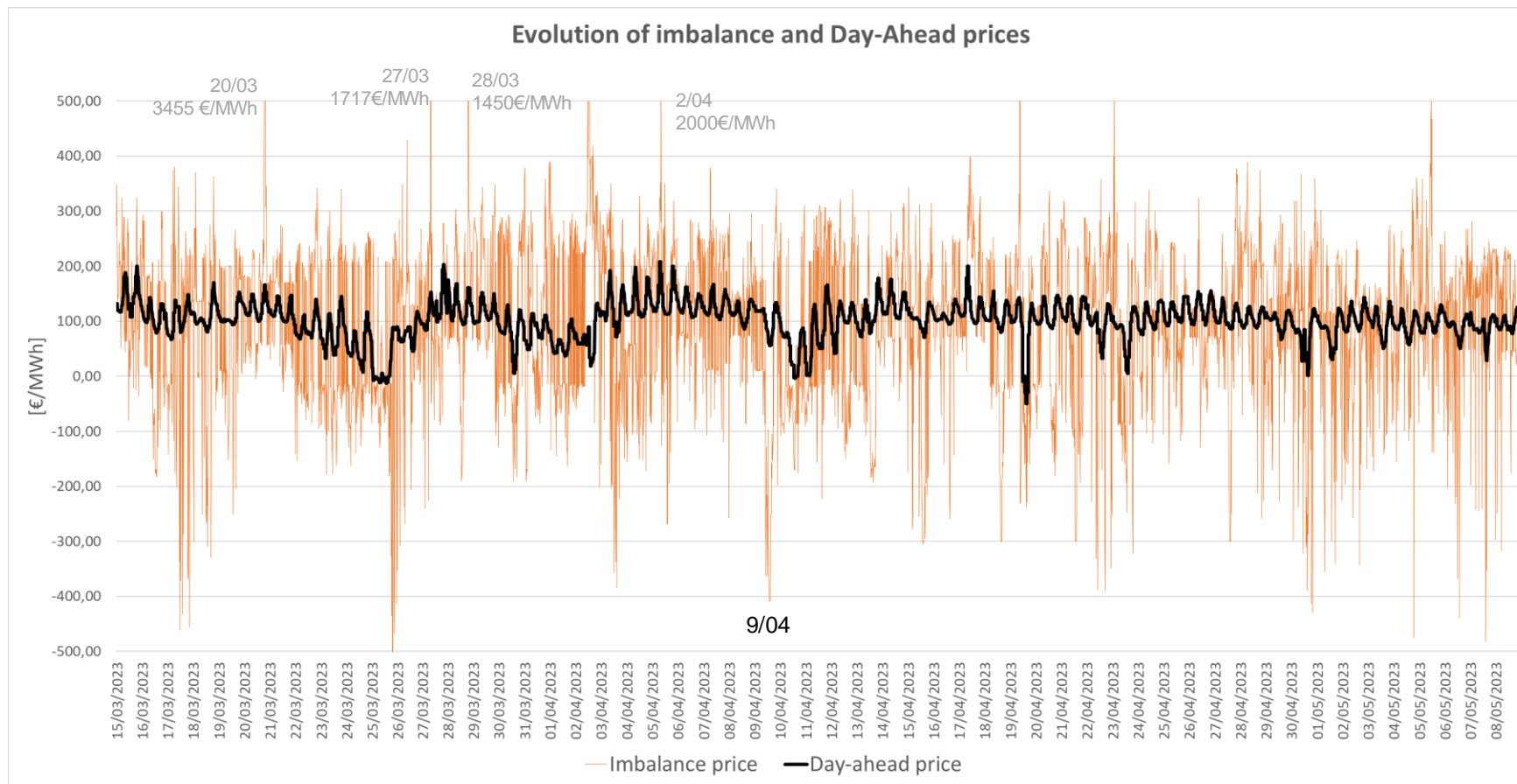
# Looking back: SI, ACE and RES infeed



→ Since spring, several cases of the system being in a structural long position (SI > 0) have been occurring



