

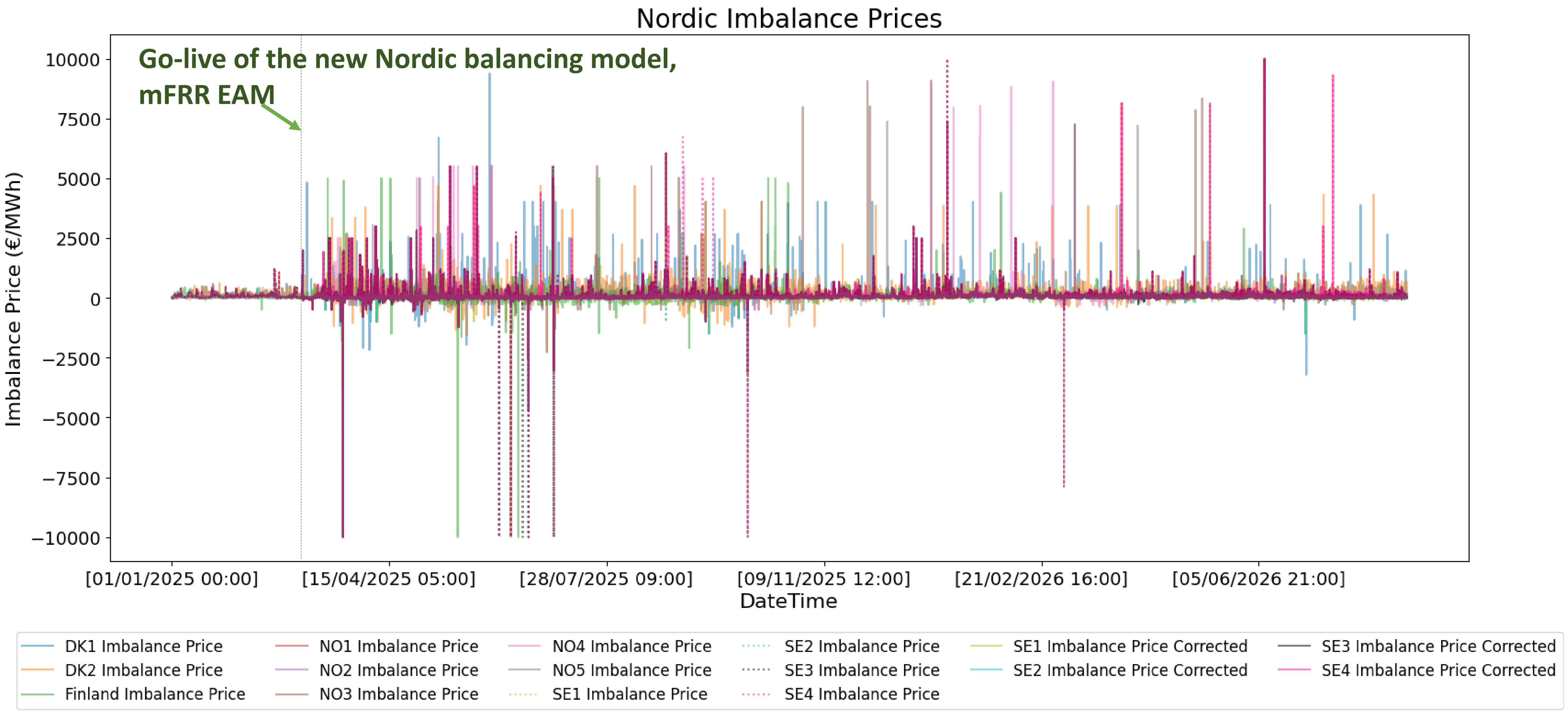
Understanding Balancing Markets: 2.0



Priyanka Shinde, Ph.D.
Nordic Market Expert
Montel

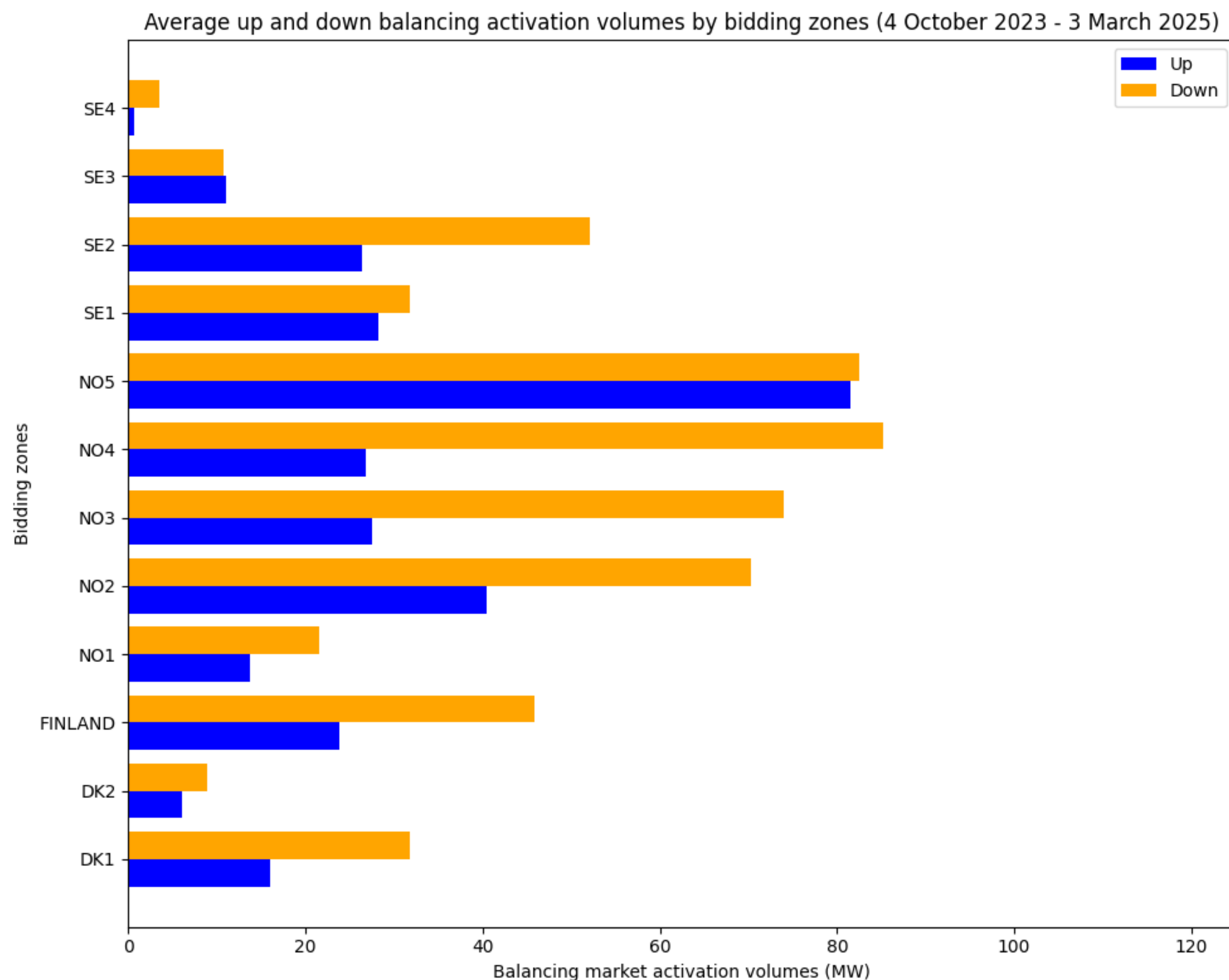
20 August 2026

Imbalance price spikes since the new market change

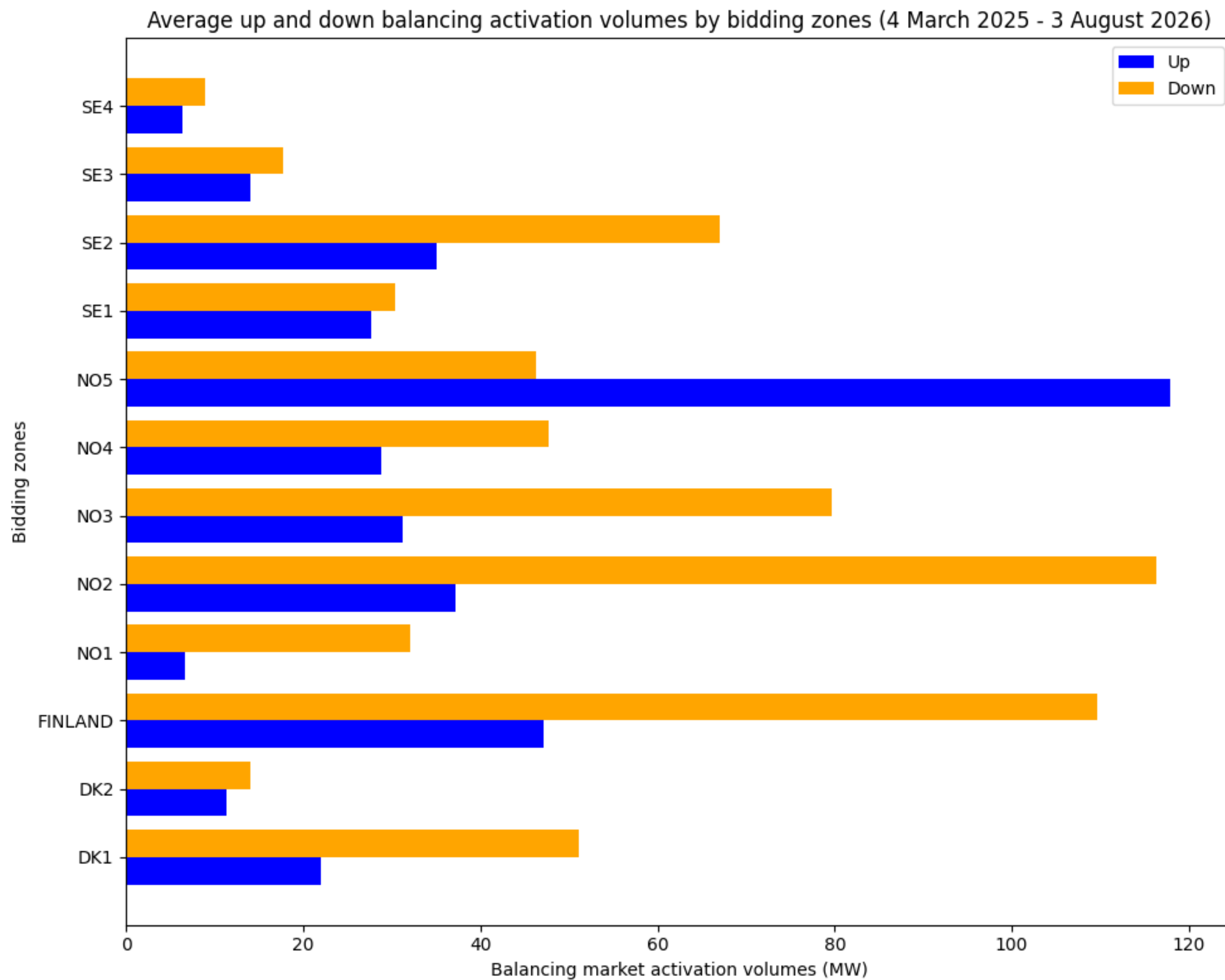


Increase in regulation volume activations

Before the change



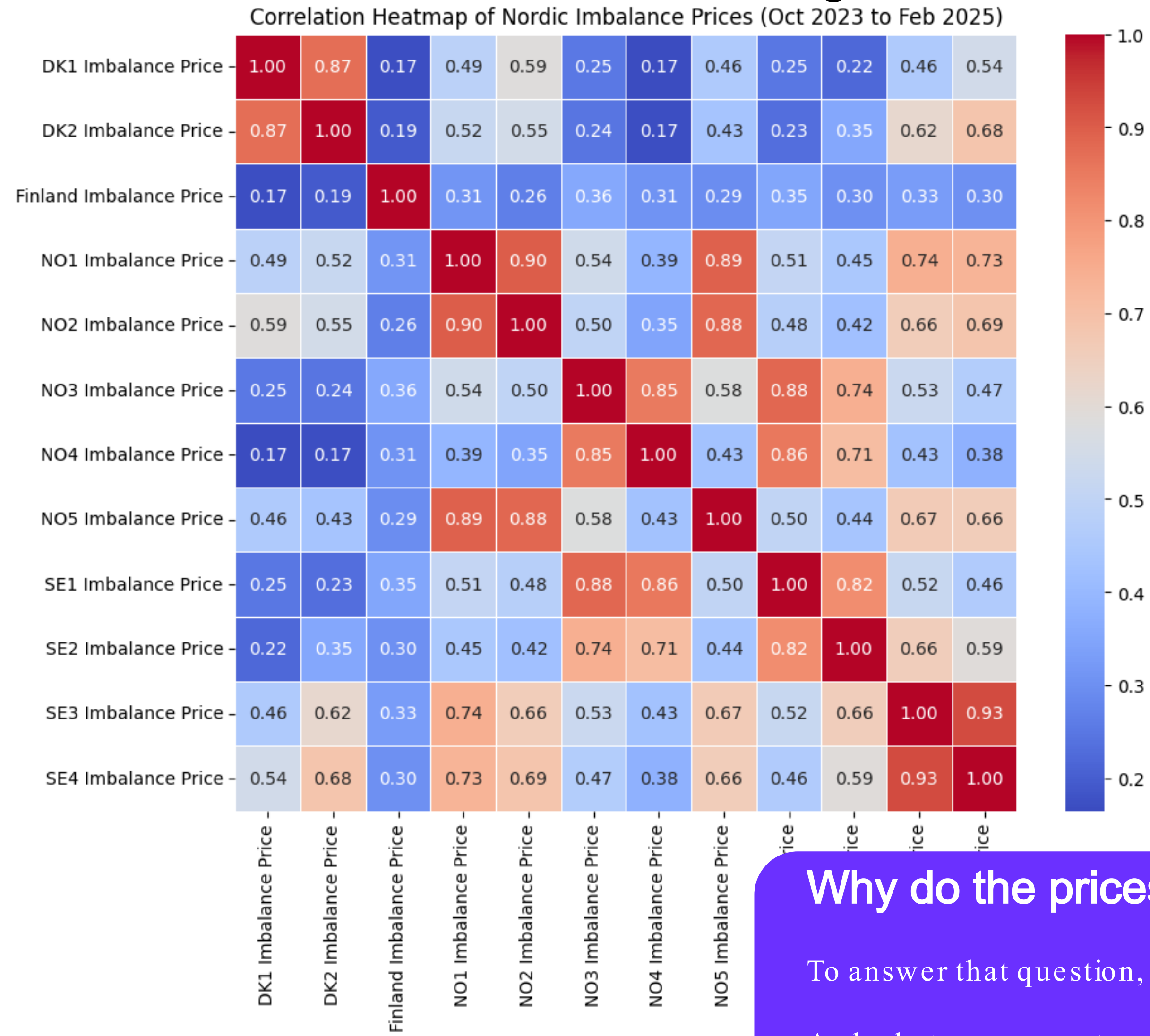
After the change



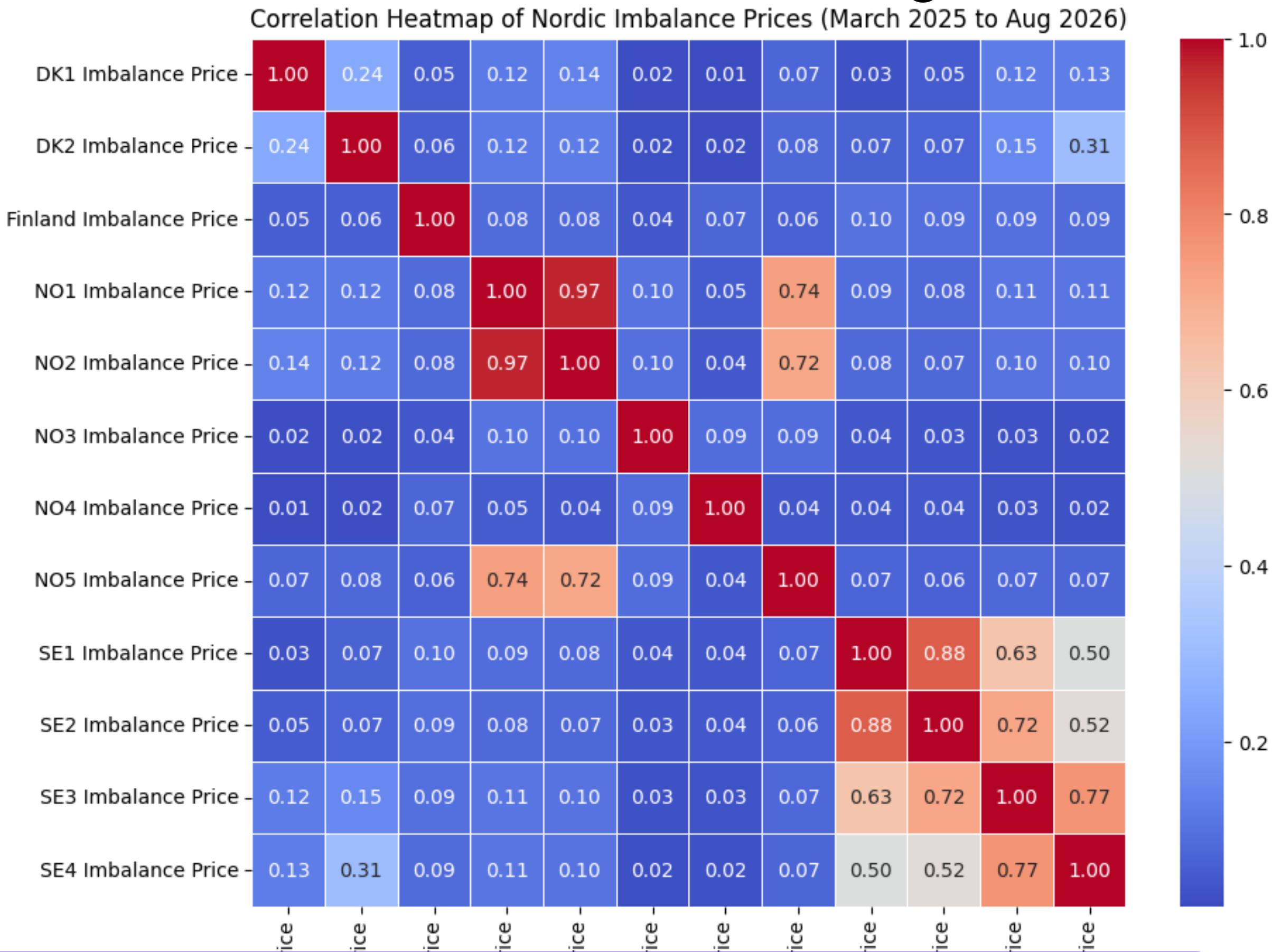
- Increased activations in mFRR can be observed in most bidding zones after the switch.
- The rise in downward activation is evident on comparing the average values.

Correlation of Nordic Imbalance Prices

Before the change



