Market Operator User Group

Dublin, 10 October 2018

Agenda

The Agenda for the session is as follows:

Item	Presenter
Welcome	Liam Ryan
Ex-Ante Market	Liam McAllister
Balancing Market	Diarmaid Gillespie, Simon Tweed
Settlement	Sean O'Rourke, John O'Dea, Nigel Thomson
Imbalance Pricing	Aodhagan Downey, Brendan O'Sullivan
Query Management	Claire Breslin

Welcome

- Go – Live 1st of October

- Market Operator user Group
  - EirGrid business owners
  - Performance of the processes
  - Analysis of the outcomes
  - Issues encountered
    - Resolution
    - Path to resolution

- 10 day in summary
  - Some issues encountered but resolved very quickly (Negative reserve, QBOA)
    - ExAnte markets performing very well
    - Balancing market have worked through some issues
    - Settlement working on overall performance

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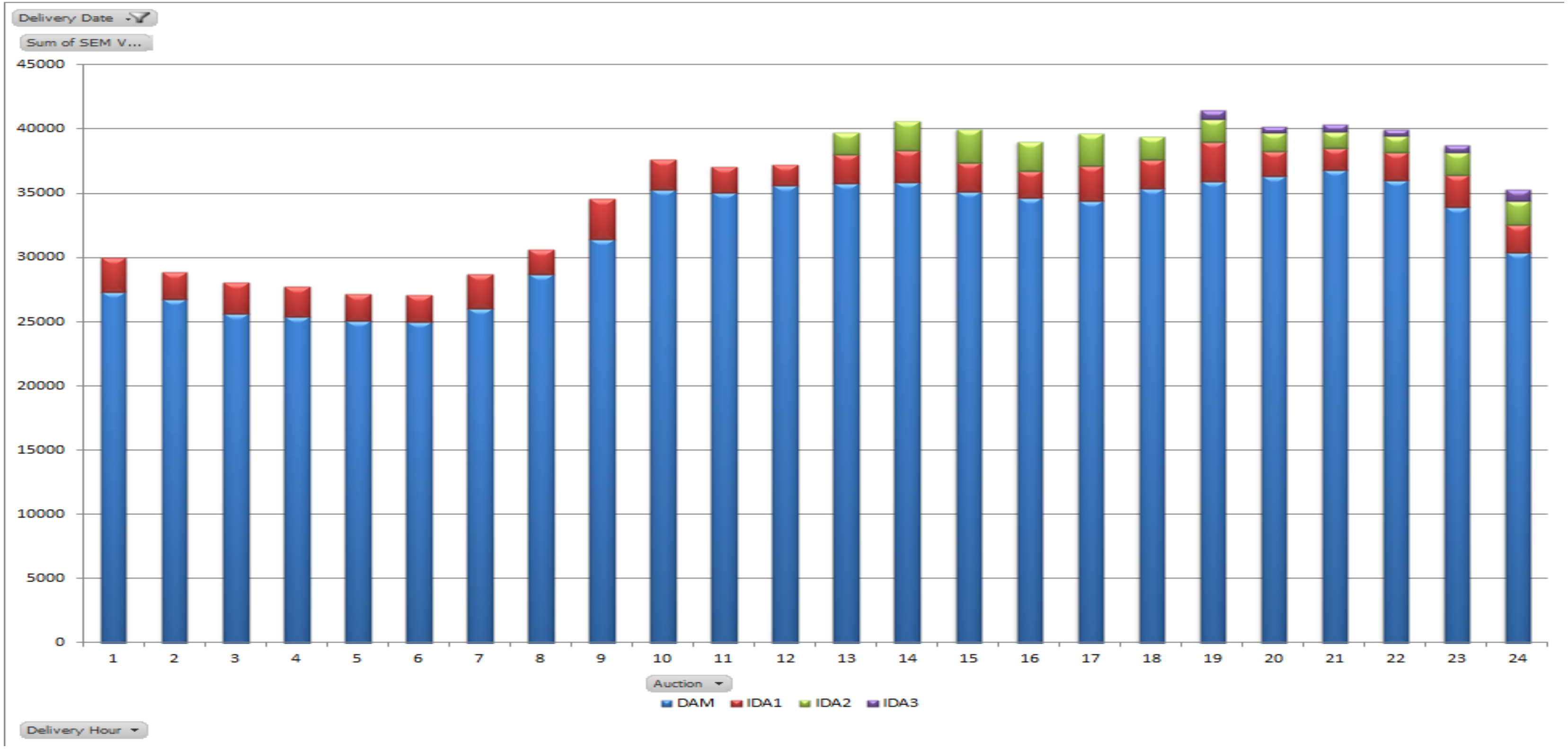
Ex-Ante Markets

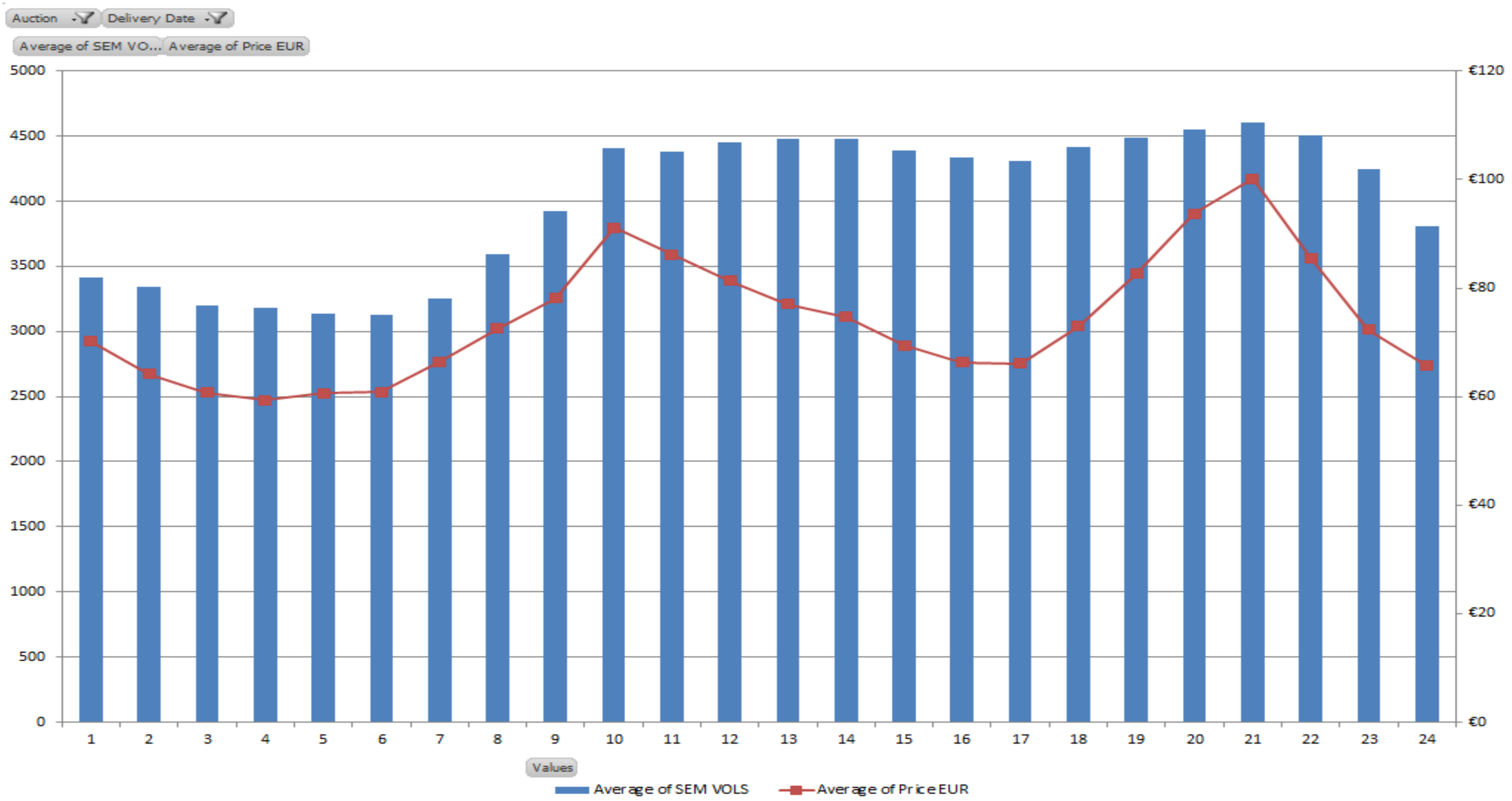
- Volumes from ex-ante auctions (01/10 – 08/10)
  - Highest volumes still clearing in DAM

*Using Average Prices		% of DAM
DAM	**€57,783,081**	
IDA1	**€3,896,304**	6.74%
IDA2	**€1,554,463**	2.69%
IDA3	**€278,967**	0.48%
IDC	**€1,897,603**	3.28%
TOTAL	**€65,410,419**	