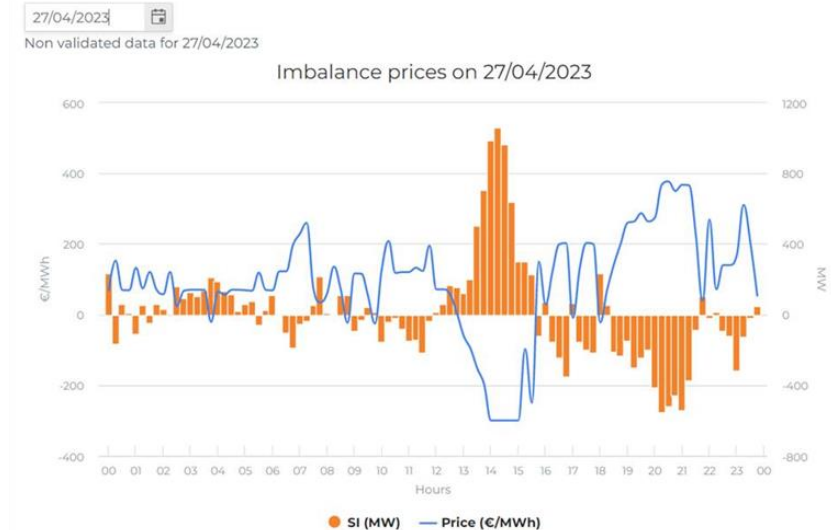
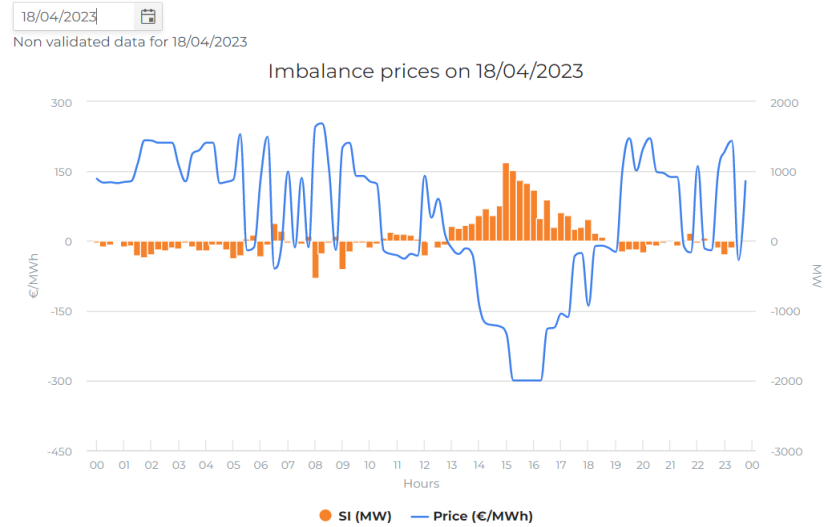
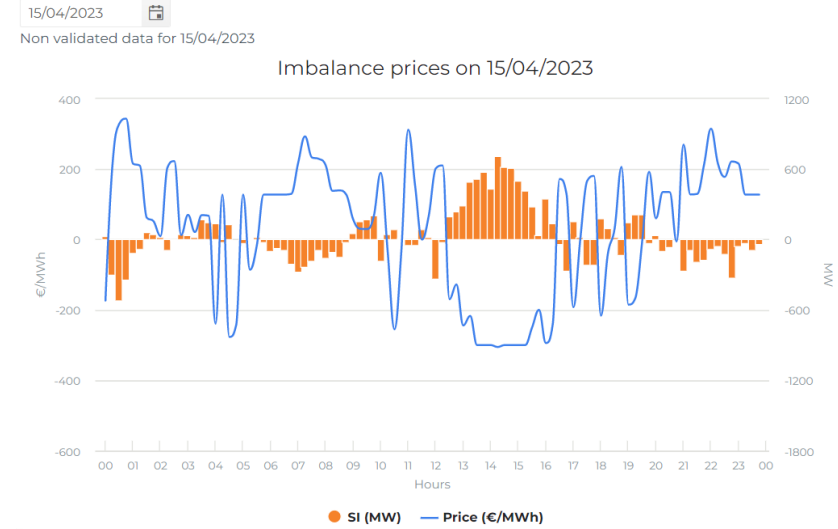
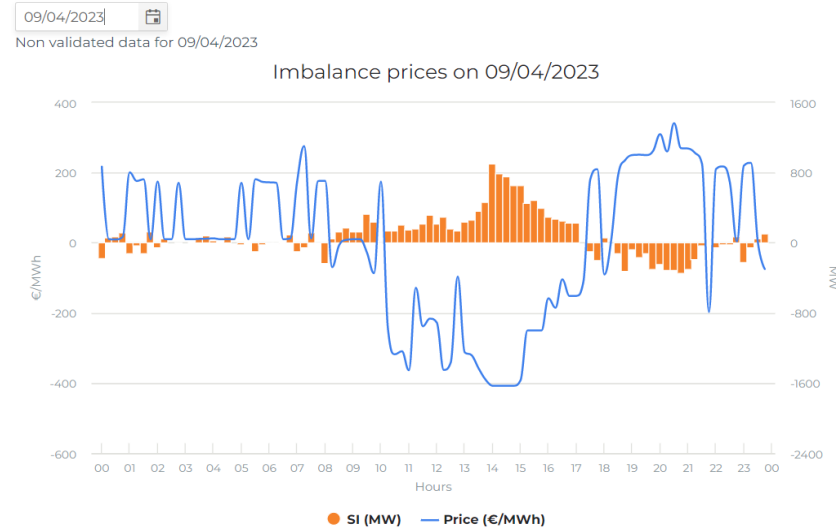
# Looking back: DA and Imbalance prices



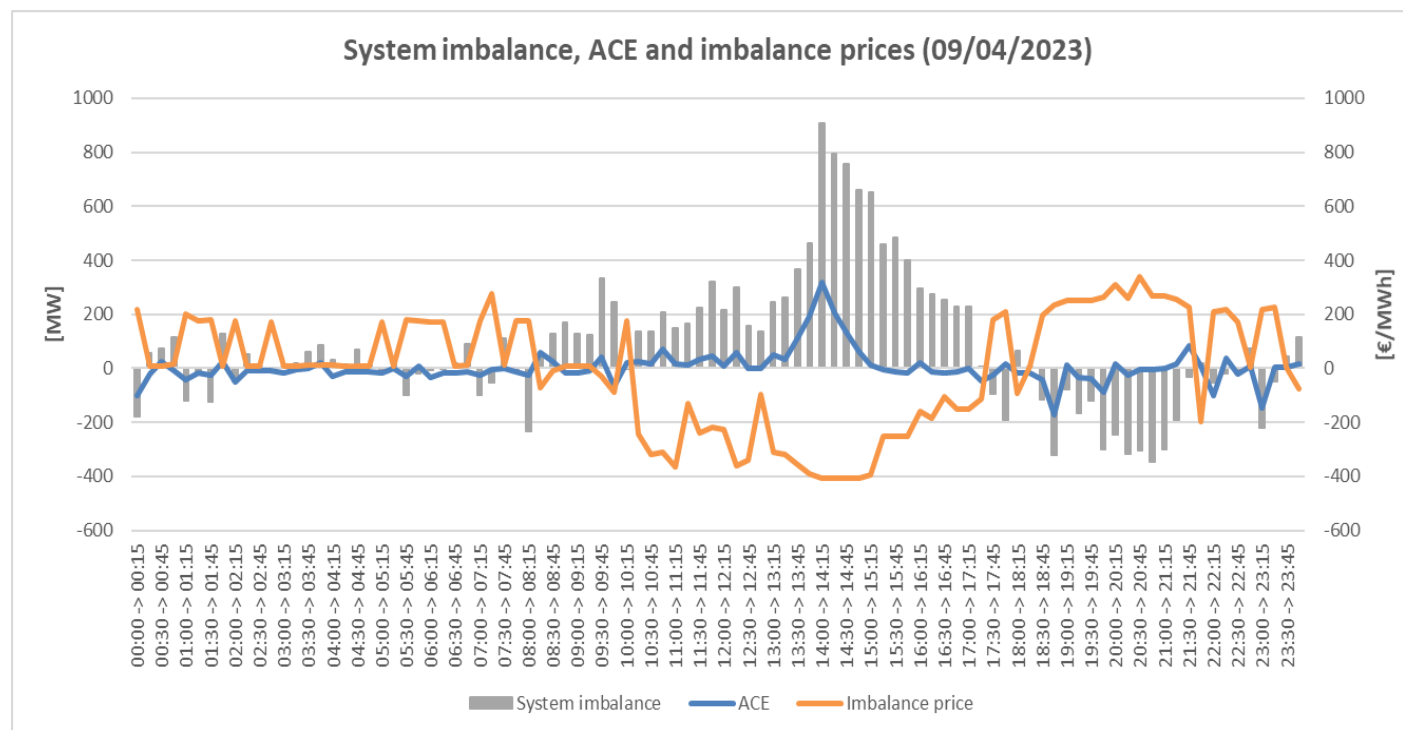
→ The structural long positions have regularly resulted in periods of sustained negative imbalance prices. DA-prices were only exceptionally negative.