After the change



Why do the prices look so disconnected?

To answer that question, it would be important to understand what does the imbalance price consist of?

And what components go into it..and by that I don't necessarily mean PICASSO but also the inputs merely based on mFRR market.

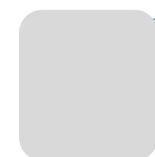
Market highlights – at a glimpse



Overview of the Nordic balancing market



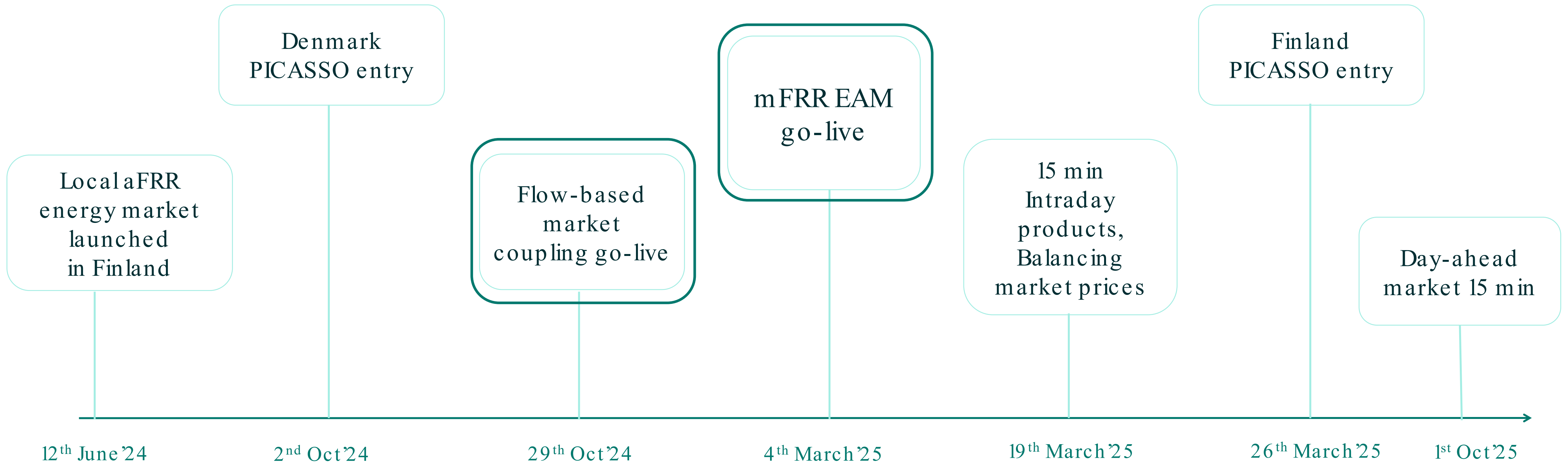
Nordic balancing market updates and outcomes



Asymmetry: developments, imbalance pricing design and data



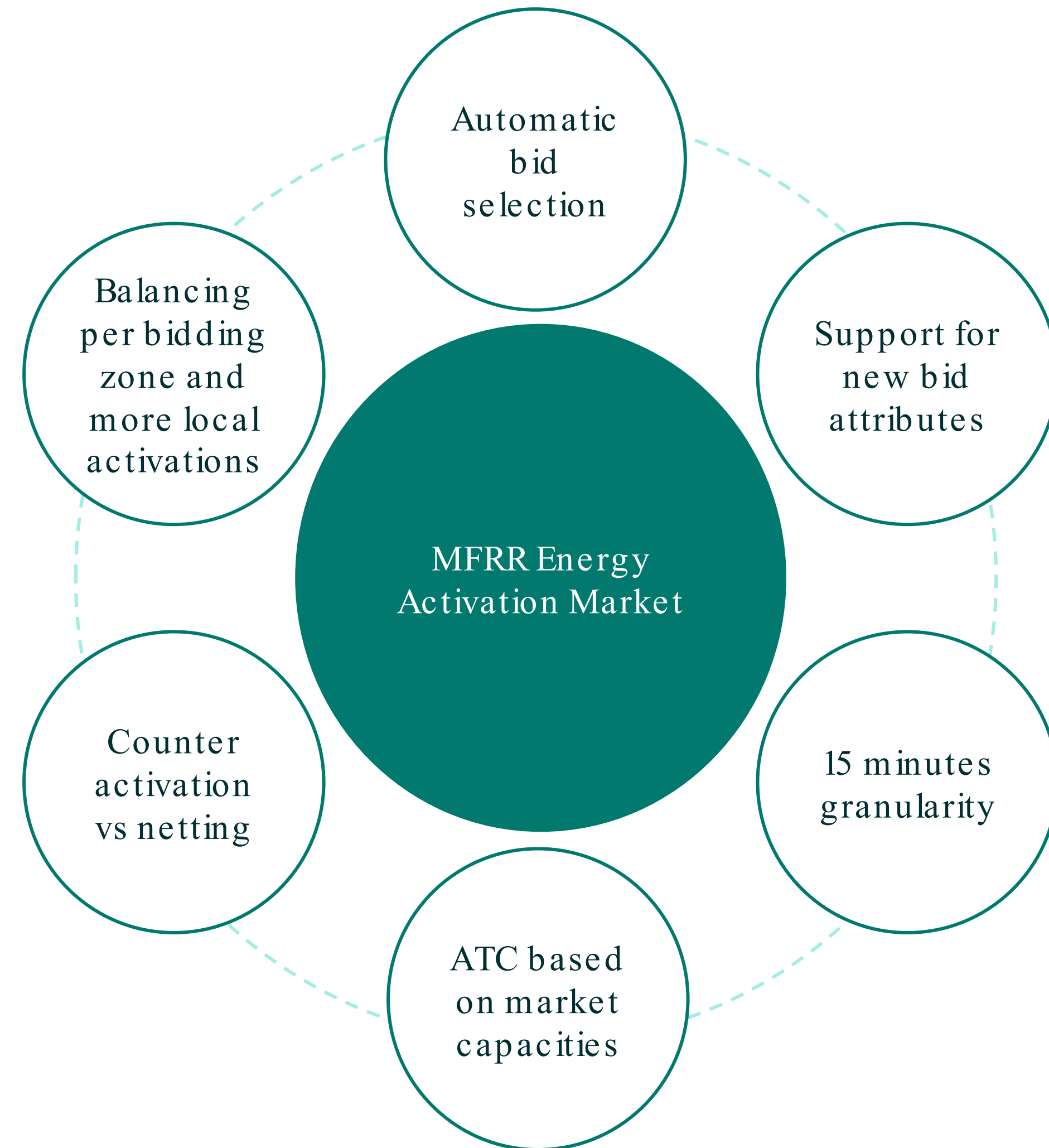
Nordic short-term market: Wind of change in the past couple of years