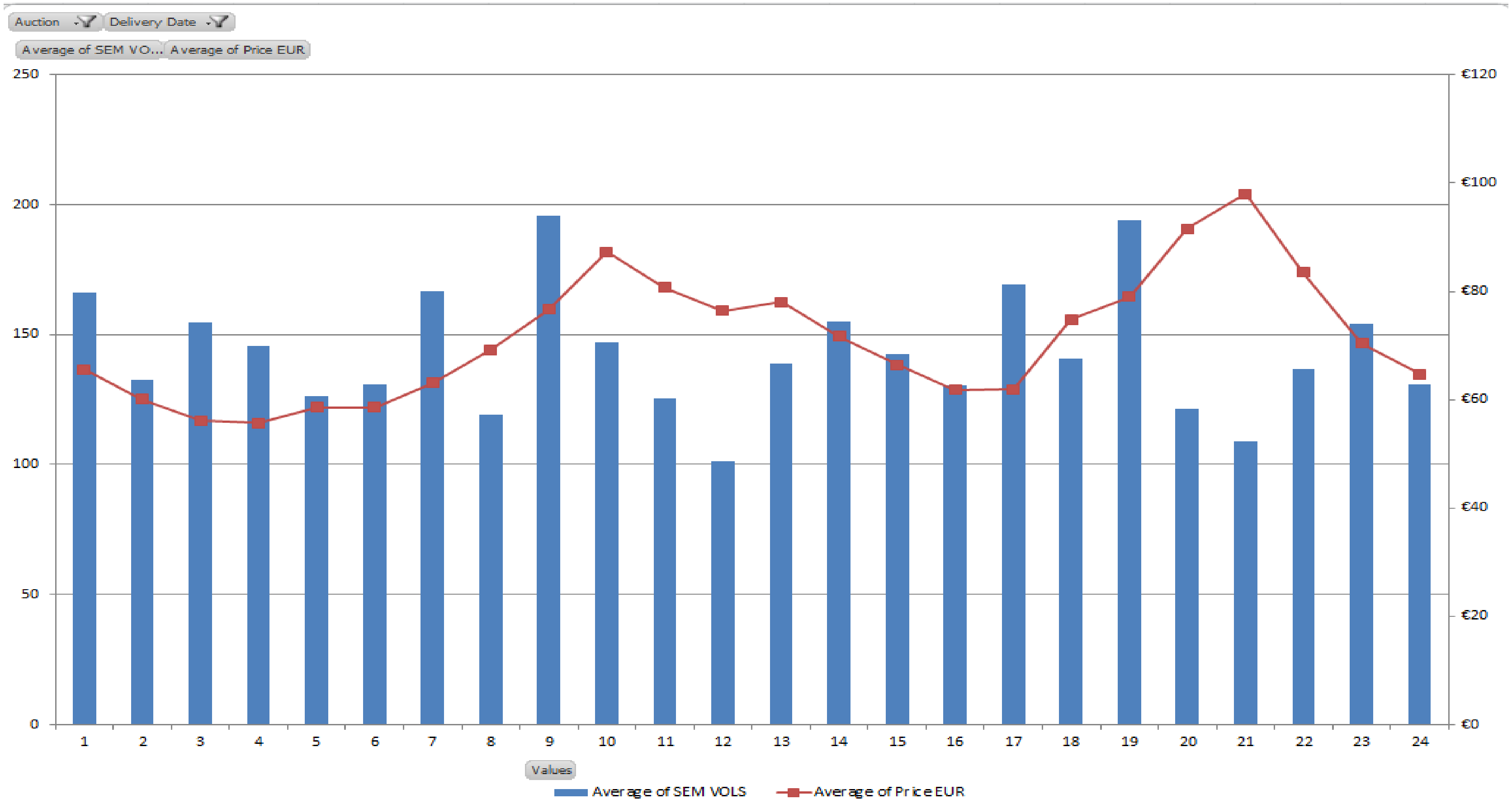
Ex-Ante Market Analysis

- DAM – average clearing price and volumes (01/10 – 08/10)
  - Prices in DAM continue to follow the profile of the load cleared
  - Suppliers clearing **97.8%** of their volume with average DAM price of **€74.10**



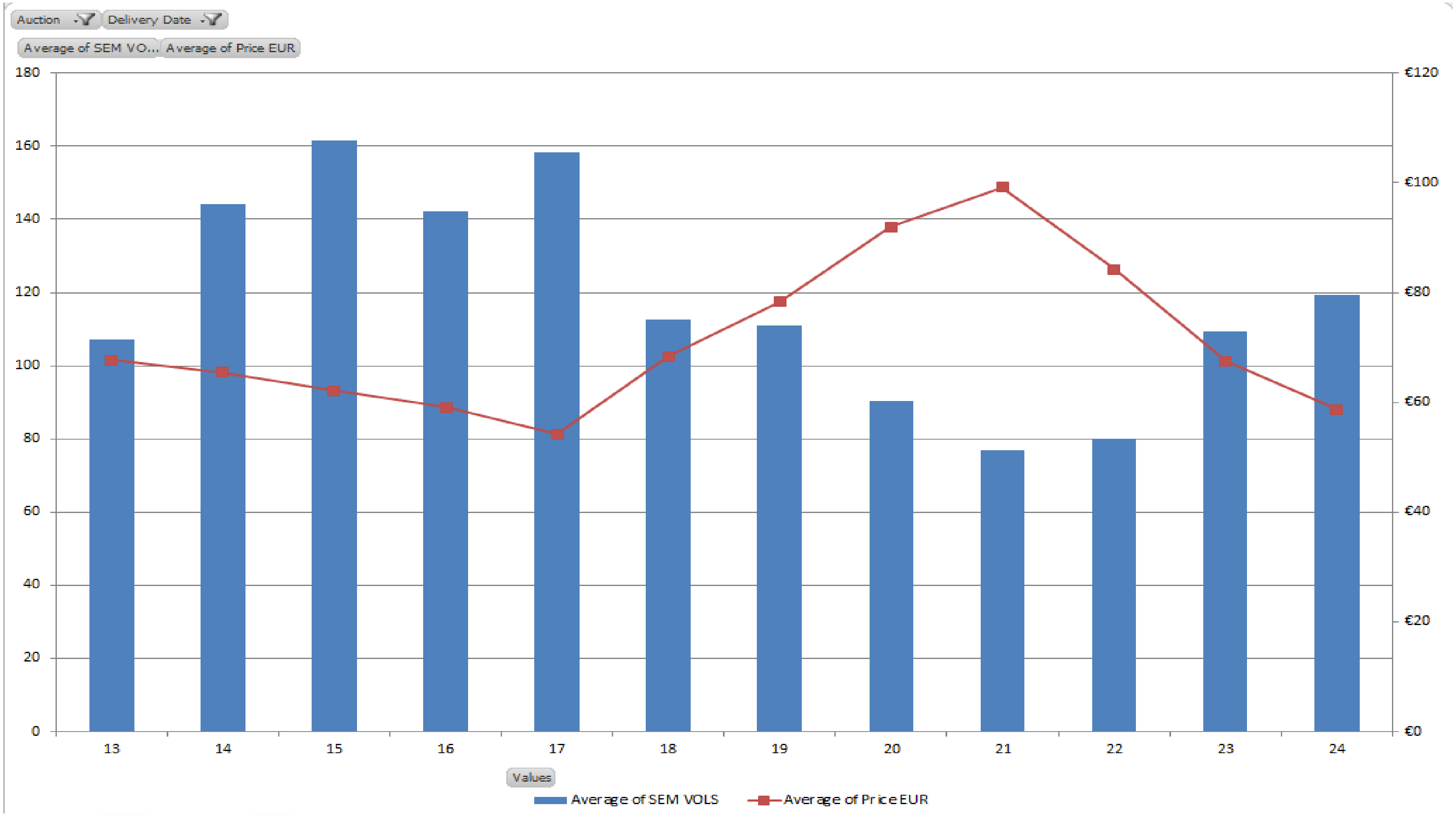
Ex-Ante Market Analysis

- IDA1 - Average volumes lower than MT, in the 140 MW range



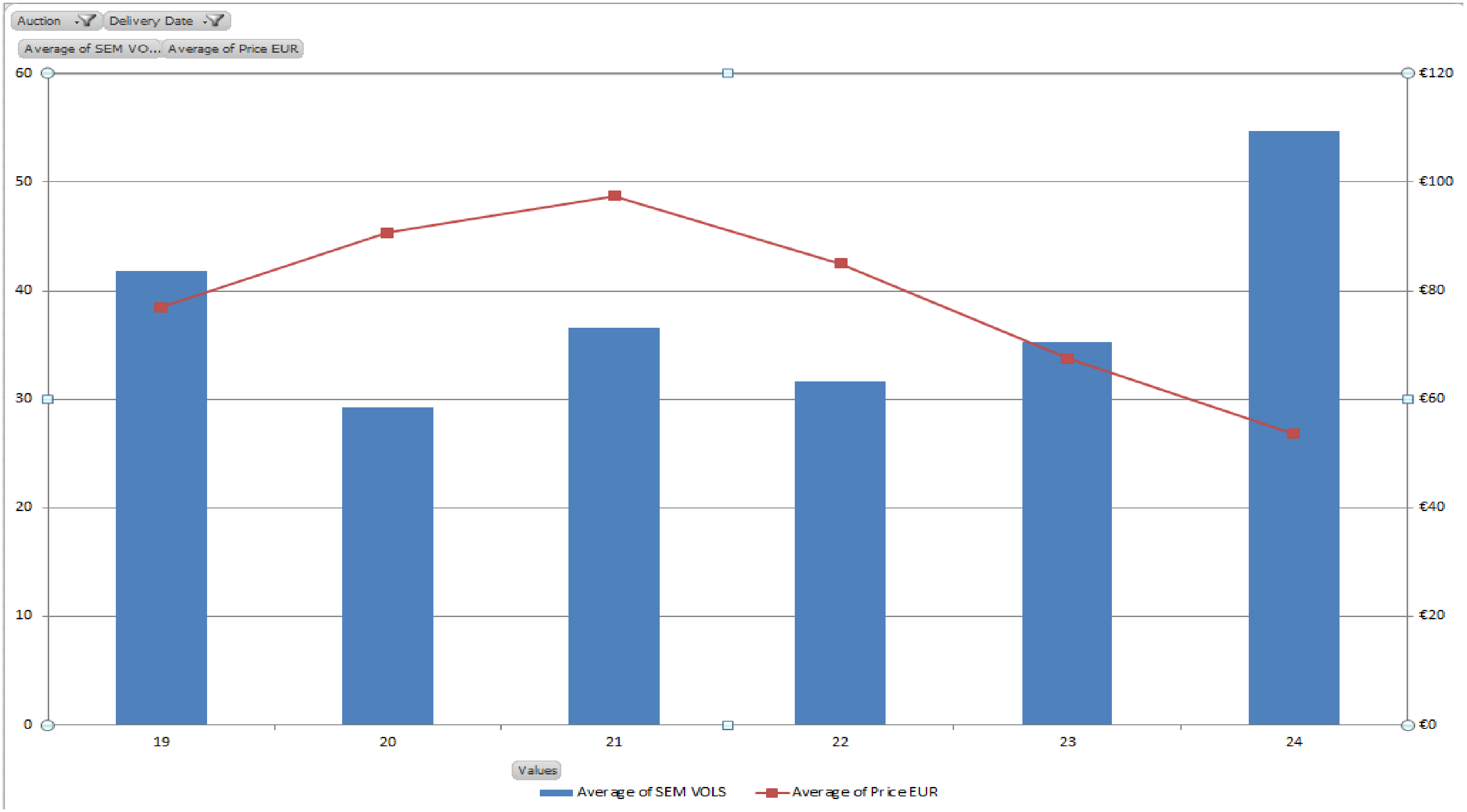
Ex-Ante Market Analysis

- **IDA2** - Average volumes in the 117 MW range



Ex-Ante Market Analysis

- IDA3 - Average volumes in the 38 MW range



Auction
Delivery Date
Average of SEM VO...
Average of Price EUR
60
50
40
30
20
10
0
€120
€100
€80
€60
€40
€20
€0
19
20
21
22
23
24
Values
Average of SEM VOLS
Average of Price EUR