# Looking back: a few examples indicating incompressibility



# Case 9/4: Real-time system indicators showing significant incompressibility

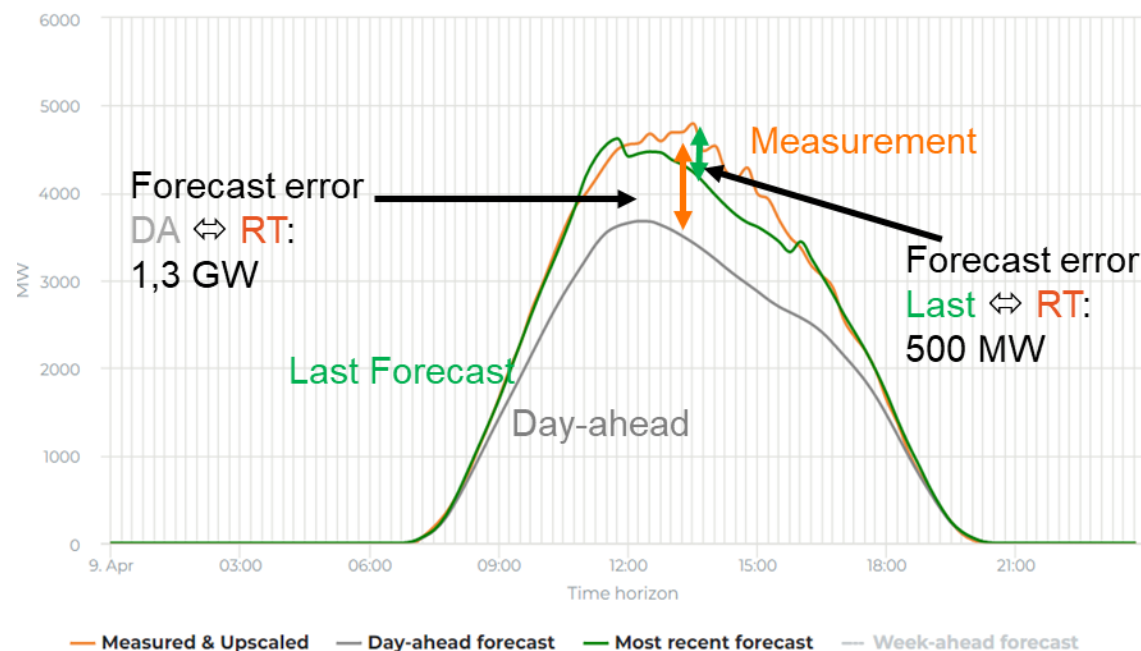


- **System imbalance (SI)** was long most of daylight hours (08:00 → 17.00)
- Peak at almost 1GW in the afternoon.
- Moreover, **ACE** peaks at 350MW in the afternoon during some QHs
- **Imbalance price** down to -400€/MWh during several QHs

**9/4 exhibits a significant case of incompressibility**

## Case 9/4: Day-Ahead solar forecast error as key driver

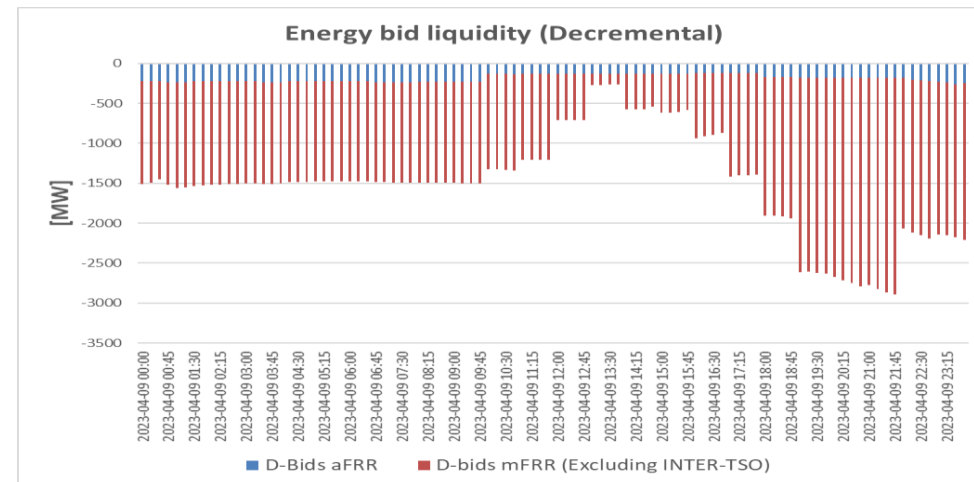
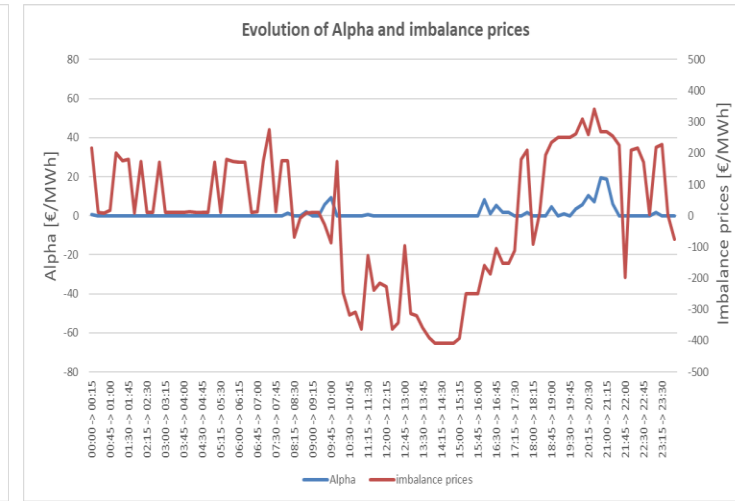
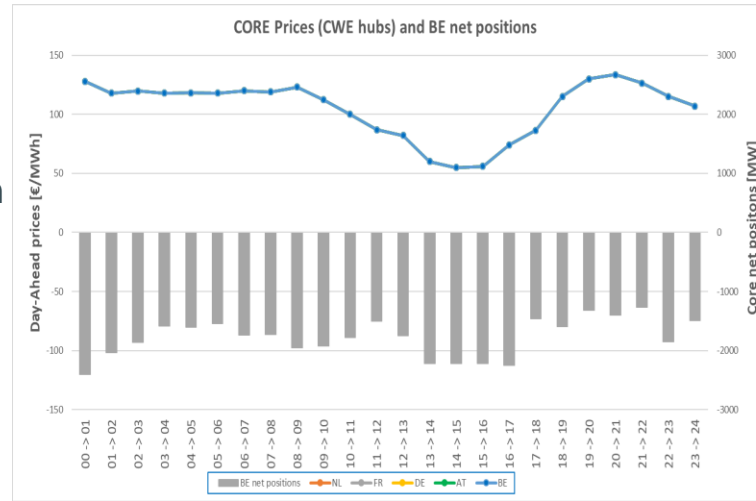
### Solar forecast : From DA → real-time



- DA Solar forecast has been the **key driver** of the system imbalance
- Forecast error of more than 1,3GW in DA compared to the measurement.
- Even the most recent forecast (=RT-1h) shows an underestimation of 500MW.
- **Wind forecast is not** a root cause of the system imbalance on this day. Hardly any wind and limited error (also limiting downwards regulation potential from wind)
- Hardly any **large gas units** were running in the afternoon. **Nuclear** infeed at about 3,5 GW.