Summarizing the balancing market update

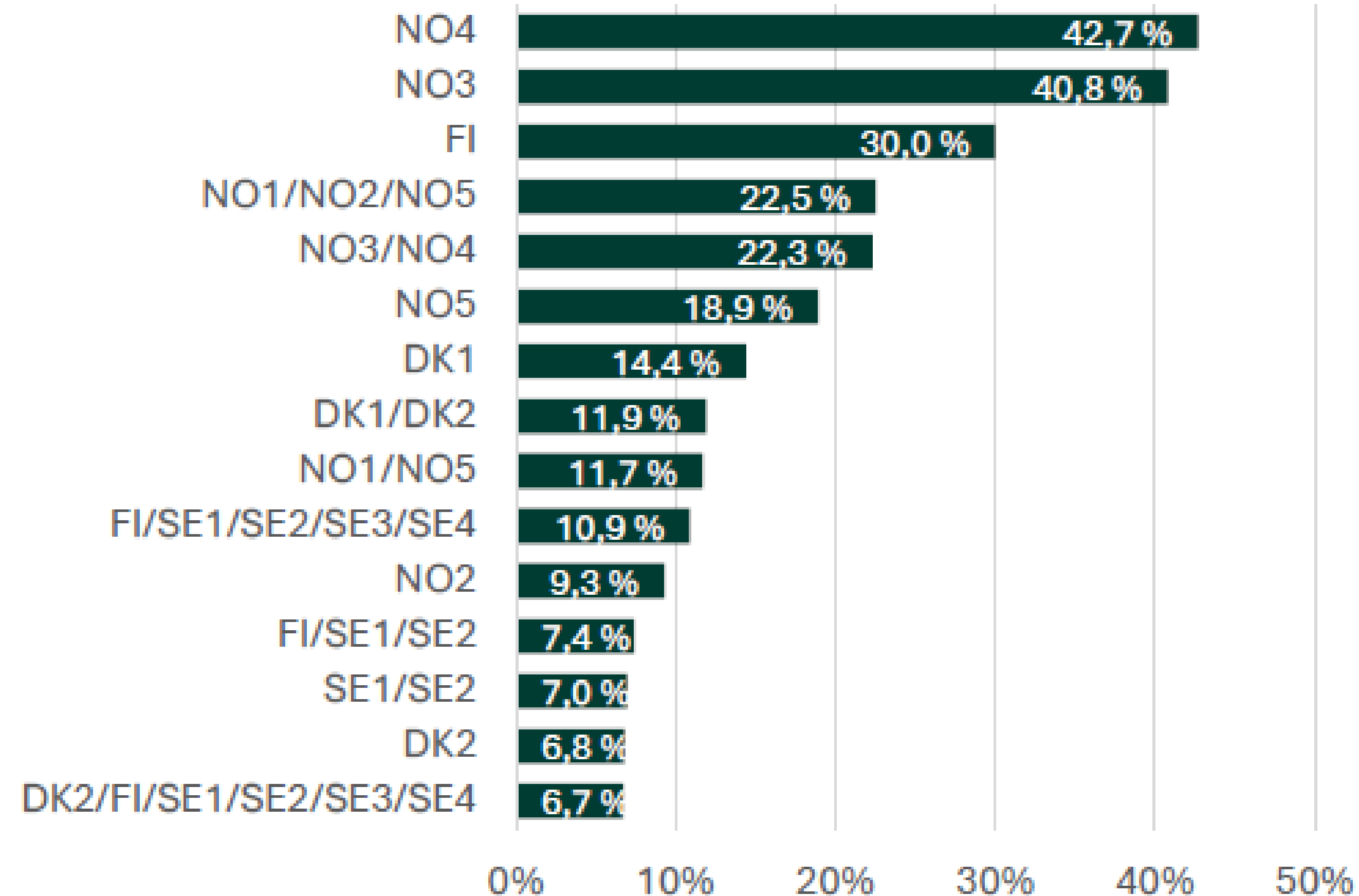
Types of activations

- Scheduled activation (SA): Activated at Nordic level with a common algorithm.
- Direct activation (DA): Decided by local bid selector if sudden need arises or if SA is not enough.



Imbalance price spikes linked to low cross-border capac

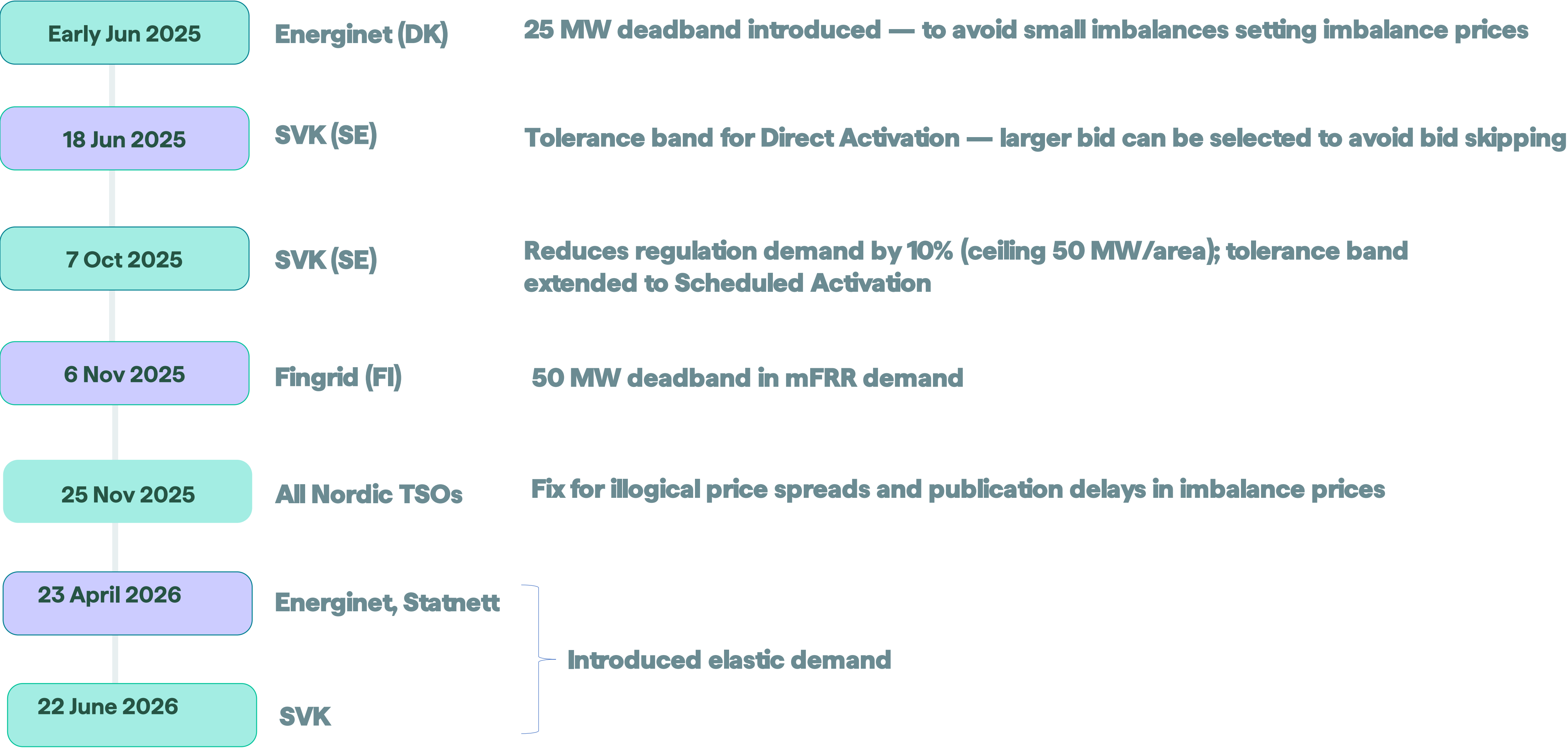
Overview of the proportion of time since go -live that bidding areas/group have been isolated



- In Norway, 50 MW more ATC or moderately priced bids would have removed approximately 50% of the price spikes.
- NO4 stands out clearly with limited ATC for balancing. In 82% of the cases with price spikes, ATC was below 10 MW.

Refining the Market: Algorithm Improvements

Post-launch, TSOs identified issues and implemented a rolling series of fixes to reduce over-activation and price distortions:



Market highlights – at a glimpse



Overview of the Nordic balancing market



Nordic balancing market updates and outcomes



Asymmetry: developments, imbalance pricing design and data



Asymmetry in different aspects of the Nordic Balancing Markets

Asymmetry in **market developments** :
PICASSO in some not in others but common markets on capacity exists.

Asymmetry in **approaches** towards imbalance **pricing design**

Asymmetry in terms of **data transparency** :
we know more about some markets than the other, but we trade cross-border.

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Imbalance price design asymmetry

Imbalance price design for Sweden and Norway

- $\text{Max}(\text{SA}, \text{DA mFRR up})$
- $\text{Min}(\text{SA}, \text{DA mFRR down})$

Imbalance price design for Denmark

- $\text{Max}(\text{SA}, \text{DA mFRR up}, \text{VWAP of aFRR up})$
- $\text{Min}(\text{SA}, \text{DA mFRR down}, \text{VWAP of aFRR down})$

(aFRR prices are considered in imbalance prices subjected to certain conditions.)

Imbalance price design for Finland

- Volume weighted average price of mFRR and aFRR
- (Can also be min, max subjected to certain conditions)

mFRR has larger weight in the imbalance price.