EIRGRID SONI

Intraday Continuous Trading

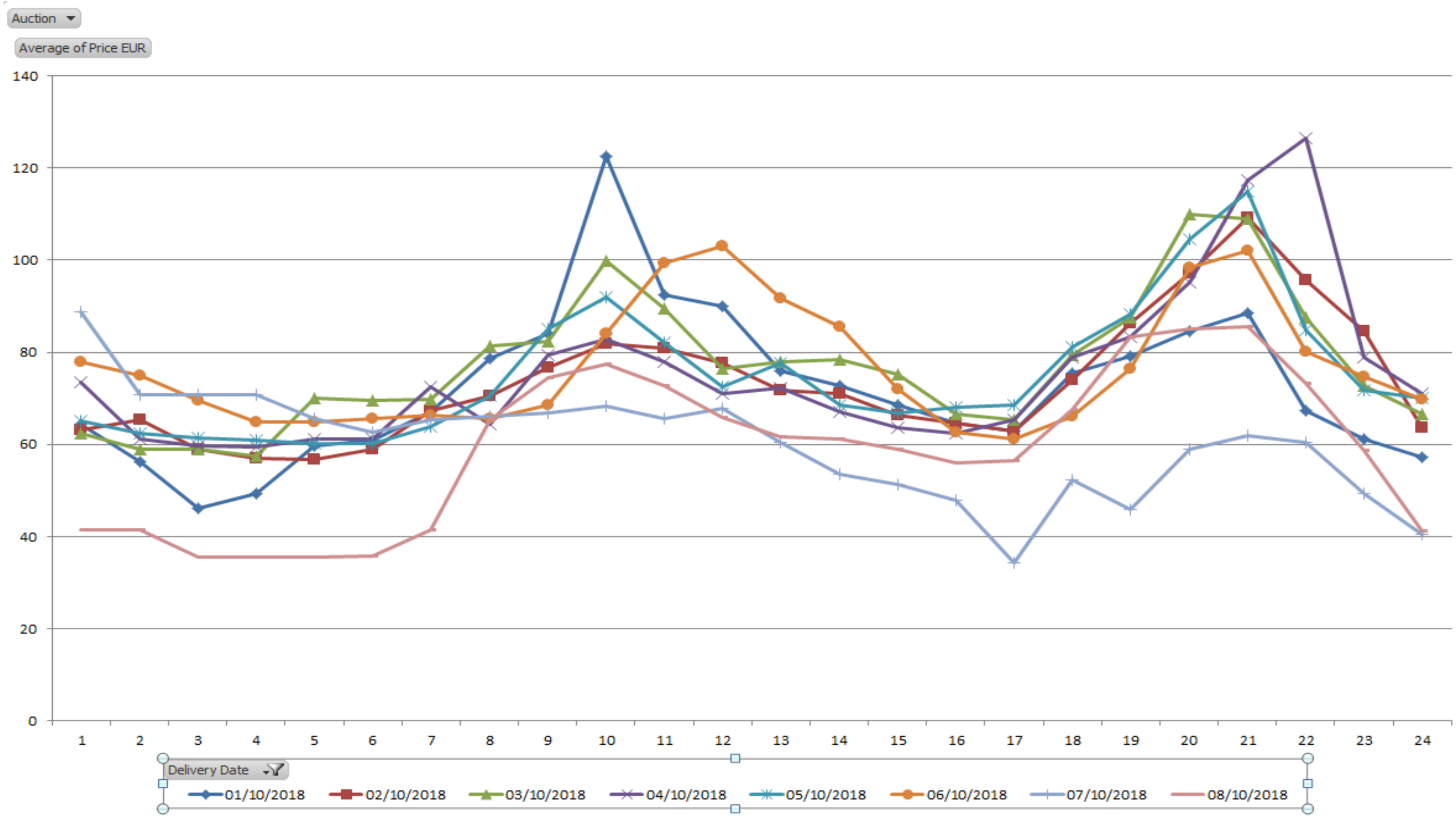
- Volumes and values traded are slowing building
  - Highest no. of trades recorded on 7th, and values on the 2nd and 8th

Trade date	Total Trades	Traded Volumes MWh	Trade Value €	Average Price €
01/10/2018	594	2632.8	€ 173,377.97	€ 65.85
02/10/2018	760	4857.4	€ 402,656.43	€ 82.90
03/10/2018	242	439.8	€ 33,313.05	€ 75.75
04/10/2018	680	4231.6	€ 278,516.59	€ 65.82
05/10/2018	434	1310	€ 95,806.13	€ 73.13
06/10/2018	422	2297.4	€ 182,190.80	€ 79.30
07/10/2018	1932	8138.8	€ 329,366.62	€ 40.47
08/10/2018	904	6967.6	€ 402,376.09	€ 57.75
Grand Total	**5968**	**30875.4**	**€ 1,897,603.68**	**€ 67.62**

EIRGRID SONI

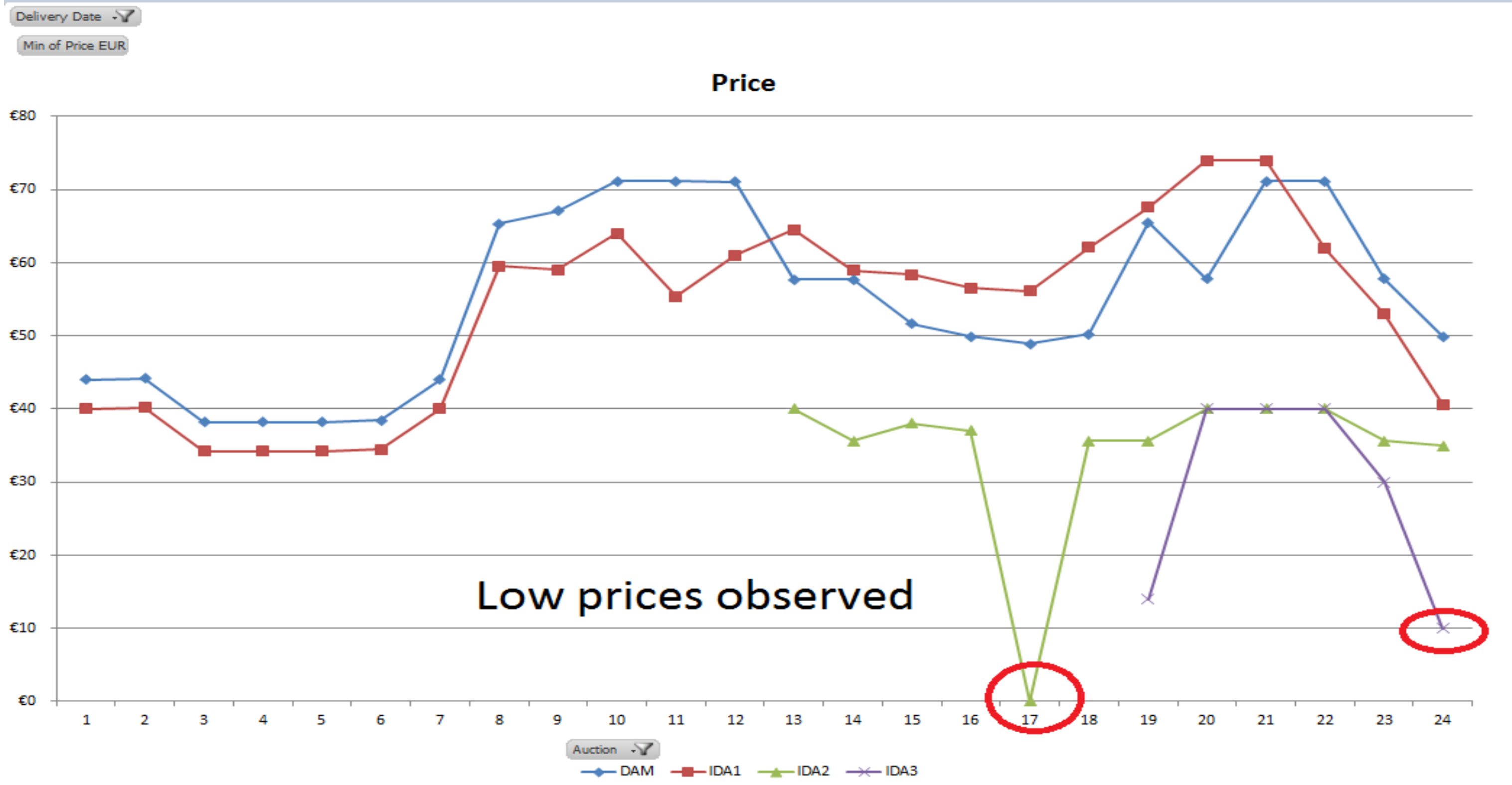
Ex-Ante Market Analysis

Prices following a similar range during the first 8 days of the market



Ex-Ante Market Analysis

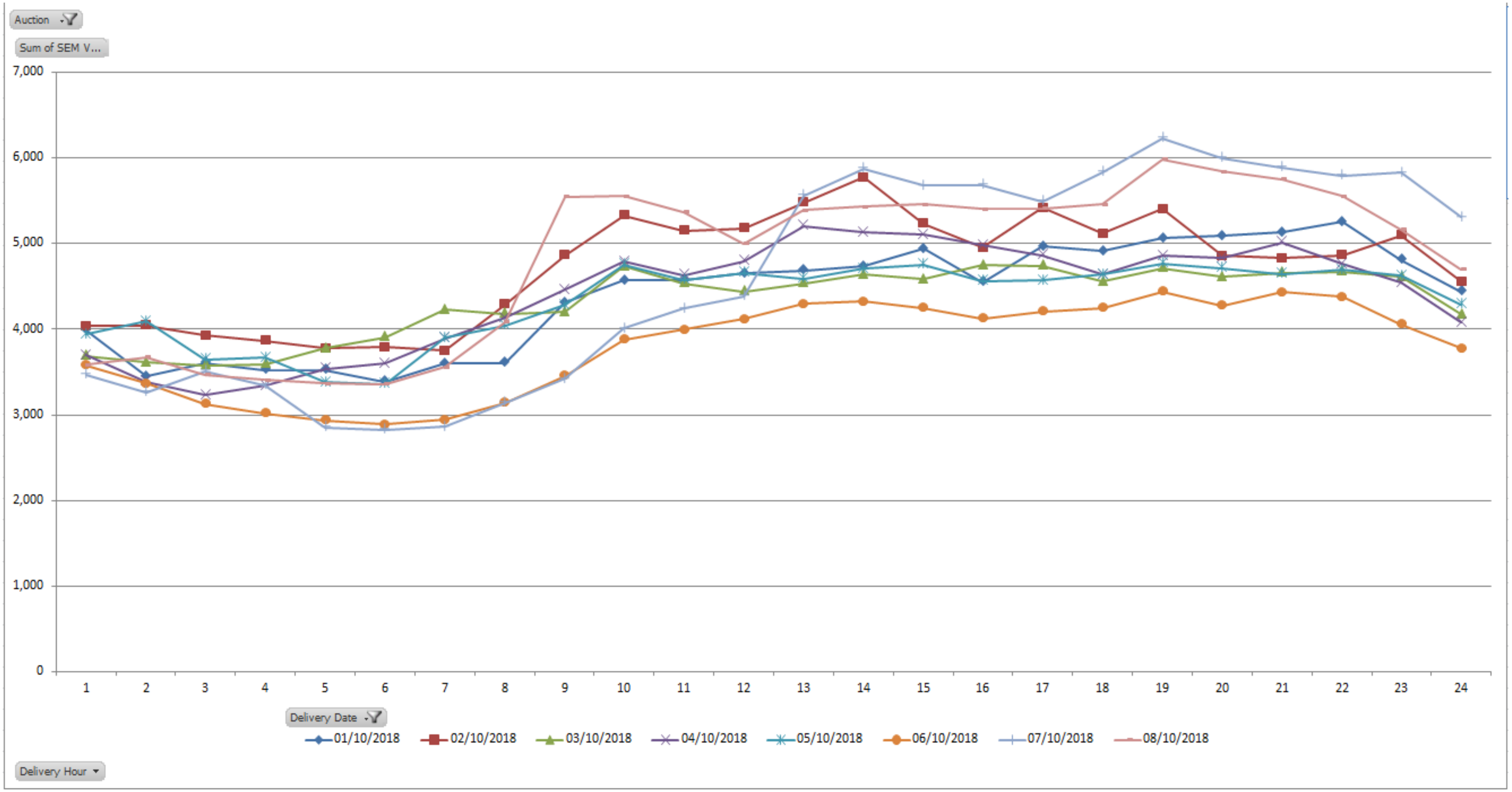
- Lowest (and highest) prices being observed in the Intraday Auctions
- Low price of €0 set in IDA 2 on the 7th October (see below).
- High €145 price set in IDA 2 on the 4th October.