# Case 9/4: also neighbouring countries were confronted with a similar situation

- **Day-Ahead Market Coupling** resulted in Belgium being in import while neighbouring countries were in export.
- In real-time the case was nevertheless further exacerbated by the fact that also in neighbouring countries a similar situation occurred.
- On the **intraday market and in real-time** it appeared difficult to evacuate the surplus volumes.
- In line with how it has been designed now, the alpha component was about zero during the situation, hence not providing increased incentives via real-time price signals.

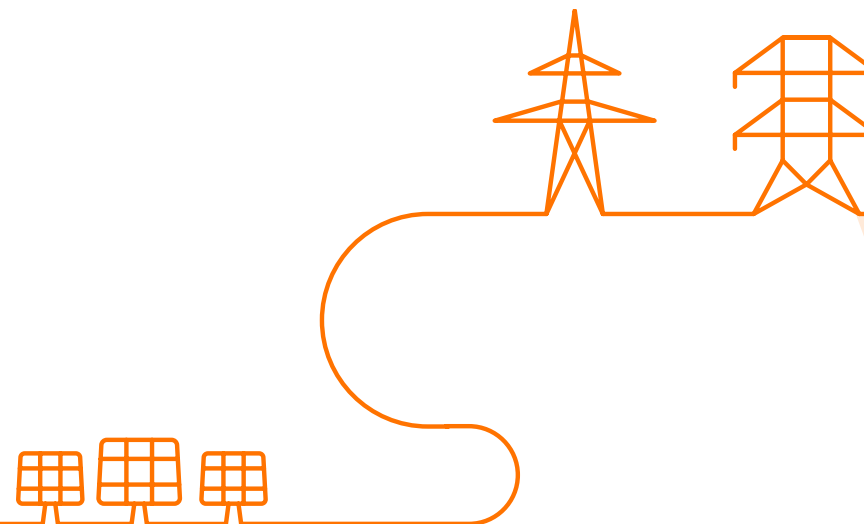
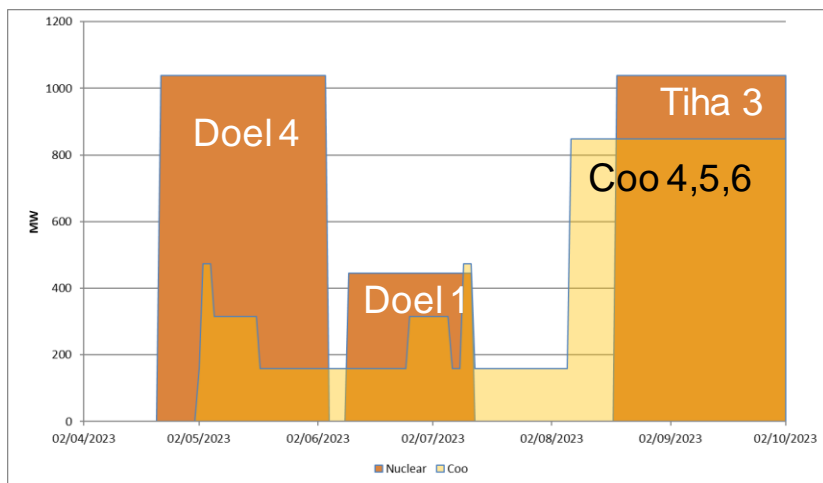


**Looking forward**

# Goal

Assessment of **export needs/incompressibility** issues during the next months (May – September 2023)

- Full revision of Half Coo (4,5,6) from 07/08 until winter
- Nuclear: high availability between mid July and mid August (Doel 3 and Tihange 2 phase-out)
- Lower offtake during the summer months
- Increasing installed capacity of renewables





# Hypothesis

|                    | P50                      | P75           |
|--------------------|--------------------------|---------------|
| Nuclear            | Revision                 |               |
| Solar              | P50 (profile)            | P75 (profile) |
| Wind               | P50 (fix)                | P75 (fix)     |
| RoR                | P50 (fix)                |               |
| CHP & bio non-CIPU | P50 (fix)                |               |
| CHP & bio CIPU     | Revision & forced outage |               |
| Reserves           | 2 running units @ Pmin   |               |
| Demand             | P50 (profile)            |               |