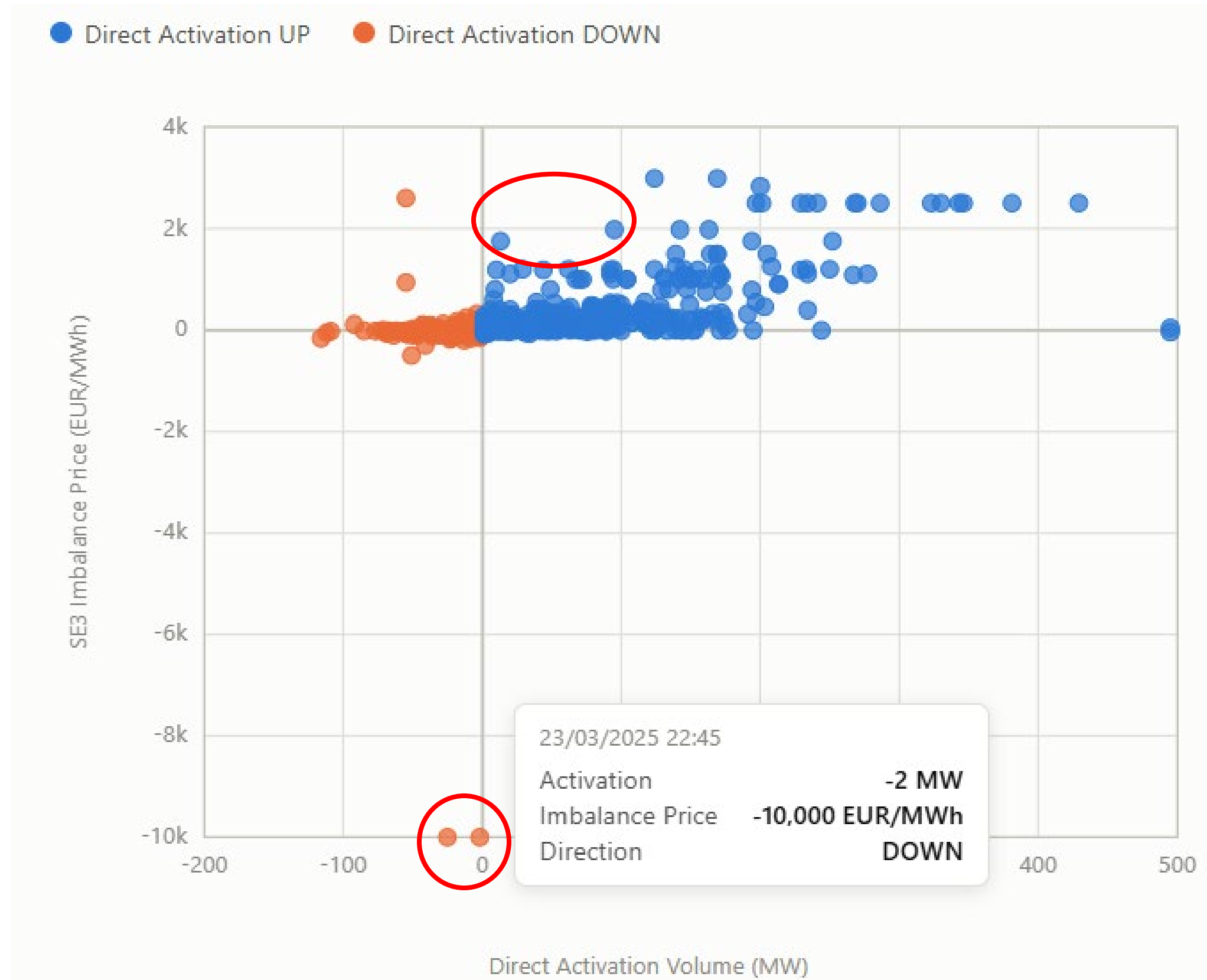
Spikes can be milder.

(Could lead to increase in under coverage of balancing costs.)

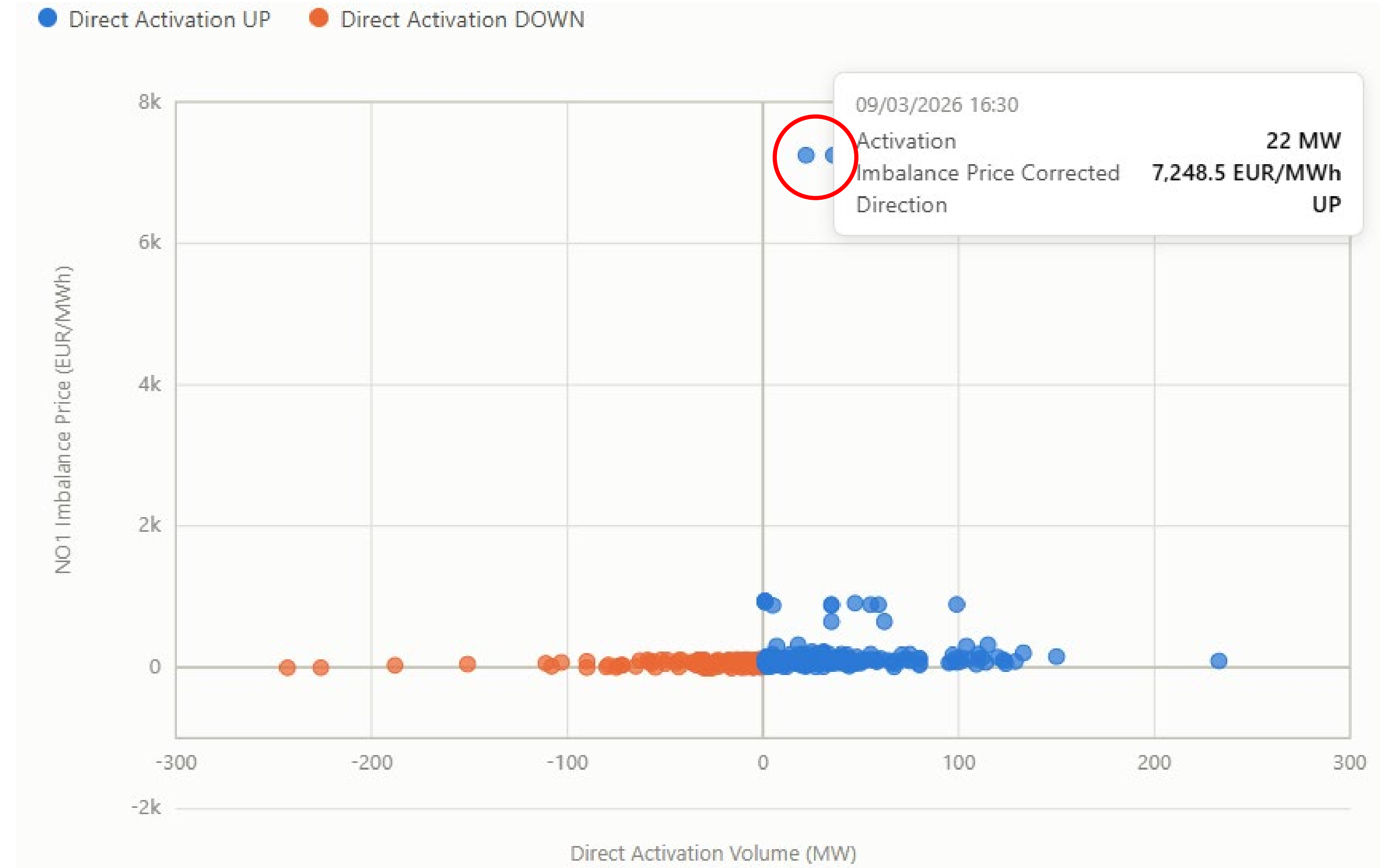


Imbalance price spikes due to small expensive DA bids

Scatter plot for SE3 Imbalance prices vs Direct Activation Volumes



Scatter plot for NO1 Imbalance prices vs Direct Activation Volumes



- Small volumes of direction activations have led to imbalance price spikes due to the imbalance price formula considering $\max()$ or $\min()$ of the activation prices for the quarter.

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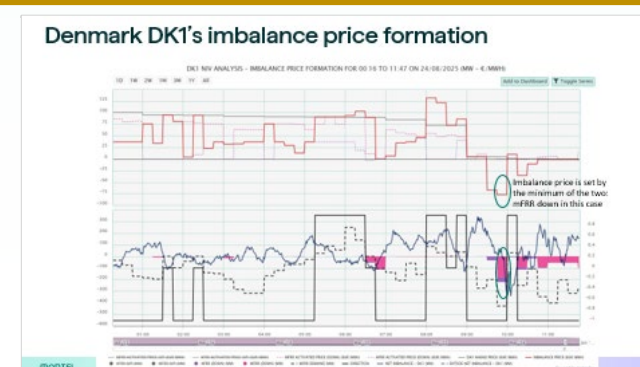
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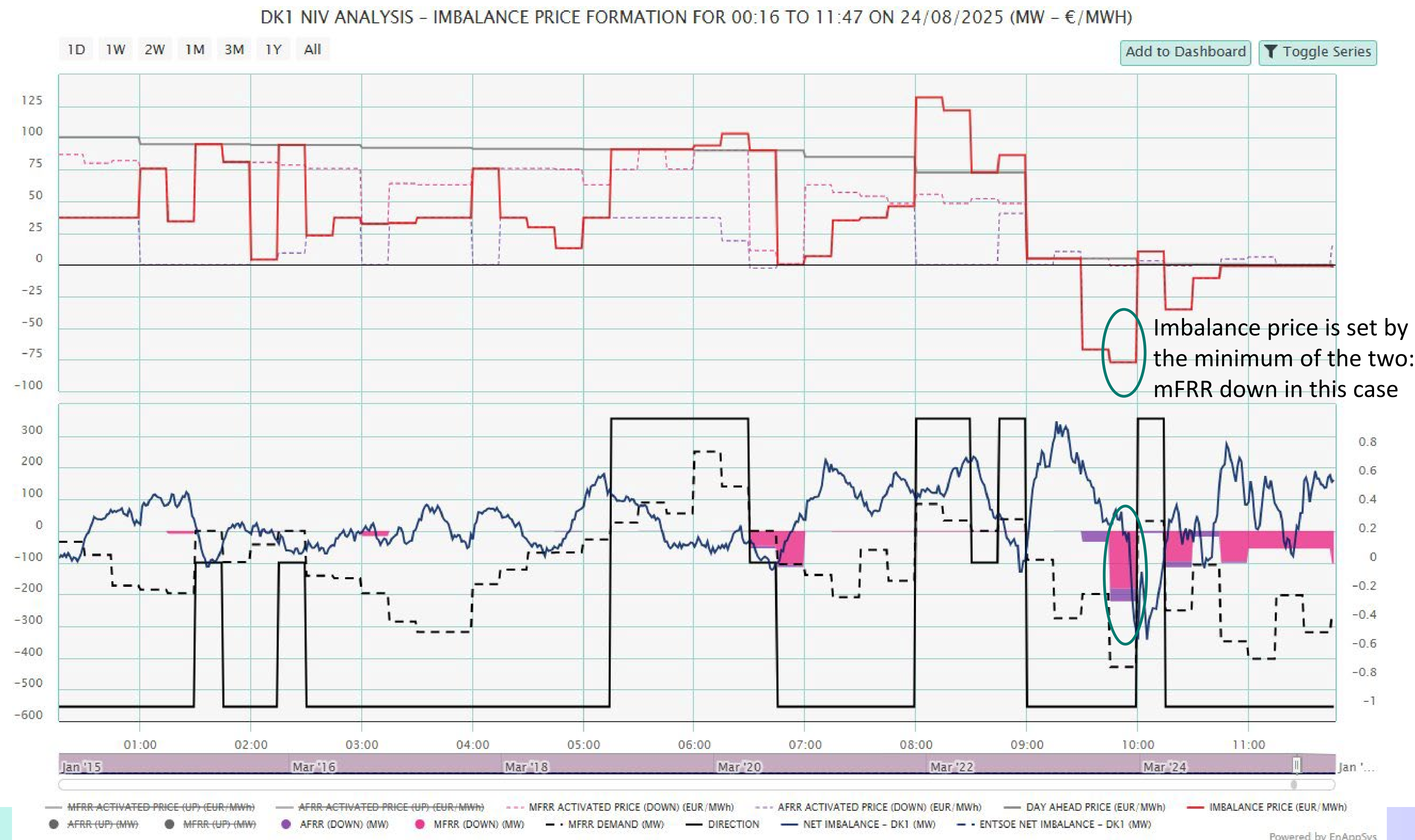
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Denmark DK1's imbalance price formation