Low prices observed

Ex-Ante Market Analysis

- Traded volumes (aggregate across markets)



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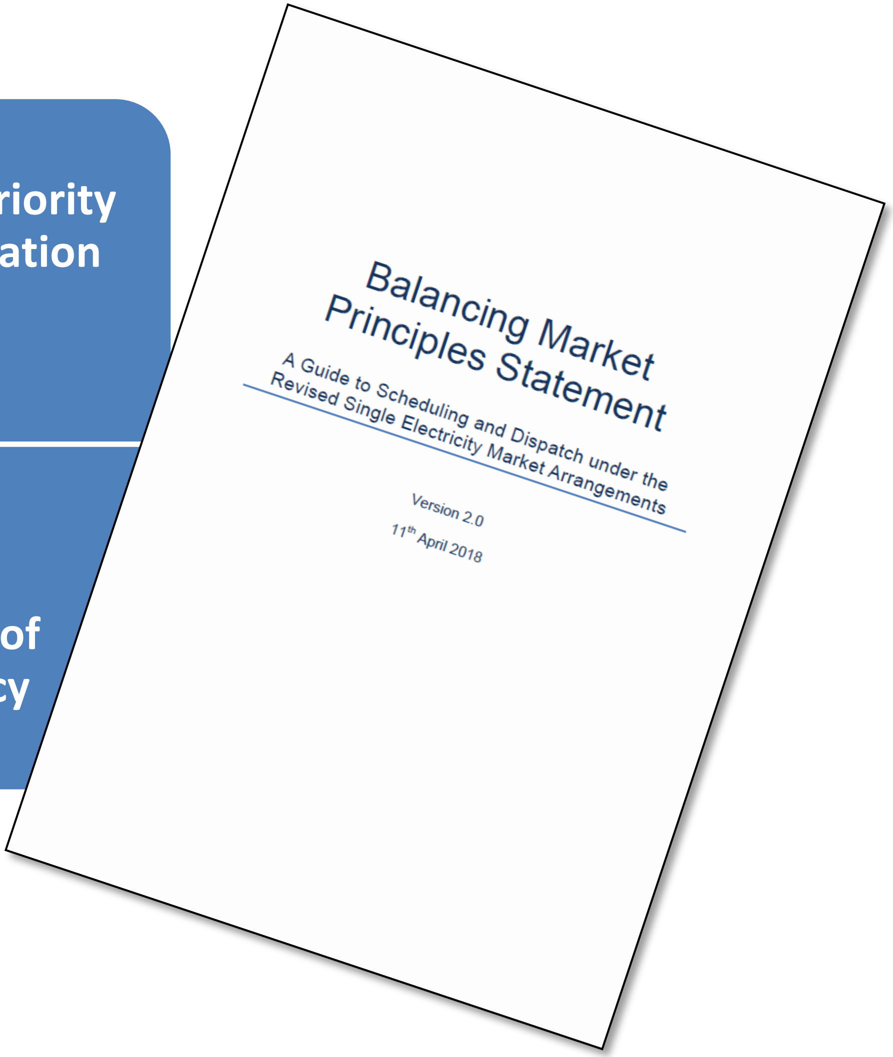
Balancing Market Operations Go-Live in CHCC and NCC

50.05
233437
233504
2721

Balancing Market Principles - Scheduling & Dispatch

Scheduling and Dispatch Process Obligations

1. Ensuring Operational Security
2. Maximising Priority Dispatch Generation
3. Efficient Operation of the SEM
4. Provision of Transparency



Balancing Market Principles Statement

A Guide to Scheduling and Dispatch under the Revised Single Electricity Market Arrangements

Version 2.0

11th April 2018

Inputs to the ‘Indicative Operations Schedules’

Policy Objectives

- Priority Dispatch
- Cost Objective

Participants / System Service Providers

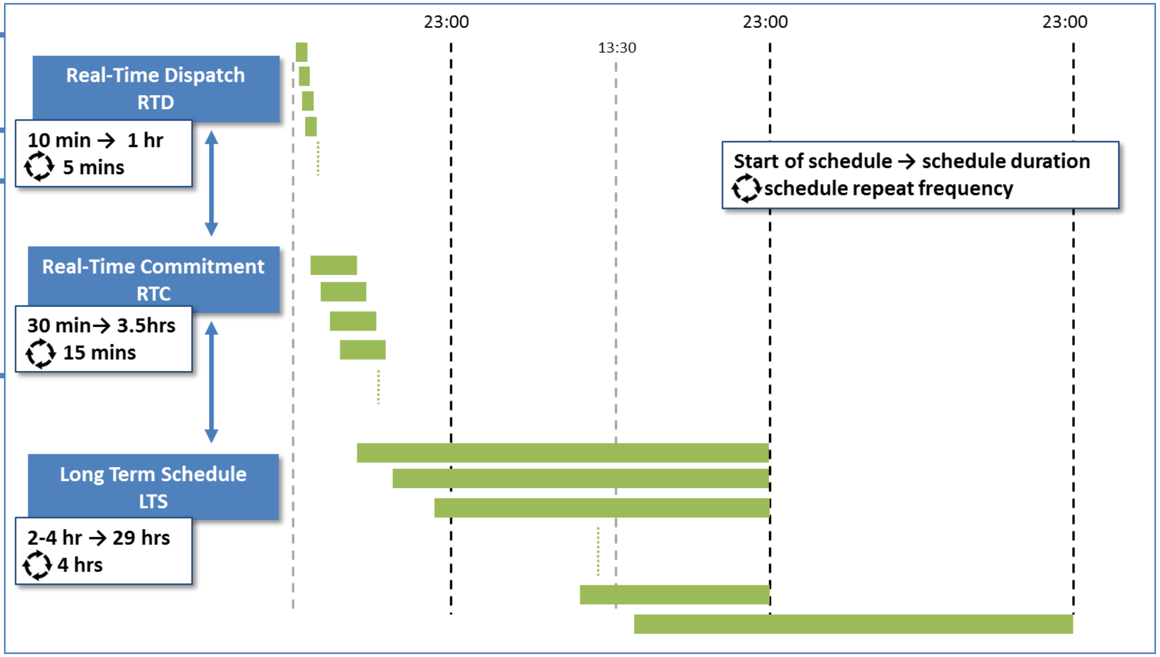
- TOD
- COD
- PNs
- System Services

Ex Ante Markets

- Interconnector Schedules

System Operators

- Demand and Renewables Forecasts
- System Constraints
- System Service Requirements
- Real-Time System Conditions



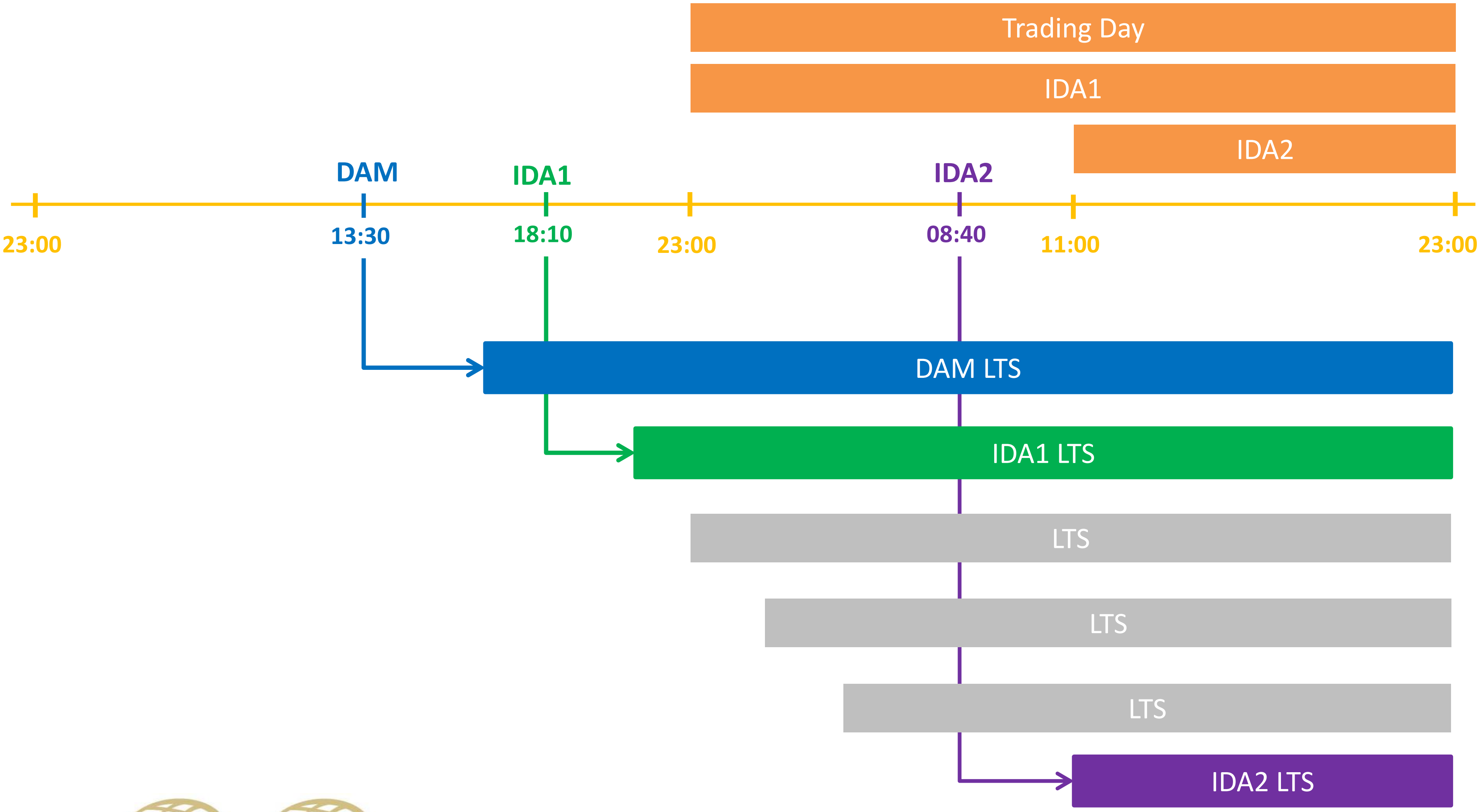
Real-Time Dispatch RTD
10 min → 1 hr
5 mins