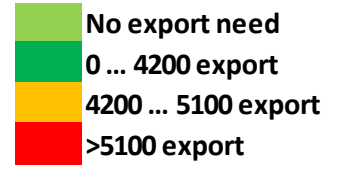
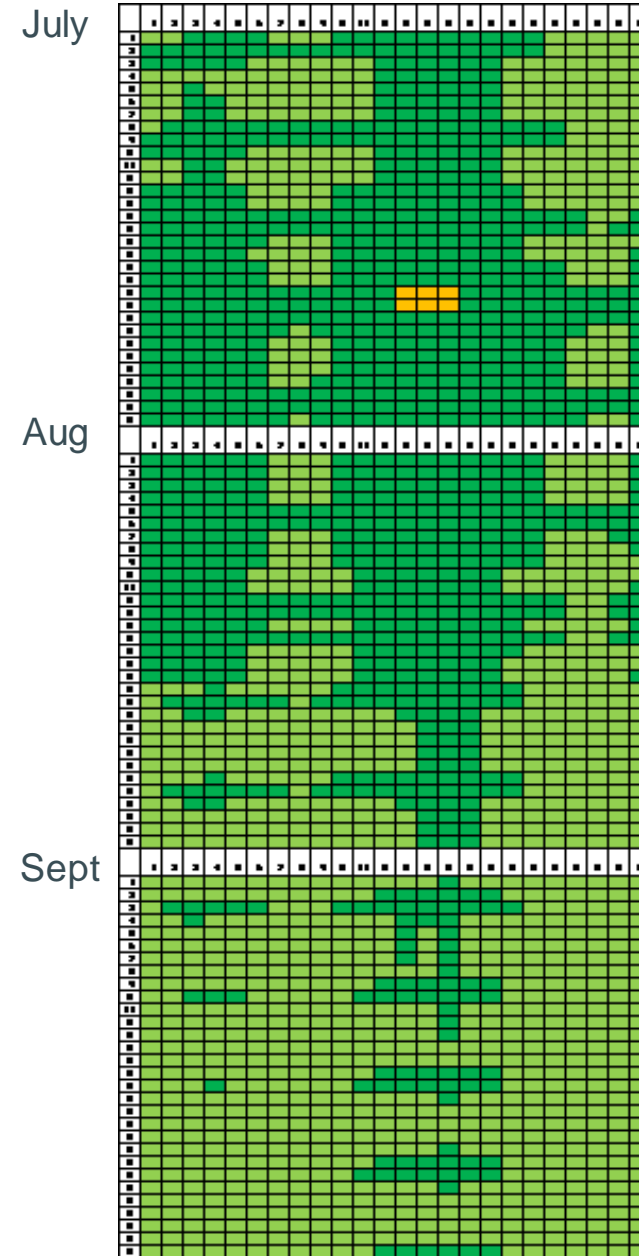
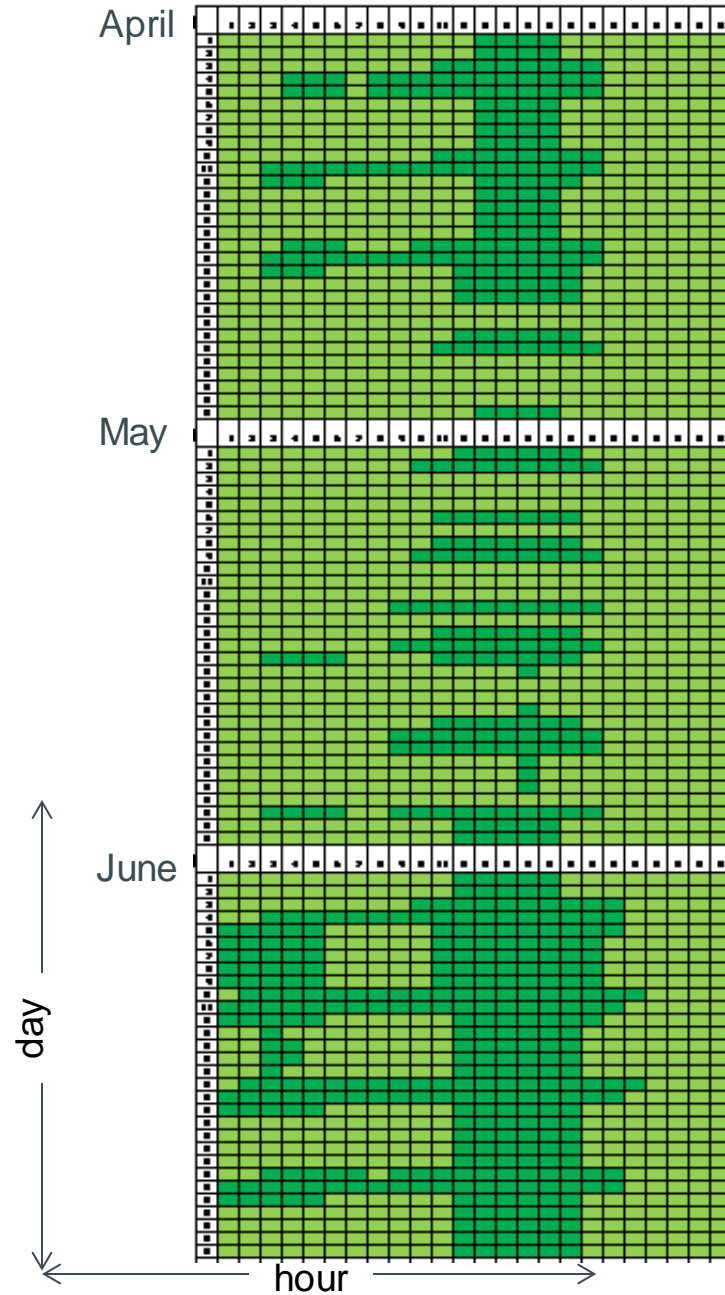
Normal day