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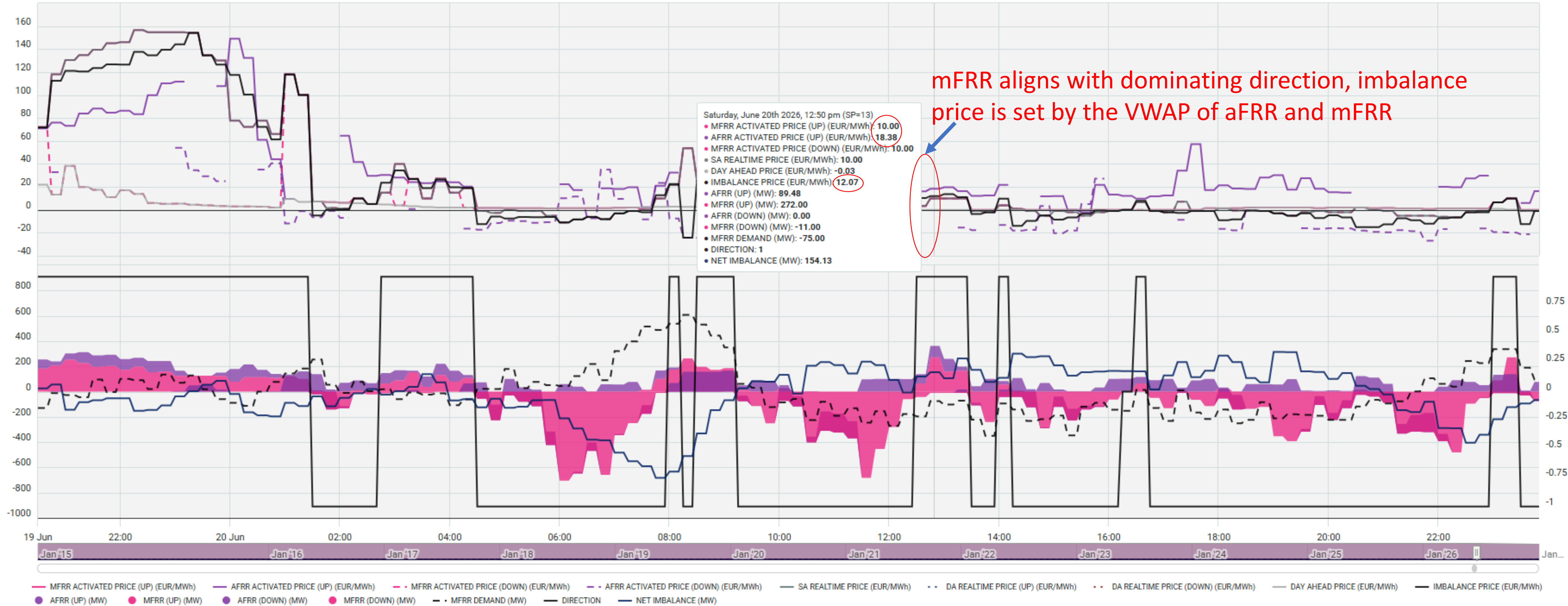


FI Imbalance price: VWAP of mFRR and aFRR

FINLAND NET IMBALANCE VOLUME ANALYSIS FOR 19/06/2026 20:33 TO 20/06/2026 23:57 (MW - €/MWh)

1D 1W 2W 1M 3M 1Y All

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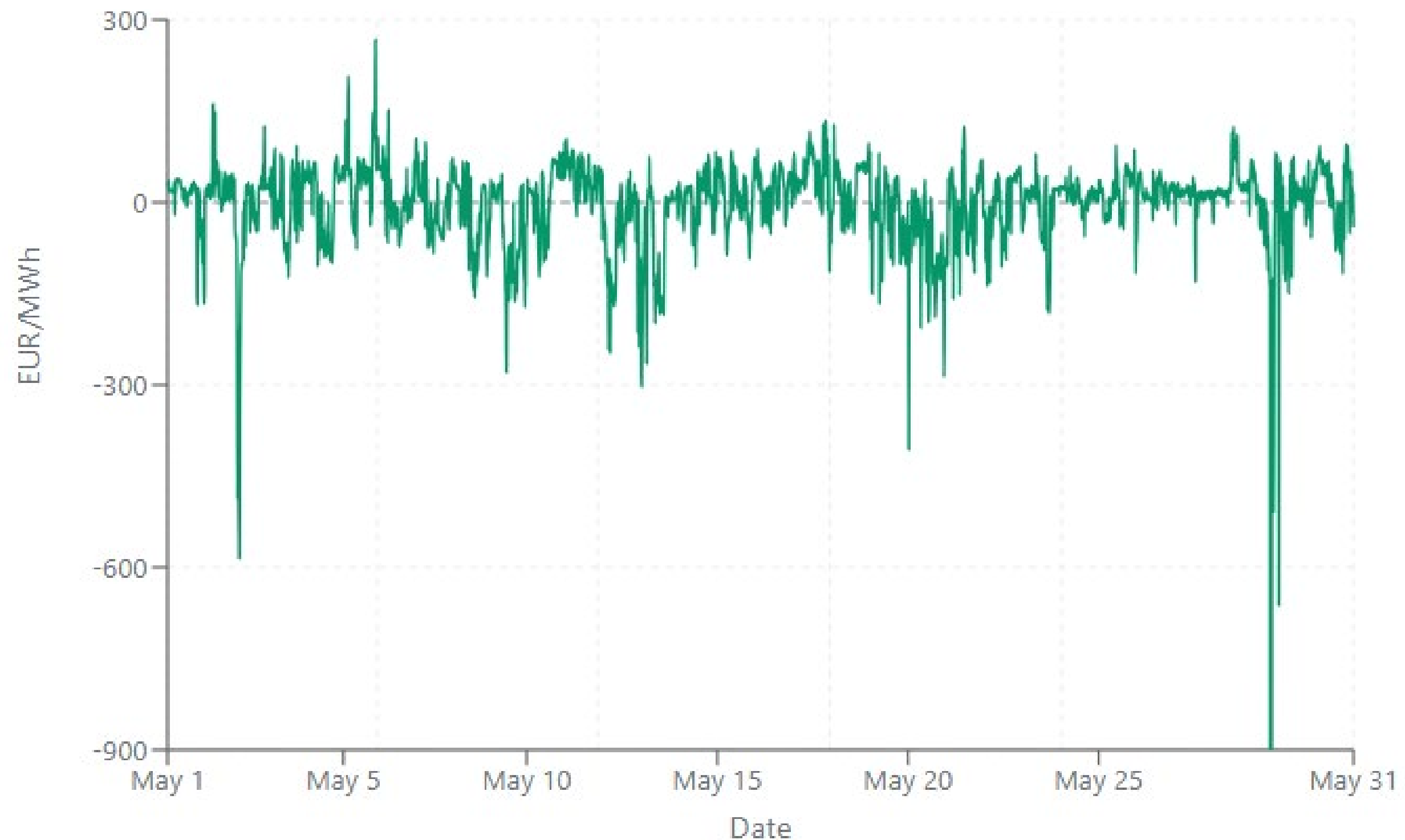
Delta between the Day ahead and Imbalance prices for FI

Before the change

Reduction in average deviation between imbalance prices and Dayahead prices in June compared to May.