Real-Time Commitment RTC
30 min→ 3.5hrs
15 mins

Long Term Schedule LTS
2-4 hr → 29 hrs
4 hrs

Start of schedule → schedule duration
schedule repeat frequency

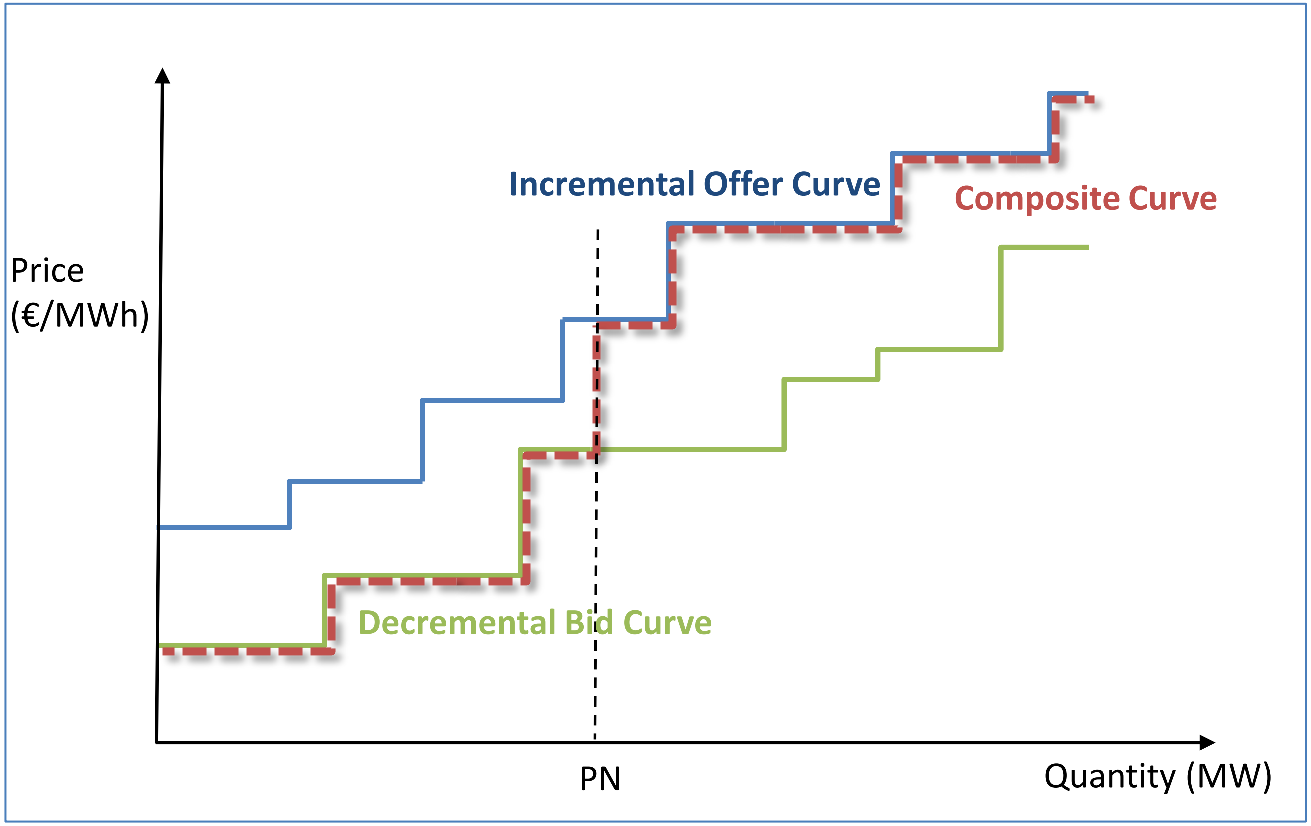
Long Term Schedule - LTS



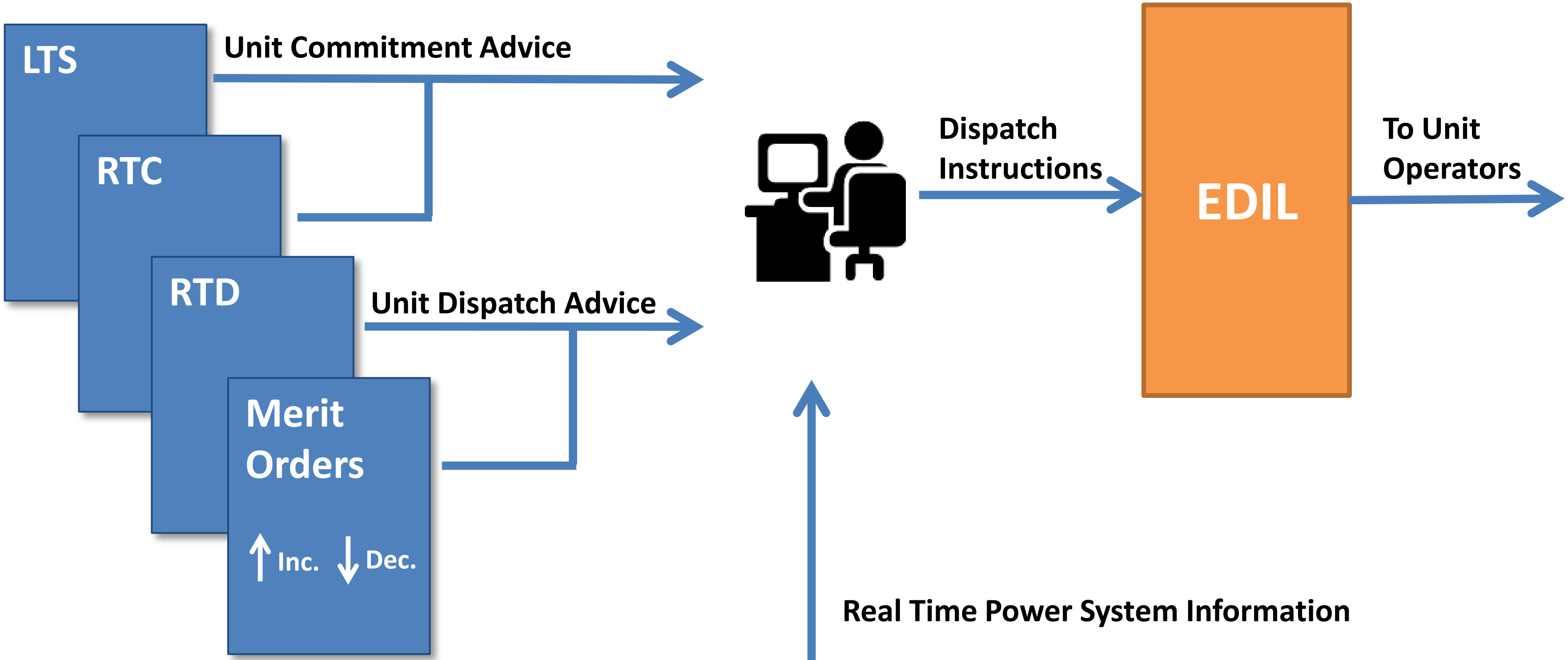
Trading Day
IDA1
IDA2
DAM
IDA1
IDA2
23:00
13:30
18:10
23:00
08:40
11:00
23:00
DAM LTS
IDA1 LTS
LTS
LTS
LTS
IDA2 LTS

Cost Objective

‘minimise the cost of diverging from physical notifications’



Dispatch



LTS

RTC

RTD

Merit Orders

↑ Inc. ↓ Dec.

Unit Commitment Advice

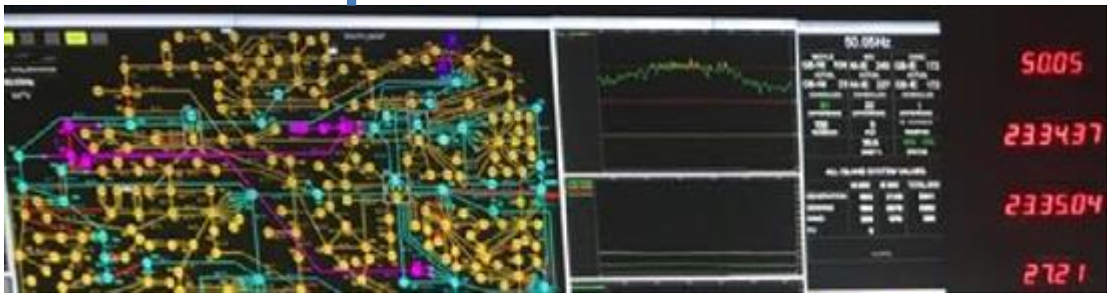
Unit Dispatch Advice

Dispatch Instructions

EDIL

To Unit Operators

Real Time Power System Information


50.05
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System Operator Trading over the Interconnectors