Sunny and windy day

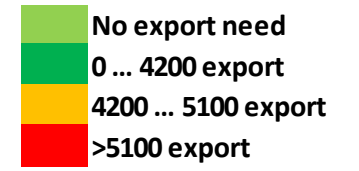
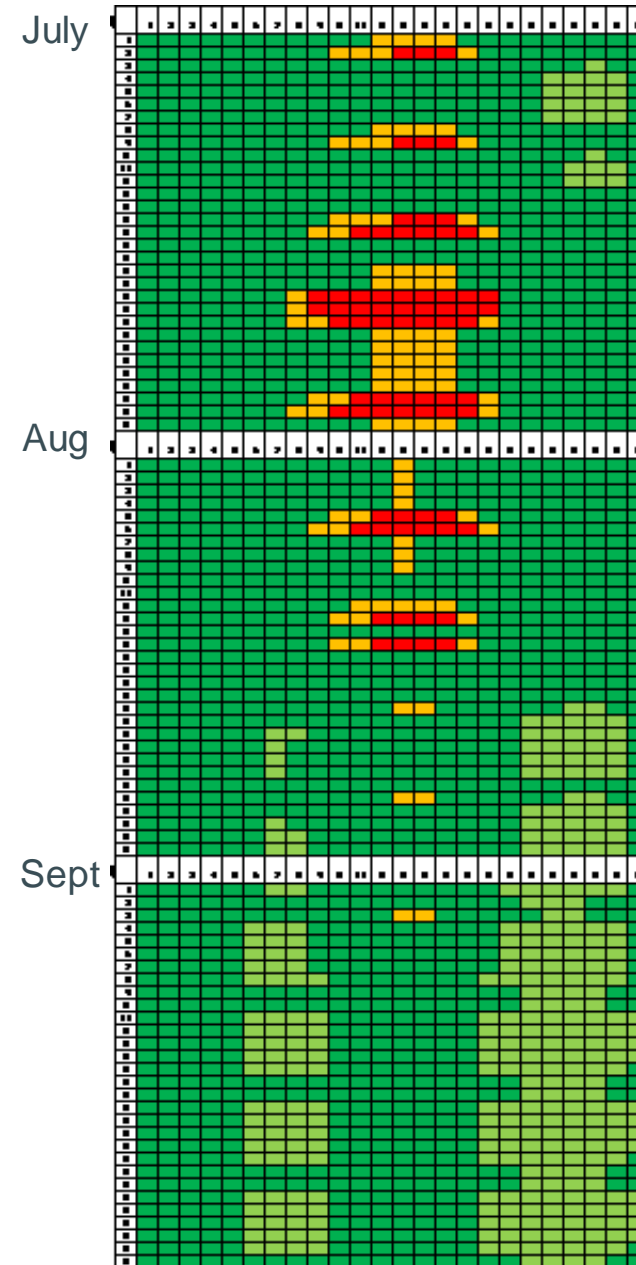
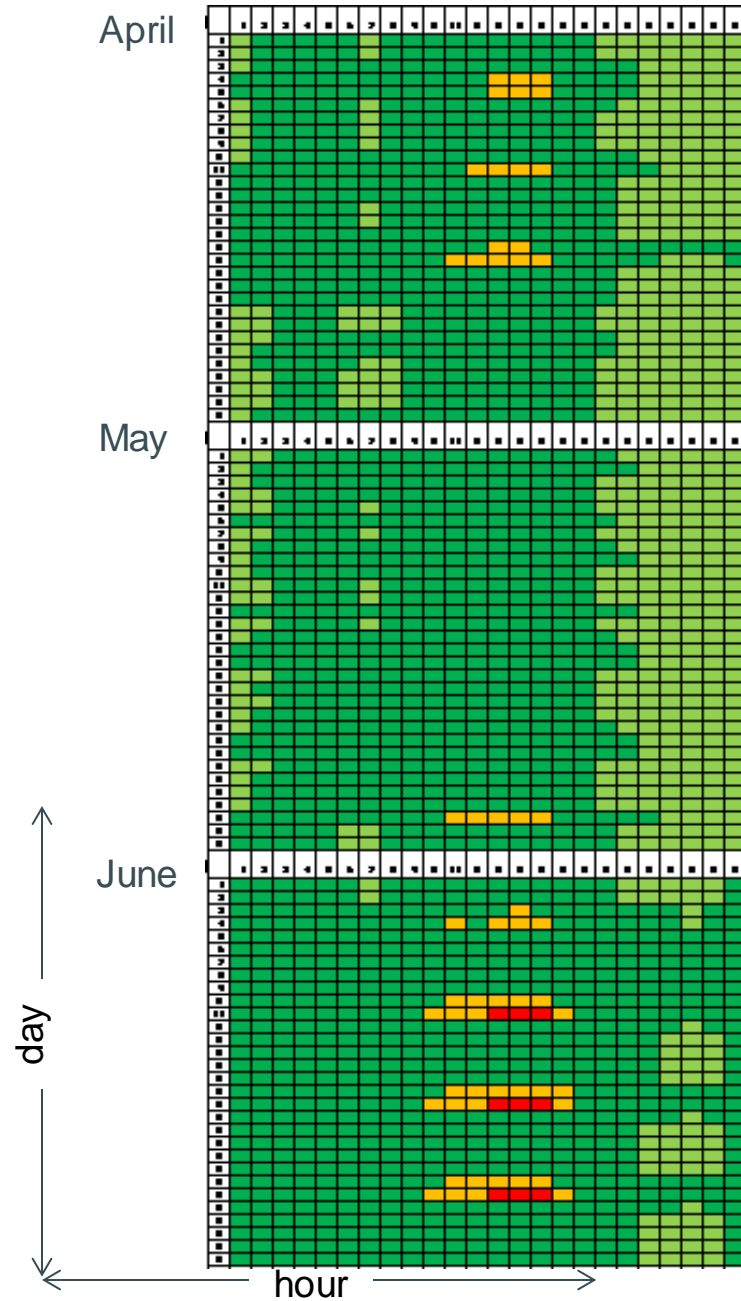
**Pumped storage and export are not taken into account in the assessment and will be used in the post-processing of the results!**