After the change

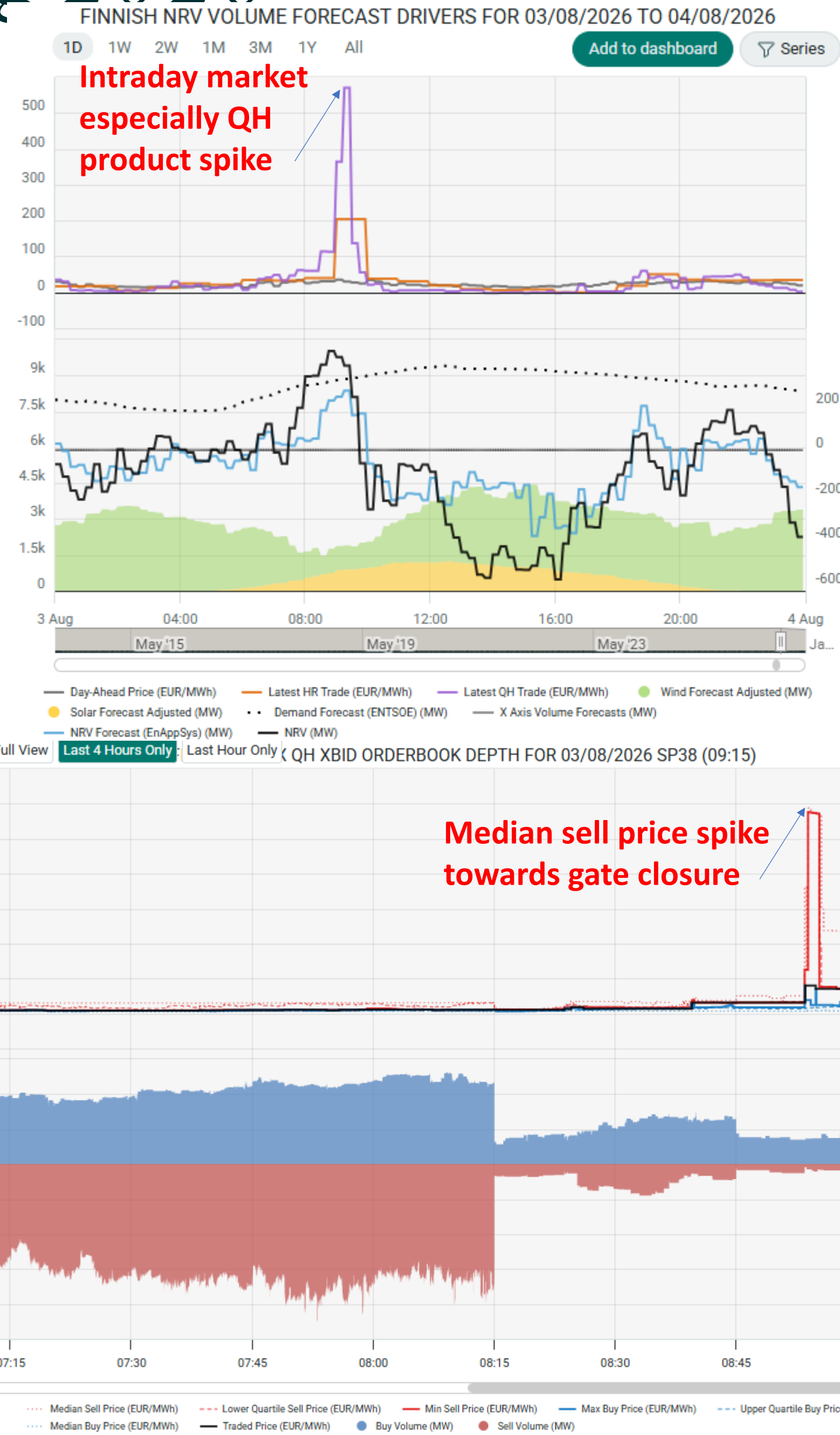
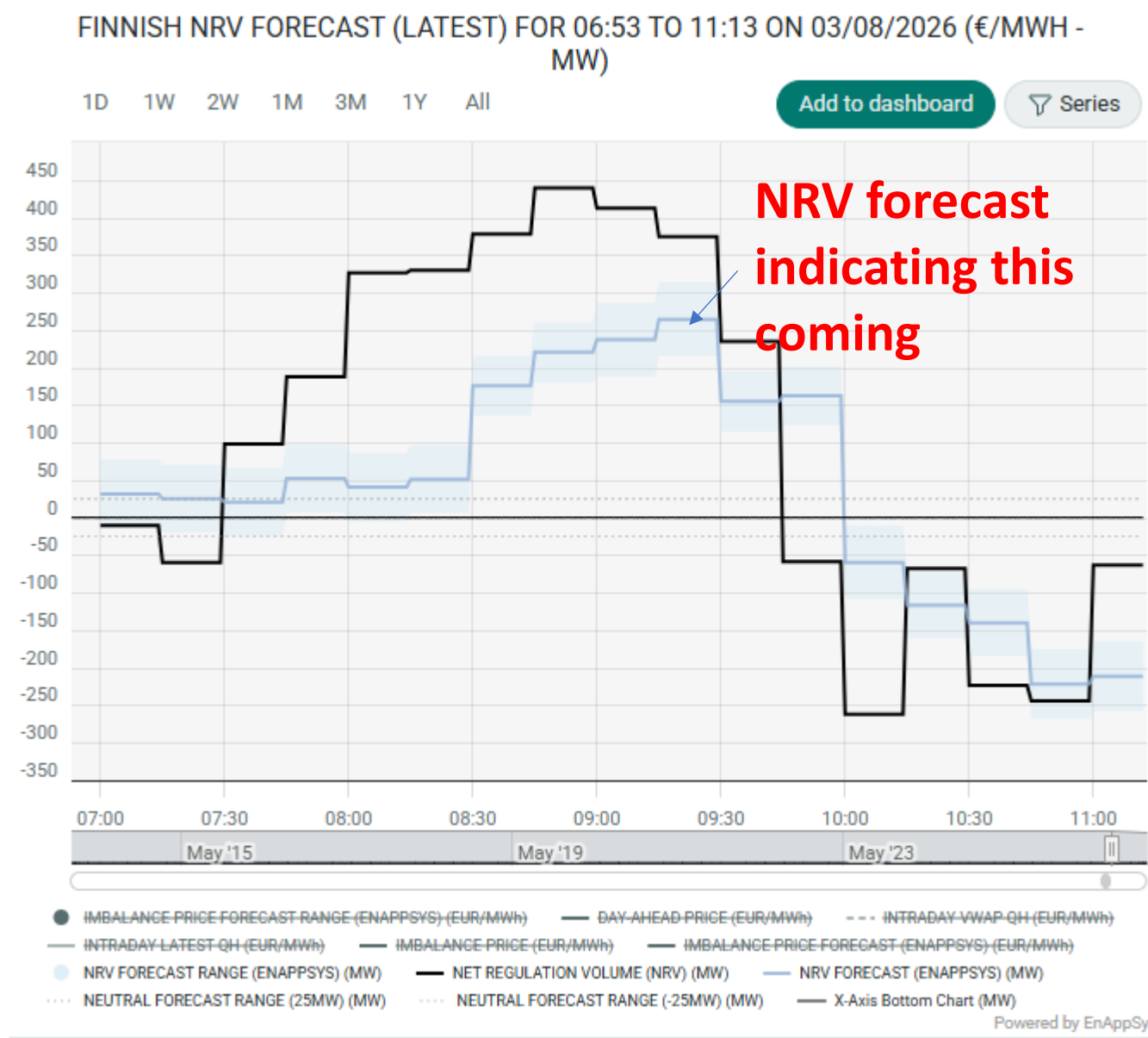
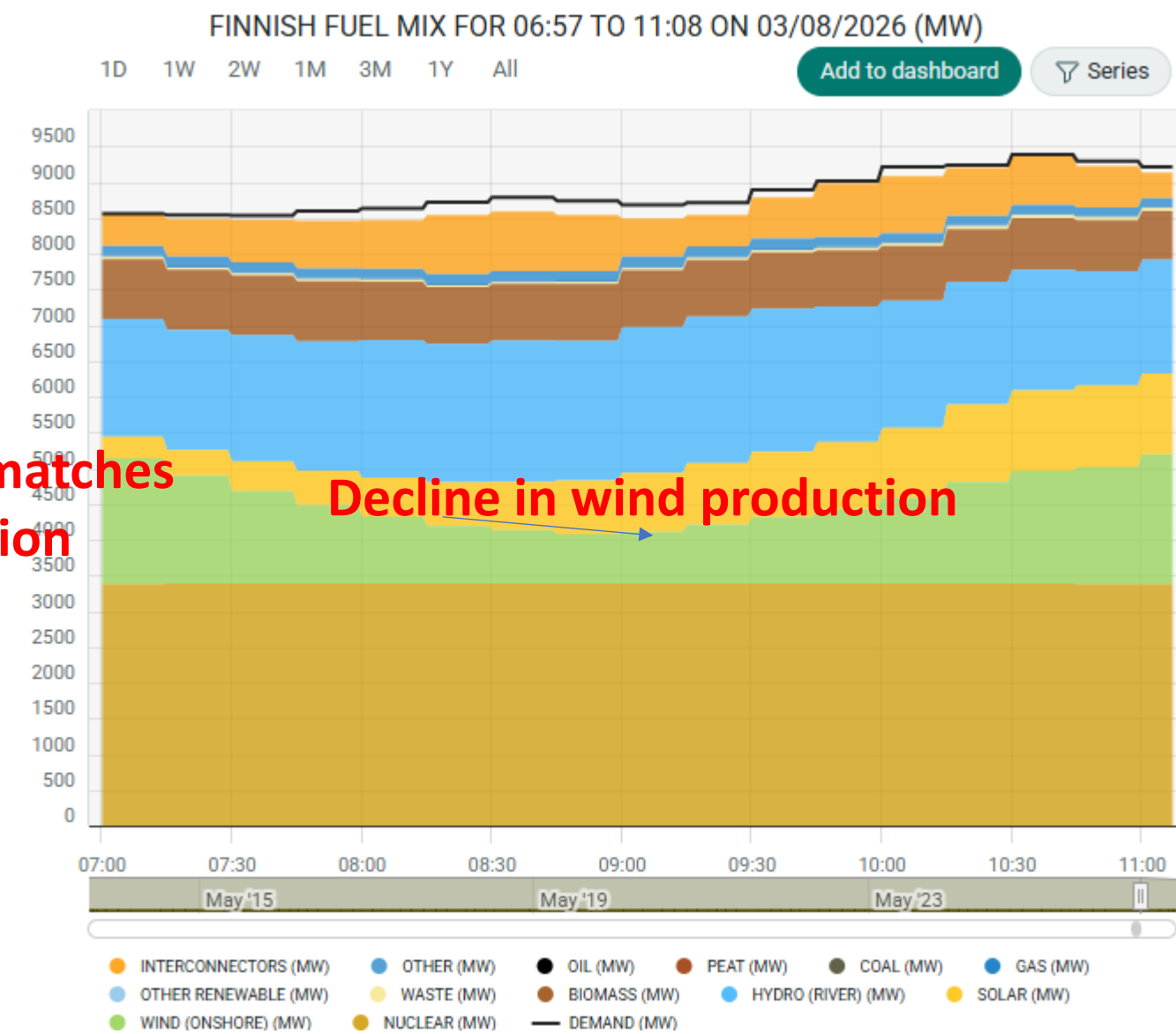
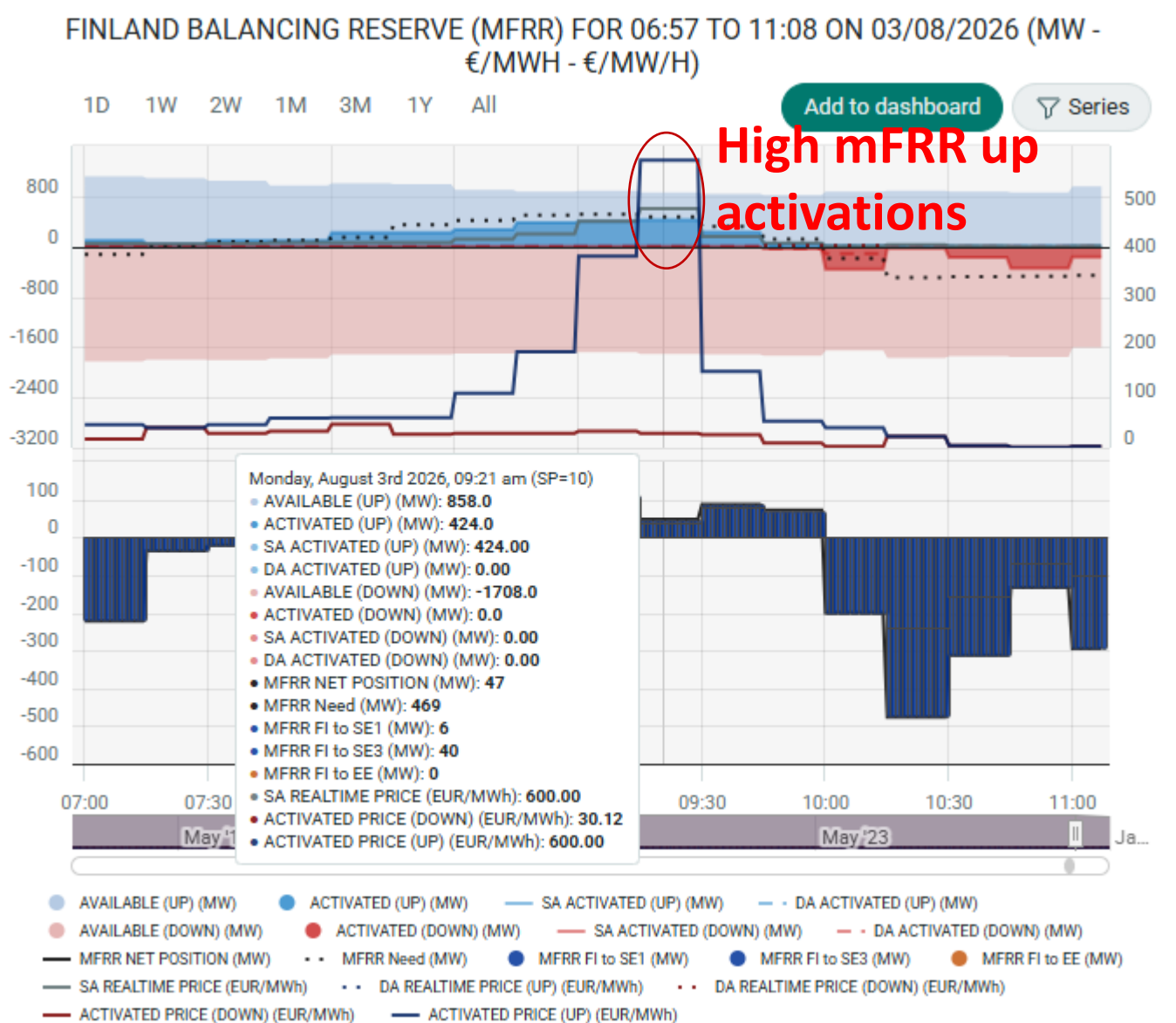
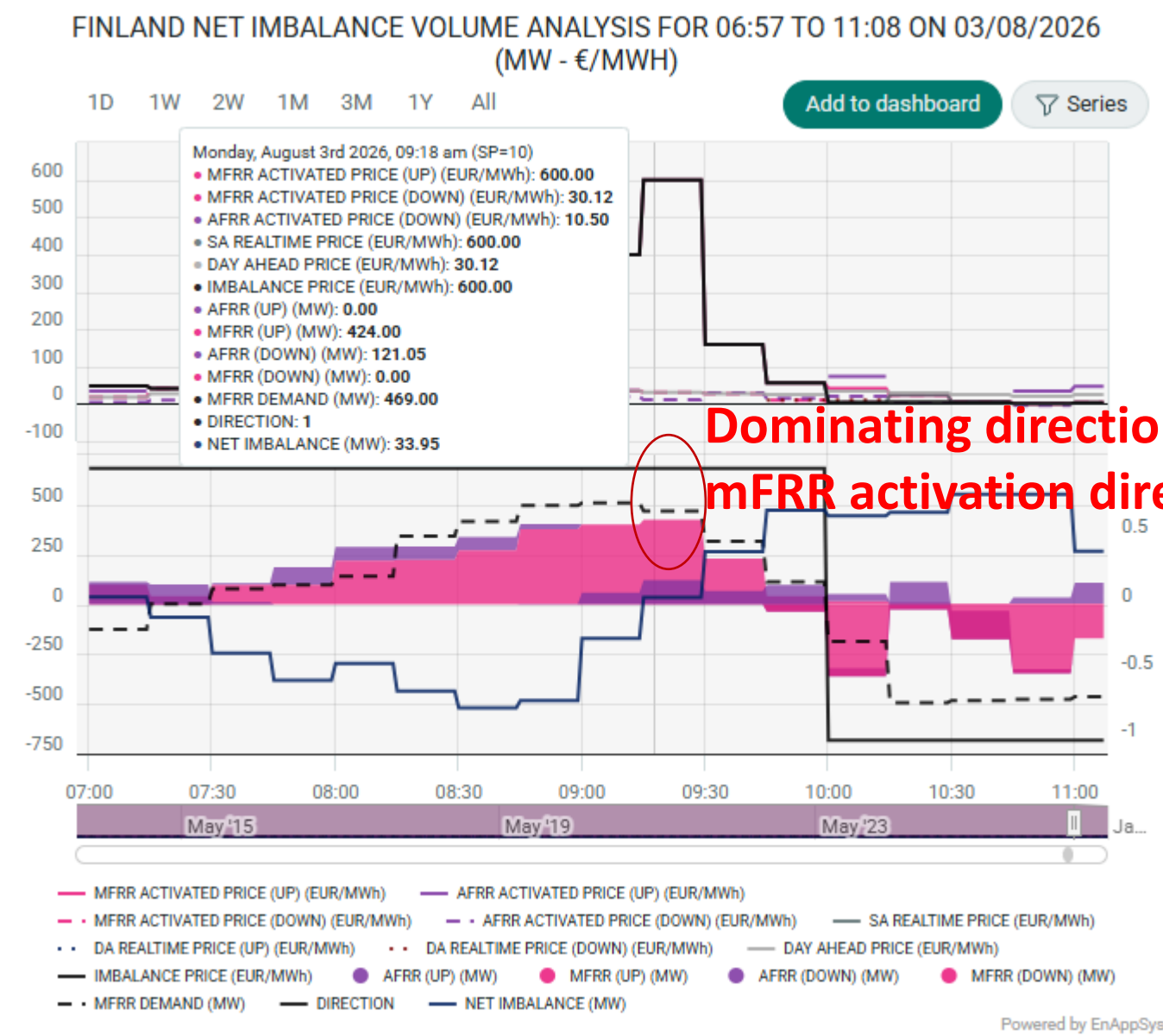
May 2026