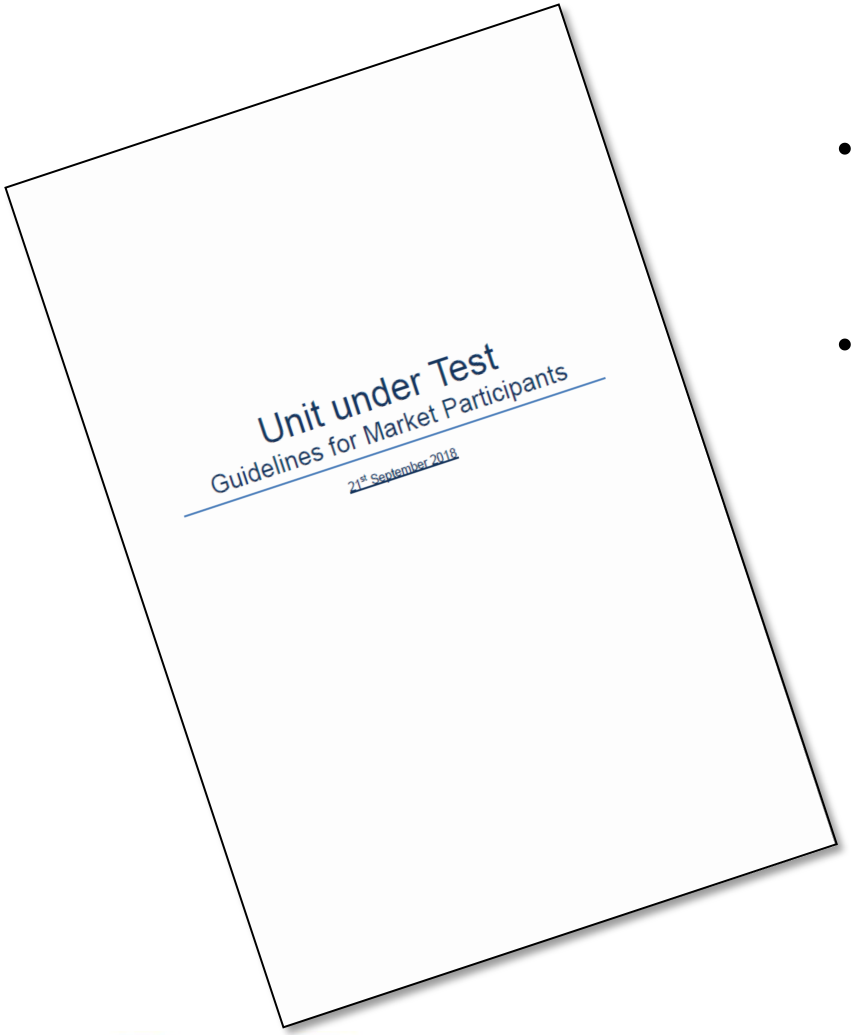
- Our focus is currently on core systems and processes.

- We will ‘SO Trade’ if required to maintain system security.

- ‘SO Trade’ for Priority Dispatch operational in November 2018.
  - Subject to market outcomes.
  - National Grid must approve any ‘SO Trade’ – but they can reject.

- ‘SO Trade’ trials ongoing.

Units Under Test



Unit under Test

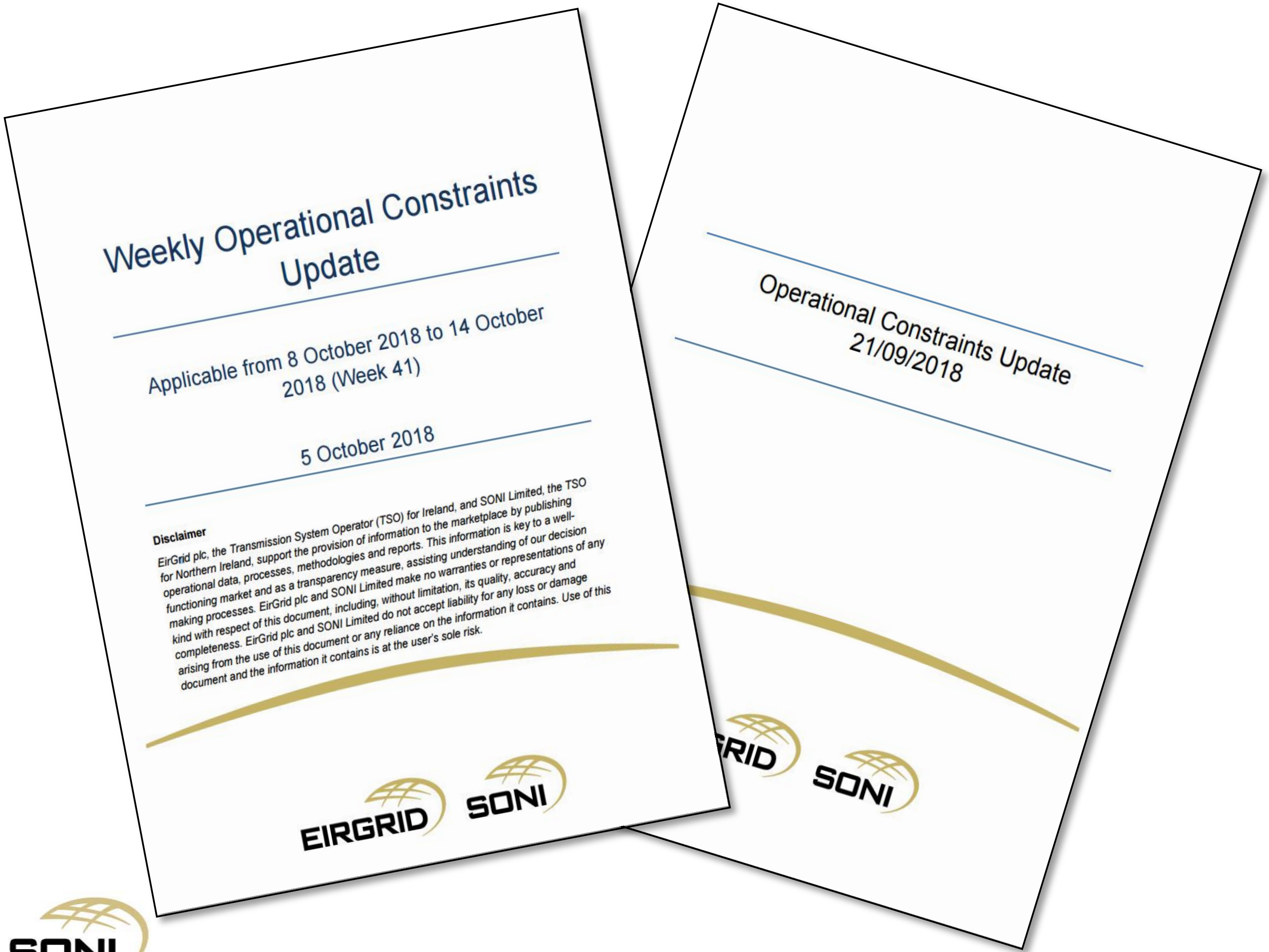
Guidelines for Market Participants

21st September 2018

- All unit testing must be agreed with the respective TSO.
- PNs are submitted with a test flag.

Link

Operational Constraints – New Weekly Update



Weekly Operational Constraints Update

Applicable from 8 October 2018 to 14 October 2018 (Week 41)

5 October 2018

Disclaimer

EirGrid plc, the Transmission System Operator (TSO) for Ireland, and SONI Limited, the TSO for Northern Ireland, support the provision of information to the marketplace by publishing operational data, processes, methodologies and reports. This information is key to a well-functioning market and as a transparency measure, assisting understanding of our decision making processes. EirGrid plc and SONI Limited make no warranties or representations of any kind with respect of this document, including, without limitation, its quality, accuracy and completeness. EirGrid plc and SONI Limited do not accept liability for any loss or damage arising from the use of this document or any reliance on the information it contains. Use of this document and the information it contains is at the user's sole risk.

Operational Constraints Update

21/09/2018

http://www.sem-o.com/publications/tso-responsibilities/

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Query Management	Claire Breslin

Settlement

- **Settlements Schedule Update – Sean O'Rourke**
- Cash Flow Analysis – John O'Dea
- Credit Update – Nigel Thomson

Settlements & Credit runs : Completed to date

Trade Dates	Type	Run Type	No of runs
30th Sep – 9th Oct	Settlements	Indicative	9
30th Sep – 10th Oct	Settlements	Initial	4
30th Sep – 10th Oct	Credit Reports	Daily	9

- As per Nigel Thomson update on credit reports: One credit report per day up to Oct 15th , two daily from Oct 16th and three daily reports from Oct 22nd
- Settlements team : high focus on meeting evening timelines

Settlements & Credit runs : Upcoming events

Trade Dates	Type	Run Type	Date
30th Sep – 6th Oct	Settlements Documents (includes last hour CRM)	Weekly	12/10/2018
30th Sep (Last Hour)	MO Charges	Monthly	12/10/2018

BAL/IMB/CRM Payments in/out

- Payments in date for Settlement Documents issued 12th : D+3 by 12:00pm
- Payments out date for Settlement Documents issued 12th : D+4 by 17:00

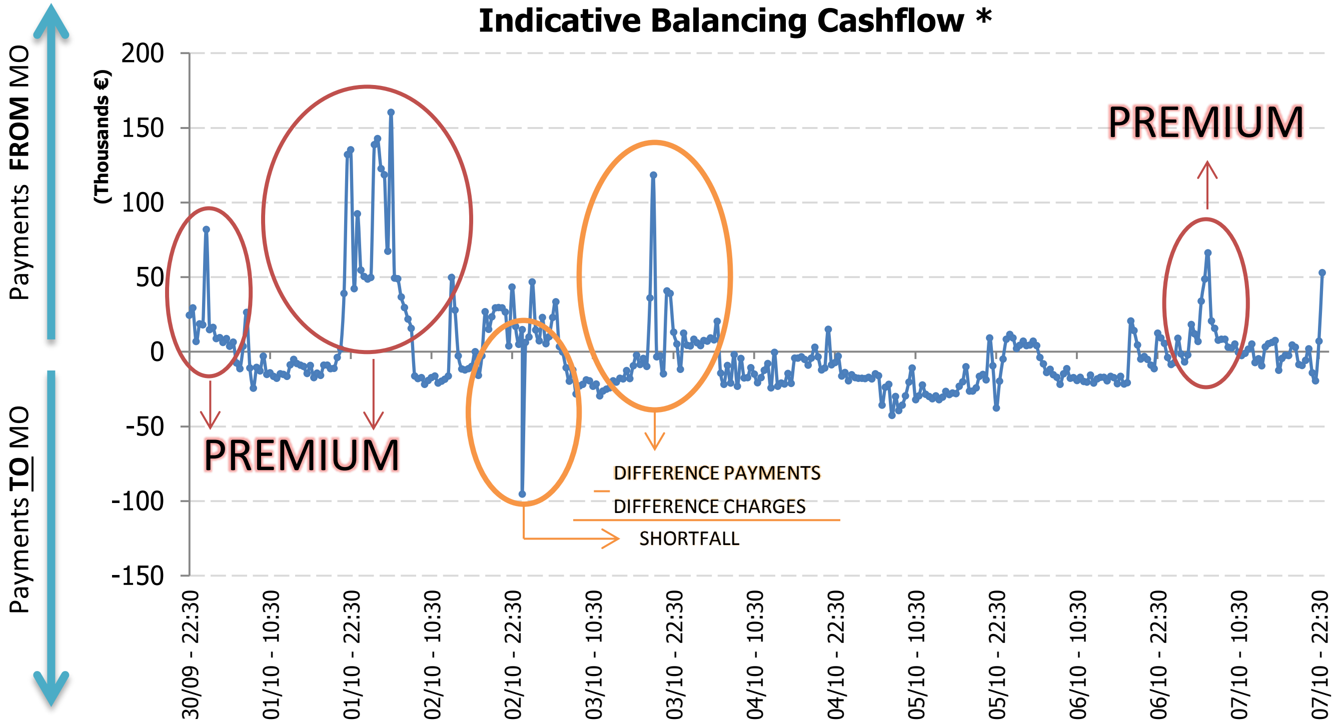
MO Payments in/out

- Payments in date for Settlement Documents issued 12th : D+5 by 12:00pm
- Payments out date for Settlement Documents issued 12th : D+6 by 17:00