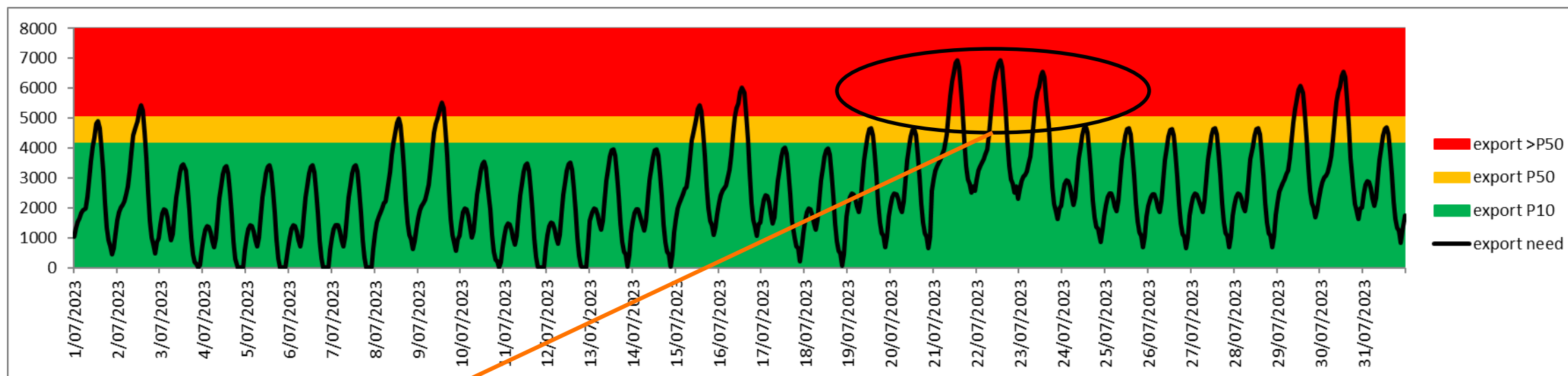
# P50



# P75



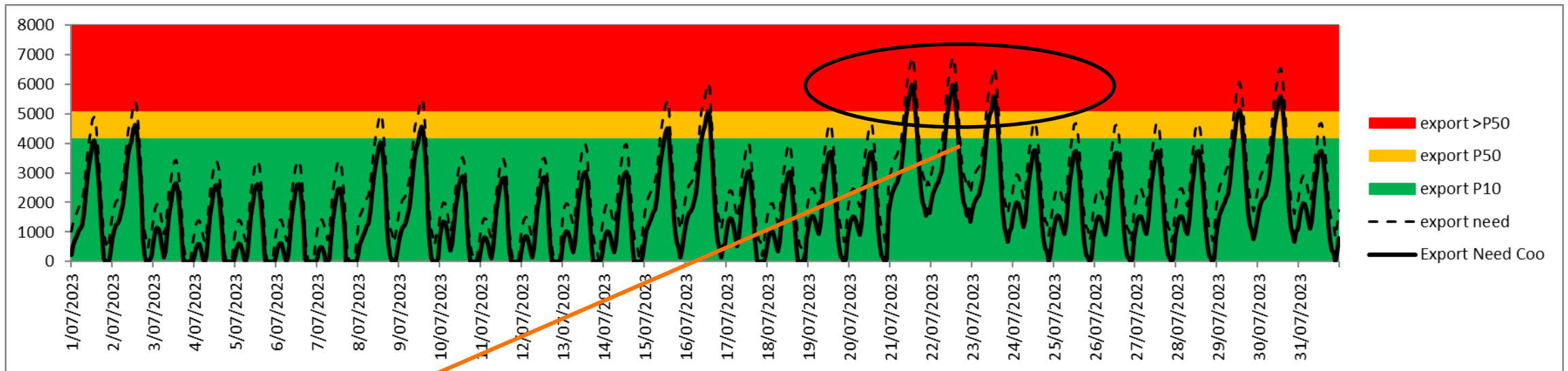
## P75 Focus on July: export needs



**High number of increased export need (all weekends)**

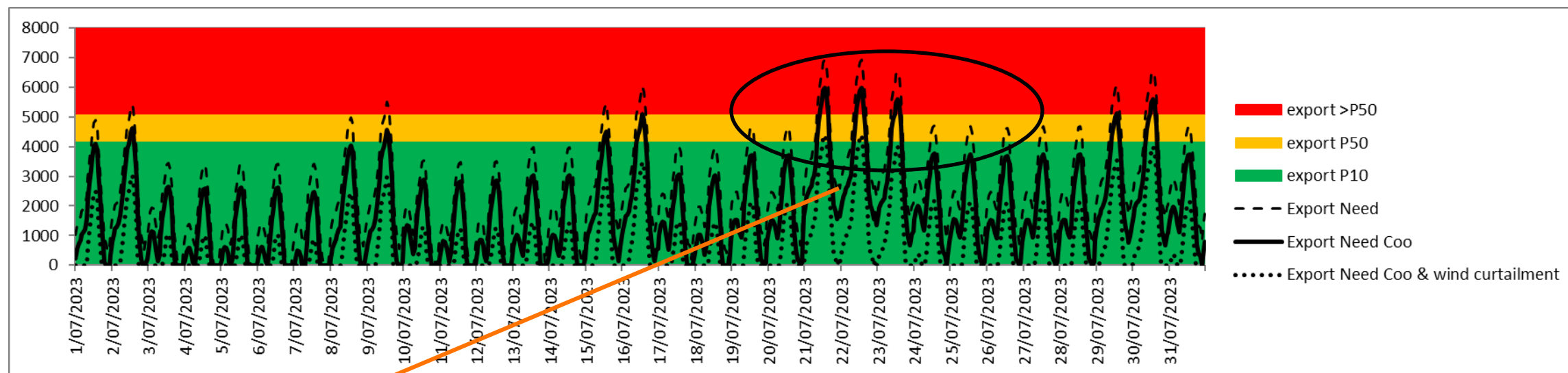
**Structural dependent of export, up to very high levels (6930MW)**

## P75 Focus on July – With Coo pumping (considering revisions – 945MW pumping capacity available)



**Max value = 6000 MW : In case not enough export possibilities nuclear modulation/wind curtailment/CHP reduction on top of export will be needed!**

## P75 Focus on July – With Coo pumping (considering revisions – 945MW pumping capacity available) and wind offshore curtailment



**Max value = 4400 MW : In case of underestimation of solar forecast, difficult situation to handle in intraday since limited short term measures available**

**→ Situation of 9/4**

## Conclusion (1)

- Main **drivers** for incompressibility: reduced load (weekend, holiday) in combination with increased wind & solar production, low revision on nuclear and revision of Coo
- Phase-out of 2 nuclear units meanwhile compensated (on sunny and windy days) by increase in Solar and Wind capacity

|               | 2021 | 2023 |
|---------------|------|------|
| Solar         | 5500 | 7400 |
| Wind Onshore  | 2870 | 3172 |
| Wind Offshore | 2253 | 2253 |

→ Result: same ‘export need’-values obtained as in the 2021 study

→ **June – August’23: increased risk of incompressibility, export may not be sufficient for 1 out of 4 weekends**

## Conclusion (2)

### ➤ Shorter term: combination of

- Importance of Day-Ahead forecast and BRPs to closely follow-up to avoid imbalance
- Elia will monitor and when needed publish balancing warning for downwards flexibility
- Optimal use of the means today available in the system (incl. wind curtailment, nuclear modulation, CHP reduction)
- Imbalance pricing will continue to provide price signals, with negative prices likely to occur regularly

+ Elia will further explore potential ways to foster flexibility from capacities in the system at times of incompressibility, incl. looking into how to enable (large(r)) PV installations to participate in downwards flexibility

### ➤ Later years: CCMD, a structural solution for the new paradigm

While more and more renewables enter the system, the further unlocking of flexibility provides an adequate solution:

- Improved market design, e.g. improved real-time price signals to steer demand (“load follows generation”)
- Same price signals also provide incentives to steer decentral production (e.g. PV, CHP, batteries...) in view of system needs

➔ Cf. Elia’s CCMD-related initiatives

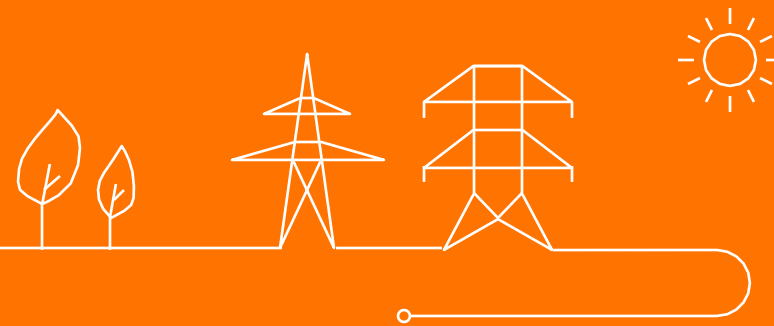


Thank you.



# Winter Plan 23-24

Balancing capacity increase and bidding obligation



## Context

- Towards the Winter 2022 – 23, Elia proposed a measure to deal with the imminent risk of unavailability of its reserve sharing agreement during tight market conditions in Western-Europe. In such cases, Elia cannot guarantee to have the balancing means available to cover its dimensioning incident.
- **A dynamic increase of the mFRR balancing capacity to be procured with 250 MW (following the reduction of the sharing contribution to 0 MW during a Critical Grid Situation in neighboring countries).**
  - *This measure was approved by CREG on 22.12.2022 for Winter 2022-23*
  - *Elia implemented the measure until 31.03.2023*
  - *The measure has never been triggered*
- **A bidding obligation for large coordinable units to offer mFRR during the first gate of the day-ahead balancing capacity tender (not applied during last winter)**
  - *The measure has been introduced by the Government as a Royal Decree based on Article 32 of the Electricity Law but Raad Van State pointed at concerns in terms of competences allocated to CREG by the European legislation.*

*These measures were developed on short-term for Winter 2022-23. Elia proposes to introduce a more robust, general framework as from November 1, 2023.*

## **Proposal balancing capacity increase (~unavailable reserve sharing)**

- Re-introduce the measure in the « LFC Means » as a structural measure (instead of one Winter period)
  
- Maintain general principles as approved by CREG on 22.12.2022
  - Based on formal regional adequacy assessment processes conducted by the regional coordination centers (Critical Grid Situation)
  - Communicated by Elia as from D-3 until 7 AM D-1 (update of the action is possible following new information)
  - For one or more CCTUs of day D related to the periods identified as being at risk.
  