June 2026



Imbalance price spike at 9:15 EET on 3 Aug 2026

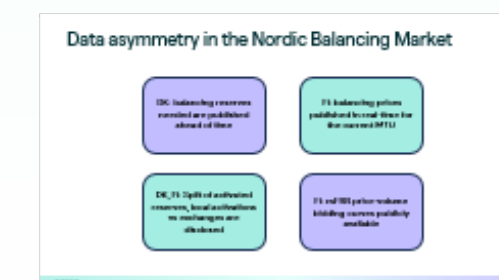


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Data asymmetry in the Nordic Balancing Market

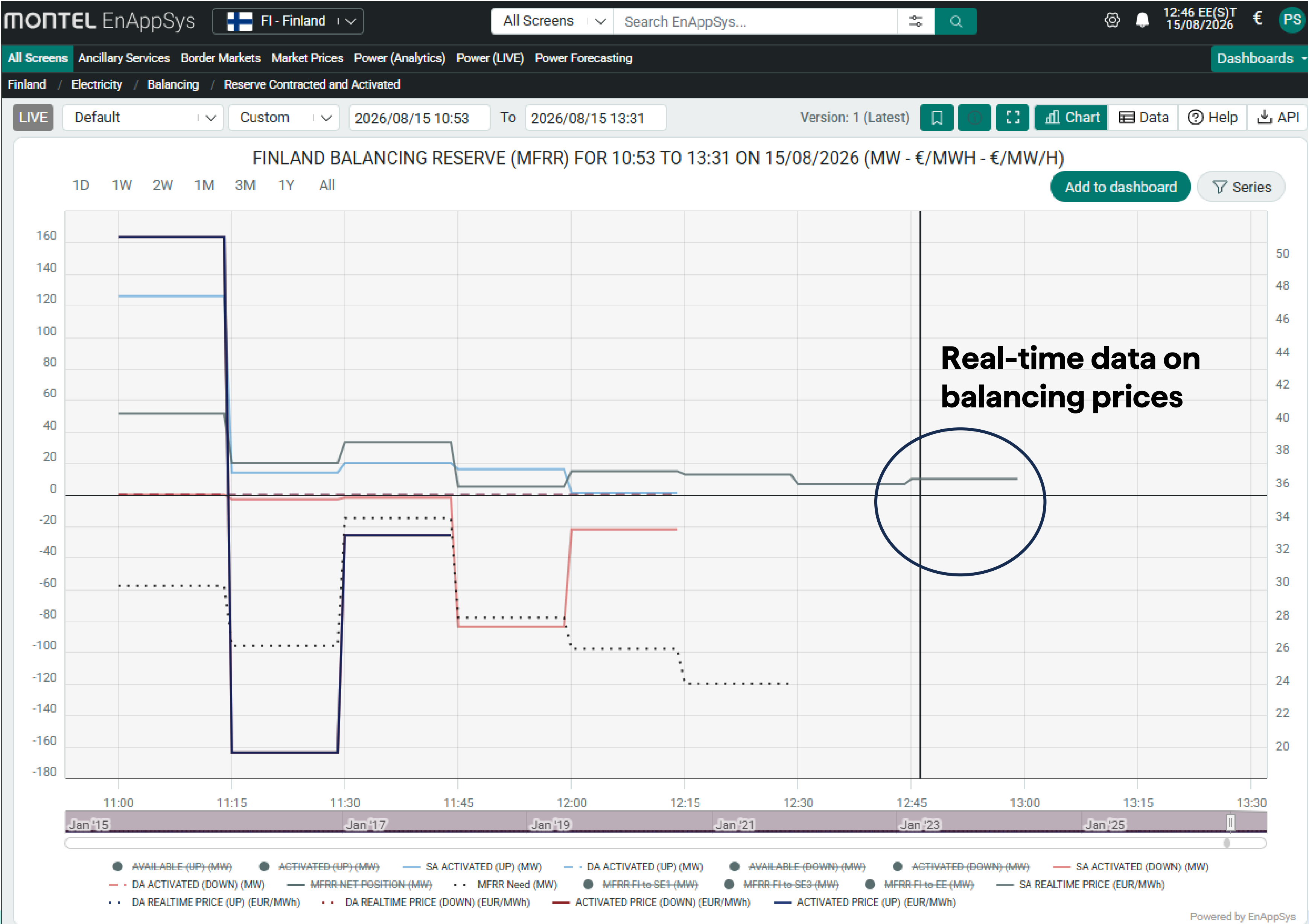
**DK: balancing reserves
needed are published
ahead of time**

**FI: balancing prices
published in real-time for
the current MTU**

**DK, FI: Split of activated
reserves, local activations
vs exchanges are
disclosed**

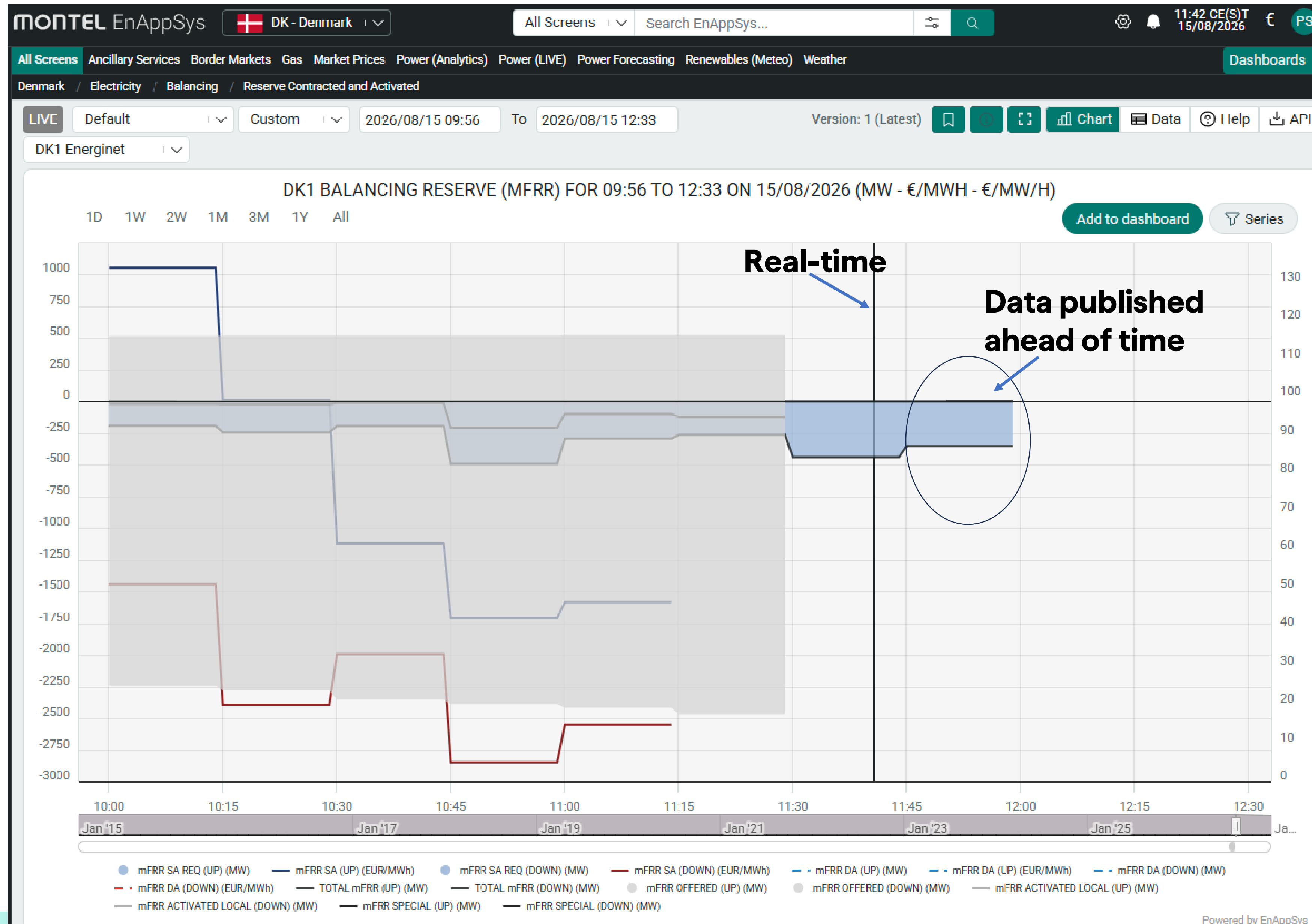
**FI: mFRR price-volume
bidding curves publicly
available**