Settlement

- Settlements Schedule Update – Sean O’Rourke
- **Cash Flow Analysis – John O’Dea**
- Credit Update – Nigel Thomson

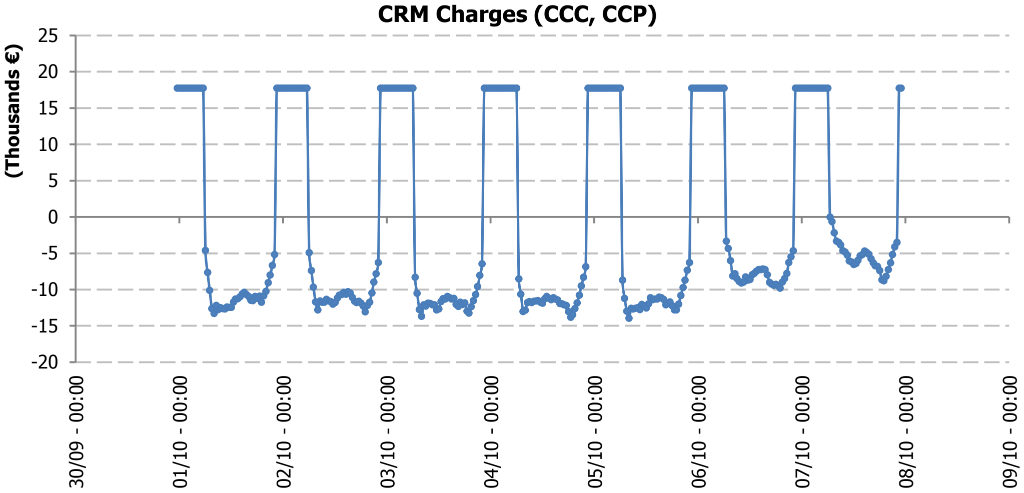
Balancing Cashflow Week 1 (Indicative)



- **Net payment of €617K mainly driven by:**
  - Premium and Discount payments [INC and DEC COD differences vs Imbalance Price]. This is mainly due to large positive and negative imbalance prices. There is also a defect in the selection of Simple COD instead of Complex COD after the Settlement Day Boundary.
  - Difference and Shortfall: Imbalance price exceeding the strike price (currently 500€/MWh). Shortfall triggered by difference between difference payments and difference charges.
  - Fixed Cost Payments of €704K Included in indicative settlement for Saturday 6th October for an Imbalance Settlement Period

*The graph does not include CRM charges, MO charges or CFC.
*Timestamps in UTC

CRM and MO Cashflow Week 1 (Indicative)

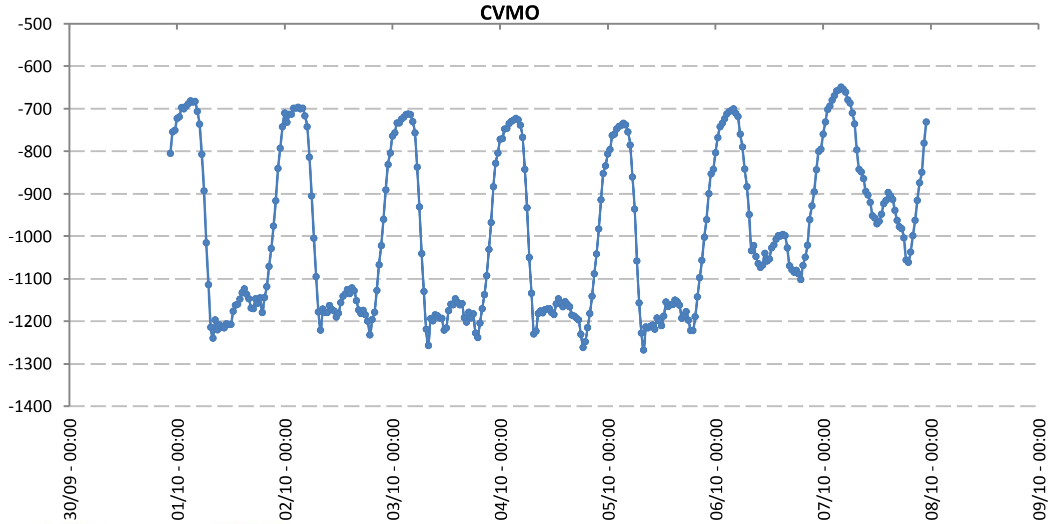

CRM Charges (CCC, CCP)

CRM (Capacity Remuneration Mechanism):

Payments are effective throughout the whole day while charges are applied only between 7am and 11pm.

$$CCP_{\Omega\gamma} = \sum_{n \in \gamma, qCCOMMISS \neq 0} \left(qC_{\Omega n} \times PCP_{\Omega n} \times \frac{1}{ISPIY_y} \right)$$

$$CCC_{v\gamma} = QMLF_{v\gamma} \times FQMCC_{\gamma} \times PCCSUP_y$$


CVMO

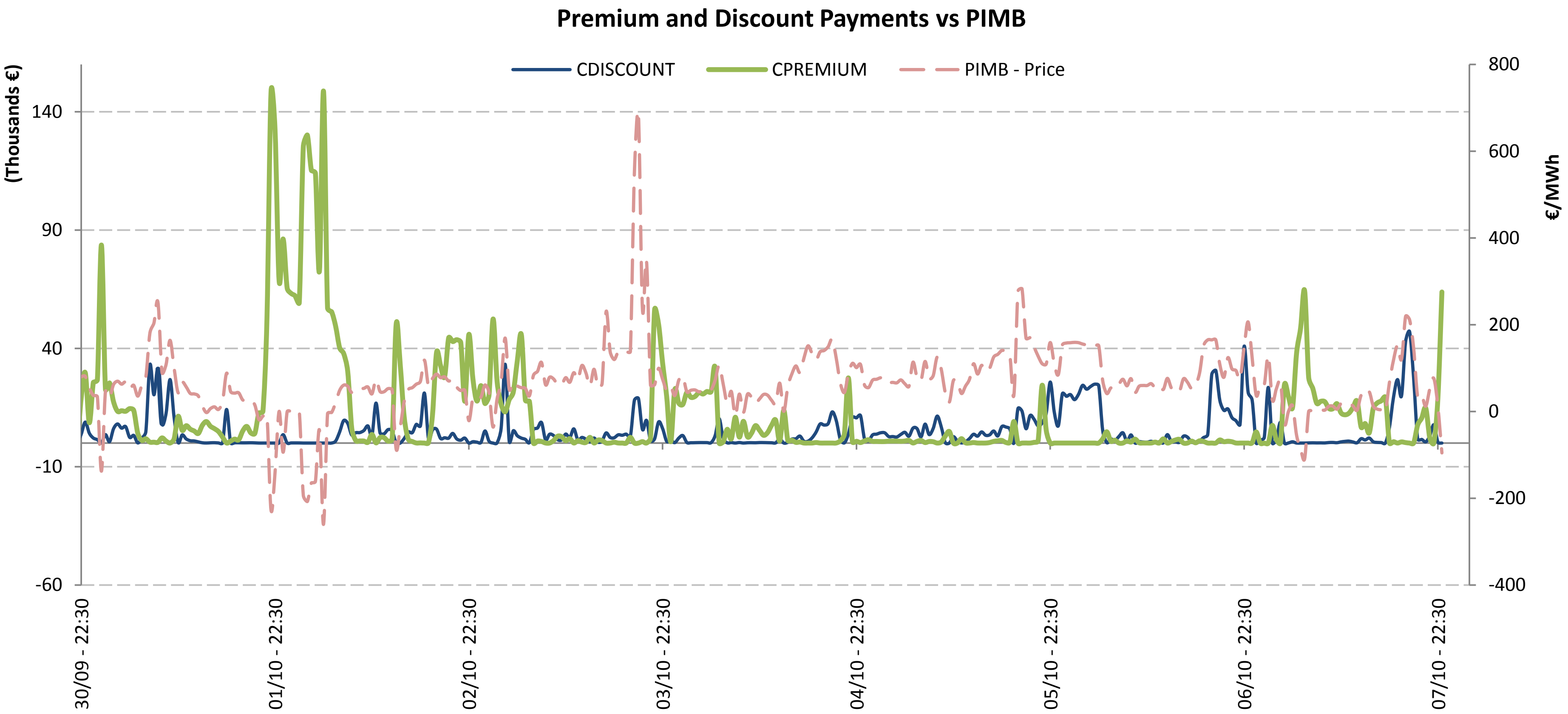
CVMO (Variable Market Operators Charge):

-Variable Charges are based Supplier Unit Metering

-Fixed Market Operators charges CMOAU and CMOAV are charged the last day of the month.