- Re-analyse the possibility to refine the « all or nothing » approach based on available information following remarks of stakeholders and regulator.
  
- Introduced as a first step in Elia's strategy to implement dynamic calculation of the contribution of cross-border flexibility

## Bidding obligation

- Elia proposes to introduce the bidding obligation in the regulatory framework (T&C BSP mFRR and/or LFC block operational agreement)
- Elia proposes to target potential liquidity problems in the mFRR balancing capacity markets during tight market conditions

### Tight market conditions in Belgium (in scope)

**What?** Measure for periods with expected liquidity problems in the mFRR balancing capacity market during tight market conditions in Belgium with a risk that market players offer insufficient capacity to the balancing capacity auction

**Why?** Even in an adequate system, it is currently not prevented that capacity to cover balancing needs is withheld to be sold on EU energy markets\*.

**Trigger?** To be based on forecasted energy prices or generation margins (e.g. expectation of exceeding certain threshold)

→ Volumes not contracted in the mFRR first gate auction and sold in the day-ahead energy market are not available for the mFRR second gate

*\*A situation with increased need for balancing capacity (due to limited availability of reserve sharing) will occur in this case when tight market conditions are expected.*

### Other (out of scope)

**What:** Liquidity problems arise when market participants do not offer available capacity in auctions for balancing capacity, even when it is not certain that the capacity is needed in the EU energy market.

**Why?** Prediction errors by market players,...

→ Liquidity problem this case should be covered by the 2<sup>nd</sup> gate auction after the day-ahead market

→ Bidding obligation for mFRR and exceptional balancing measures foresee possibility to provide sufficient balancing means



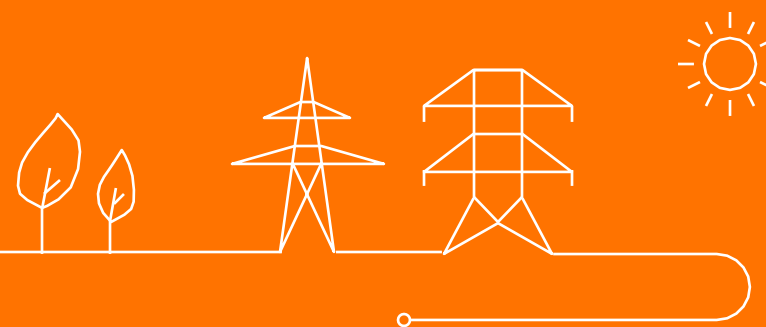
## Complementary to ongoing initiatives

- Elia has several ongoing initiatives to increase liquidity (and competition) to manage procurement cost, including during tight market conditions.
  
- 1. *Elia already opened balancing capacity products for all technologies on all voltage levels and has launched several initiatives to encourage BSPs to bid their capacity in the mFRR balancing capacity auctions*
  
- 2. *CCMD Design for developing a market model based on individual perimeter correction (at access point or behind) allowing smaller BSPs to enter the market more rapidly than with existing ToE/Opt-out models (end-2023 for TSO grid users)*
  
- 3. *LV Market model to open up the aFRR and mFRR markets segments to LV assets*
  - *aFRR fast track for 2023 (DSO consultation ongoing)*
  - *mFRR test in 2023, and full implementation in 2024*

*These existing initiatives should help to avoid liquidity problems on long-term but are deemed insufficient to secure the system on short term, i.e. upcoming Winter(s)*



# AOB – Public Consultation aFRR LV



## Opening aFRR on Low Voltage

ELIA, in cooperation with DSO's, intends to **open aFRR on Low Voltage** in **early Q2 2023**

### Scope for opening on low voltage:

- Current BSP contract aFRR remains valid
- Current FSP-DSO contract remains valid, at exception of Annex 1 which stipulates that only DP connected above 1kV can participate
- Current processes for onboarding and pool management remain unchanged

Discussion with regulators is ongoing with respect to regulatory process and timing

The **conditions for participation** will be presented in detail during the **next WG Balancing**.

For any questions on the topic you can contact [arno.motte@elia.be](mailto:arno.motte@elia.be)



## Framework for participation to aFRR LV

Participation to aFRR LV will be possible in the following framework:

- Digital meter with SMR3 required (\*)
- NFS applicable while CCC not required
- Only one DP per accesspoint
- Best effort principle applied for onboarding of Delivery Points by DSO
- No changes on measurement accuracy requirements

More details can be found on [Synerggrid](#)

(\*) unless not yet supported by the DSO or specified otherwise by regional legislation, in which case only a digital meter is required



## Opening aFRR on Low Voltage

Framework needs to be implemented in:

- FSP-DSO contract
- C8/01
- Marktguids Flexibiliteit

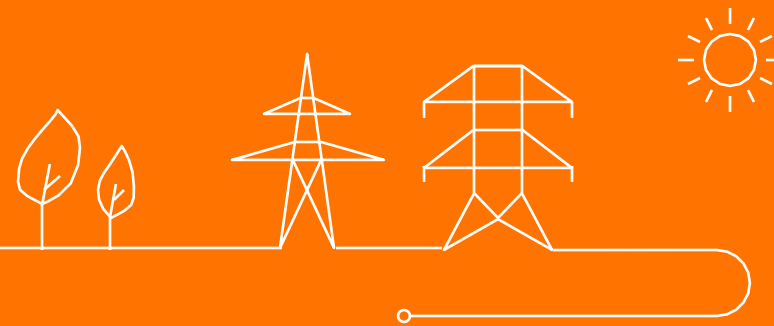
[Public consultation](#) is running from 21/4/23 until 2/6/23 on Synergrid.



Due to public consultation, go-live of **aFRR LV** postponed to **Q3 2023**

# AOB – Next WG Balancing

Loup Vanderlinden



## Next WG Balancing

- WG Balancing 29/06/2023 14:00 – 18:00
- WG Balancing 27/09/2023 09:00 – 13:00
- WG Balancing 14/11/2023 14:00 – 18:00