FI: Activated Balancing Prices in Real-time



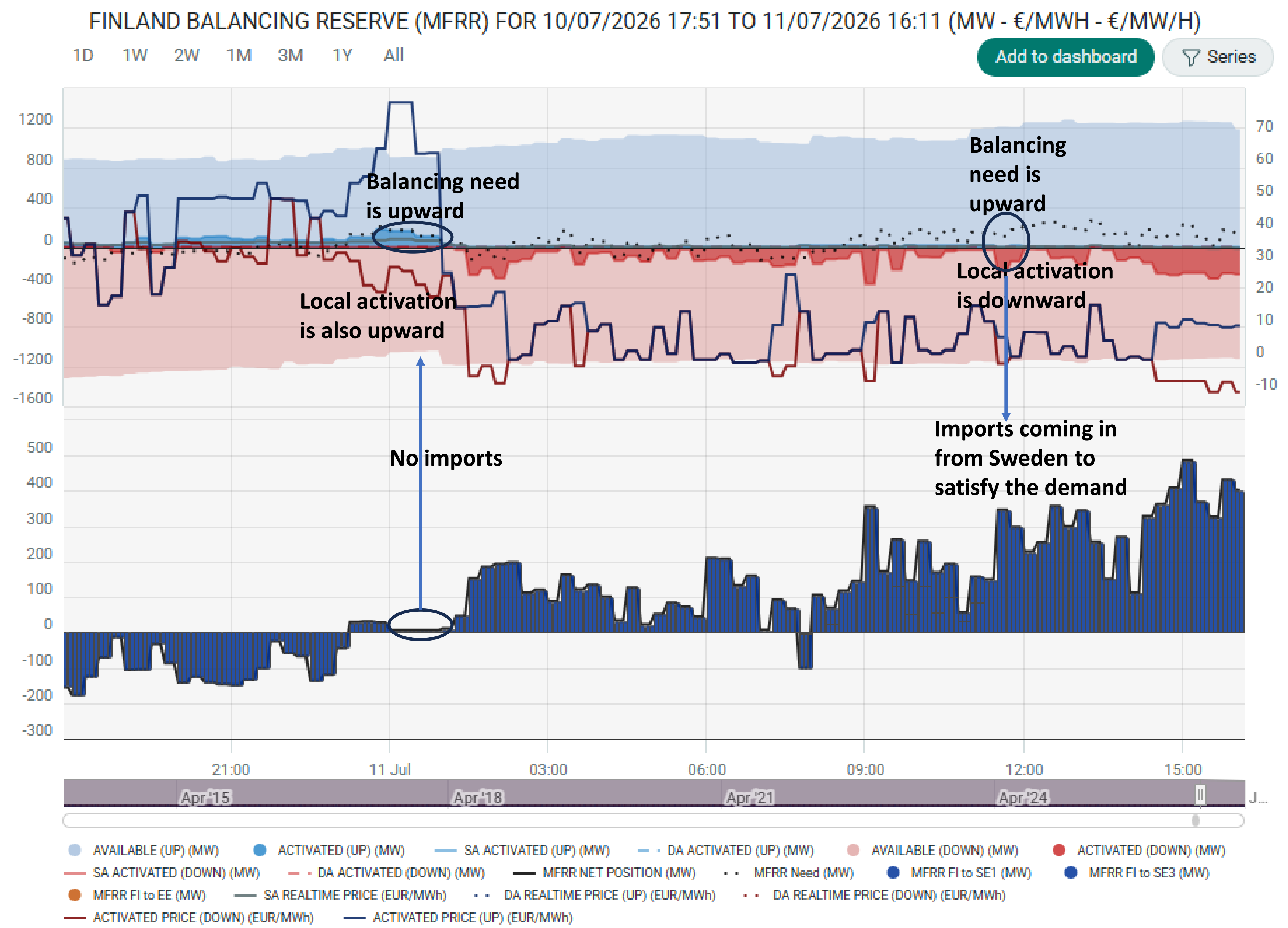
- **Balancing prices published in real-time for the current MTU**
- **Acts as a good indicator of the state of the balancing system and the value of reserves in the market.**
- **Both Scheduled and Direct Activation prices are published.**

DK: Requested Balancing Reserves Volumes before time



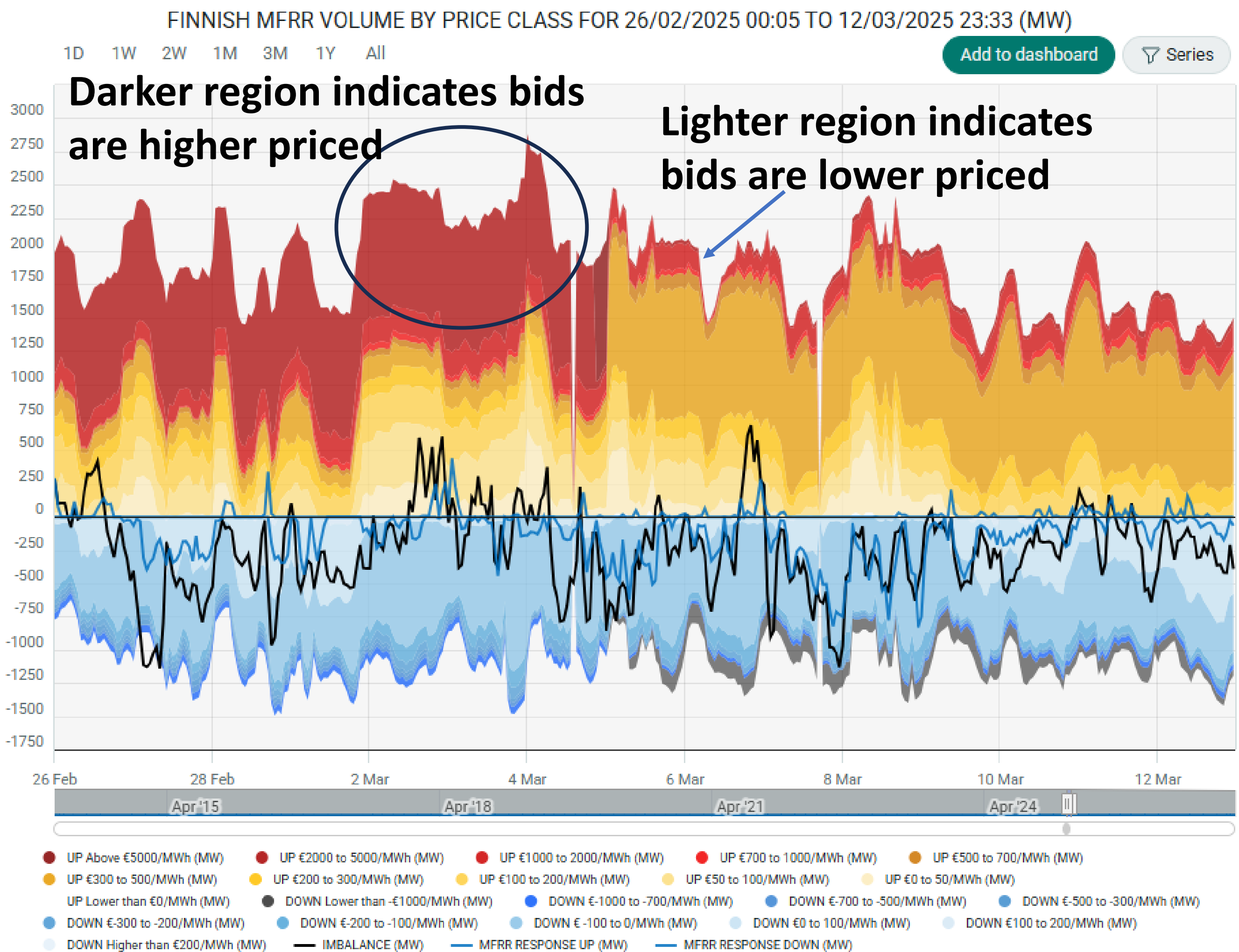
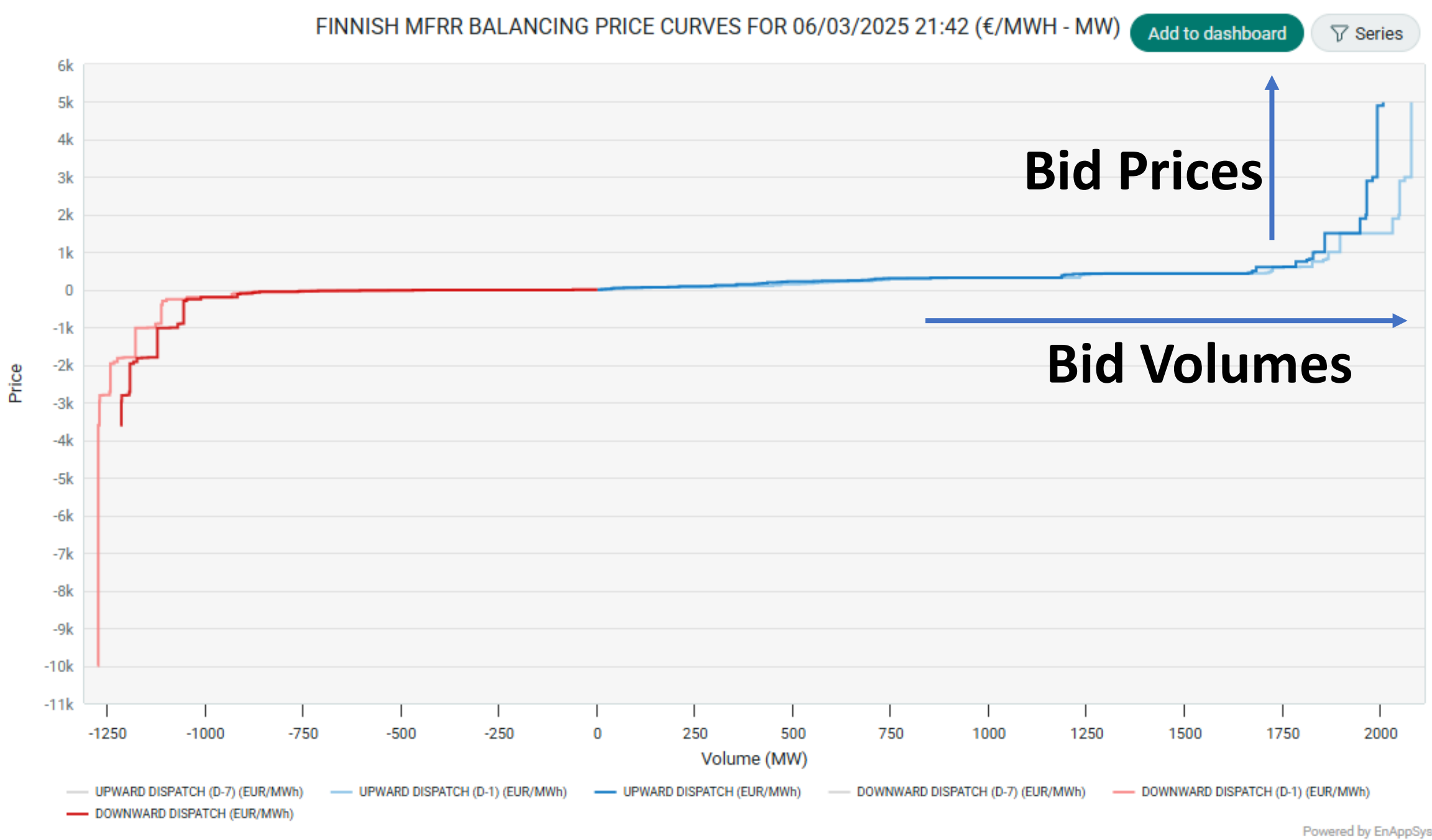
- **mFRR requested demand up and down is published ahead of time per bidding zone.**
- **It acts as a good indicator for the state of the system.**
- **It also helps in adding transparency and serves towards bringing a level-playing field for all actors in the market.**
- **A split between local activation and cross-border exchanges is provided.**

FI: mFRR Demand and Exchanges in between bidding zones



FI: mFRR Energy Market Trading Behavior Analysis

Price-volume mFRR Bidding curves are published by Fingrid



Lack of data transparency in the Balancing Markets

Limited view on trading behavior in each bidding zones of Sweden, Norway, Denmark

Limited view of exchanges in mFRR resources in between countries/bidding zones.

Limited view on cross-border capacities used for the mFRR EAM.

Path forward:

MARI (pan-European mFRR energy market):
Q1 2027 for all of Nordics.
This will also bring stricter rules in place for more data sharing.

PICASSO (pan-European aFRR energy market):
Sweden and Norway to join late 2027 (tentatively) which will compel the TSOs to share more info about aFRR market and bidding curves.

- **MARI:** Manually Activated Reserves Initiative
- **PICASSO:** Platform for the International Coordination of Automated Frequency Restoration and Stable System Operation

Summary

Major updates in balancing markets have influenced the market results! And disconnected imbalance prices

Imbalance price spikes: largely associated with low cross border capacities, and expensive bids

TSO reaction: made several efforts to correct the mFRR EAM algorithm

Data transparency is still a major issue

Market asymmetry exists and makes cross-border intraday trading complicated with different rules, interpretations

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BALTICS
And many more...

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