$$CVMO_{vb} = \sum_{\gamma \text{ in } b} QMLF_{v\gamma} \times PVMO_y$$

Premium and Discount Components

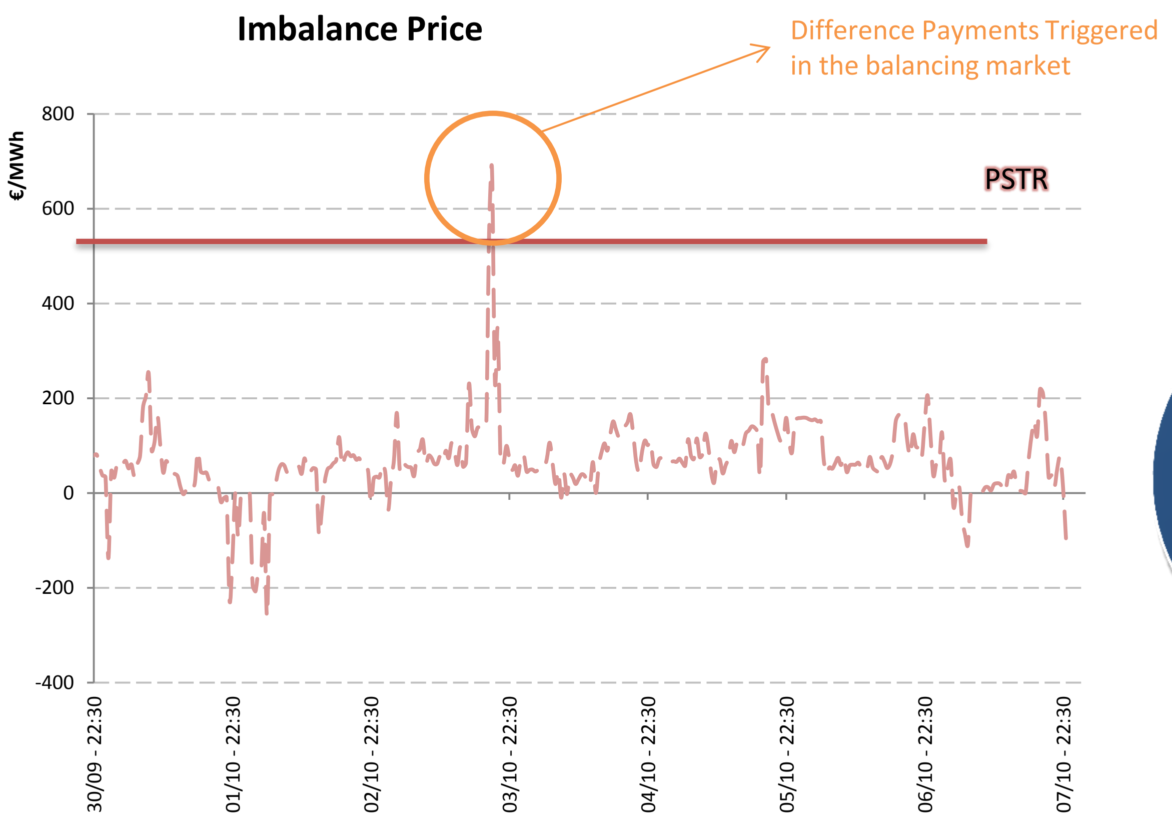


-With **higher** Imbalance prices we get higher Discount payments and with **lower** imbalance prices we get higher Premium payments.

$$
\begin{aligned}
&CPREMIUM_{u\gamma}\\
&= \sum_{o}\sum_{i}\Big(Max(\overbrace{PBO_{uoi\gamma} - PIMB_{\gamma}},0)\\
&\times \Big(QAOLF_{uoi\gamma}\\
&- \ Max(QAOOPOLF_{uoi\gamma}, QAOBIAS_{uoi\gamma}, QAOUNDEL_{uoi\gamma}, QAOTOTSOLF_{uoi\gamma})\Big)\Big)
\end{aligned}
$$

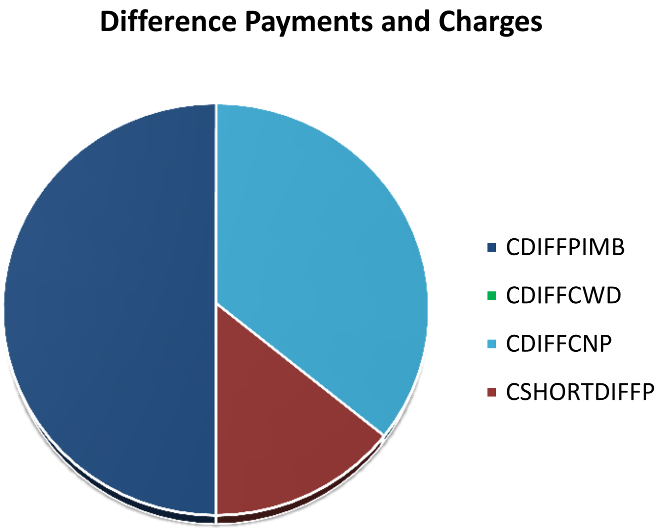
$$
\begin{aligned}
&CDISCOUNT_{u\gamma}\\
&= \sum_{o}\sum_{i}\Big(Min(\overbrace{PBO_{uoi\gamma} - PIMB_{\gamma}},0)\\
&\times \Big(QABLF_{uoi\gamma}\\
&- Min(QABBPOLF_{uoi\gamma}, QABBIAS_{uoi\gamma}, QABUNDEL_{uoi\gamma}, QABNFLF_{uoi\gamma}, QABCURLLF_{uoi\gamma},\\
&QABTOTSOLF_{uoi\gamma})\Big)\Big)
\end{aligned}
$$

Difference Payments and Charges


Imbalance Price

Difference Payments Triggered in the balancing market

$$CDIFFPIMB_{vd} = \sum_{\gamma \in d} \left(QDIFFPIMB_{v\gamma} \times Min\left(0, \overbrace{PSTR_m - PIMB_\gamma}\right)\right)$$


Difference Payments and Charges

The Imbalance Price went above the strike price on the 3rd leading to Difference charges and payments.

Causes for Shortfall:

- Defect regarding - Within day difference charges
- Stop Loss limits
- Autoproducers difference charges not being correctly calculated

Known Settlement Issues

- Selection of Simple COD instead of Complex COD at the Settlement Day Boundary- Fix Delivered
- Difference Within Day Charges reduced due to simple MAX/MIN logic change- Fix Delivered
- I/C CIMB/Premium/Discount Settlement not outputting from system - I/C trades interface issue
- Difference Charge Calculation - Autoproducer trading sites not being correctly calculated
- Missing BOA at the start of Settlement Day intermittently - related to QBOAs not being calculated for affected unit
- Units being skipped in QBOA calculation because of incomplete FPN submission or dispatched above Maximum Generation, causing units not to have QBOAs calculated - Fix Delivered
- Wind units skipped due to internal processing error – Fix Delivered

Settlement

- Settlements Schedule Update – Sean O’Rourke
- Cash Flow Analysis – John O’Dea
- **Credit Update – Nigel Thomson**

Temporary Process

Issue:

- Process issue with managing collateral allocation between SEM and I-SEM
  - It was not envisaged to be such high volumes
  - ~25+ small value Credit Cover Increase Notices (CCINs) in SEM would have occurred each day and the transitional process of requesting allocation of I-SEM to SEM posted collateral was to cumbersome to cope with this.

Solution:

- Temporary process implemented to manage in the short term
  - Communicated in daily call and email sent to all distribution list
  - Temporary process included:
    a. **Automatic allocation of Posted Credit Cover to SEM** if CCIN
    b. **Afternoon I-SEM credit report only** until after final SEM Initial Capacity payment cycle complete (15th Oct '18)
      - No morning or mid-day reports
- More details on the issue and mitigations are available from the SEM-O website here

Phase Out of Temporary Process

- Morning and mid-day I-SEM credit reports
  - Plan to publish morning credit reports from 16th October

    i.e. 2 credit reports per day
  - Plan to publish mid-day credit reports from 22nd October

    i.e. 3 credit reports per day

Credit Report	Credit run started	Estimated Publication Time
Morning	9:00	10:30
Mid-day	12:00	13:30
Afternoon	15:30	17:00

Automatic Allocation Phase Out

- **Automatic allocation** of collateral between SEM and I-SEM will stop from 16th Oct.

- **SEM Resettlement Invoices and SEM Credit Cover**
  - In SEM, you may get a Credit Cover Increase Notice (CCIN) when resettlement invoices created
    - You will need to either:
      - **a. Pay SEM resettlement invoice early**
        - within 2 working days [not standard 3 working days]
      - **b. Request transfer of excess collateral from I-SEM to SEM** to cover this (I-SEM collateral refund authorised person needs to request this following AP9 Collateral refund procedure. [TSC Part C 11.12.2]
        - Must be done within 1 working day of the CCIN
        - Must specify that the refund needed is part of a interim transfer facility and provide the related SEM Participant ID.
      - c. SEMO will also accept **requests to maintain an additional buffer** of SEM credit cover over and above the amount required by [TSC Part C 11.9.3]
        - Request in by Monday 15th October to crmteam@sem-o.com
        - From SEM Collateral Refund Authorised person

Resolving Credit Cover Increase Notices (CCIN)

- Whether breach is resolved or not is based on results of next I-SEM credit cover report
- If latest report is not in breach then CCIN considered resolved
- You will have 2 working days from the working day after the date of issue of the Credit Cover Increase Notice (i.e. credit breach report) to bring your credit cover back in line (i.e. a new credit report needs to show no breach)
- Just posting the difference between the required and posted credit cover from the first breach report may not be enough, as the inputs and calculations move on.

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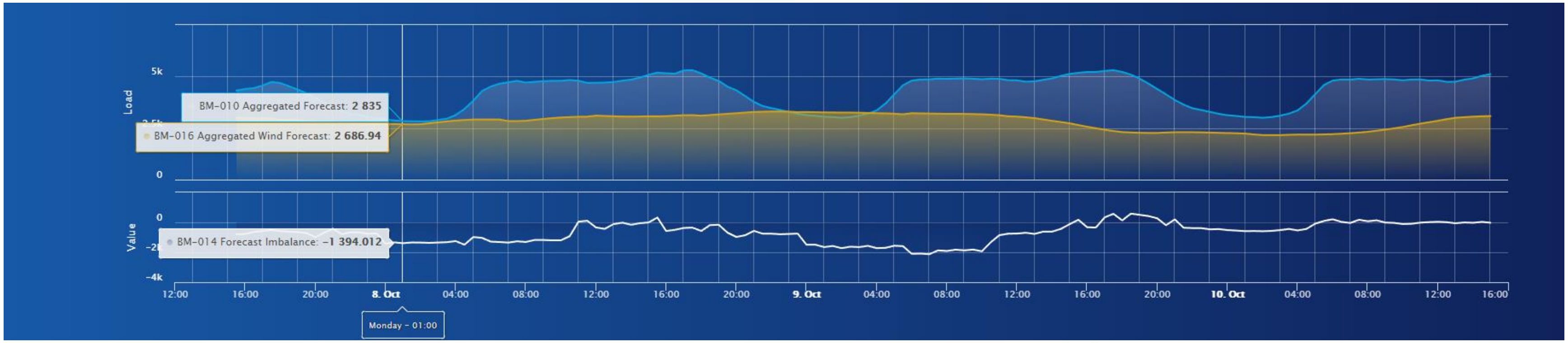
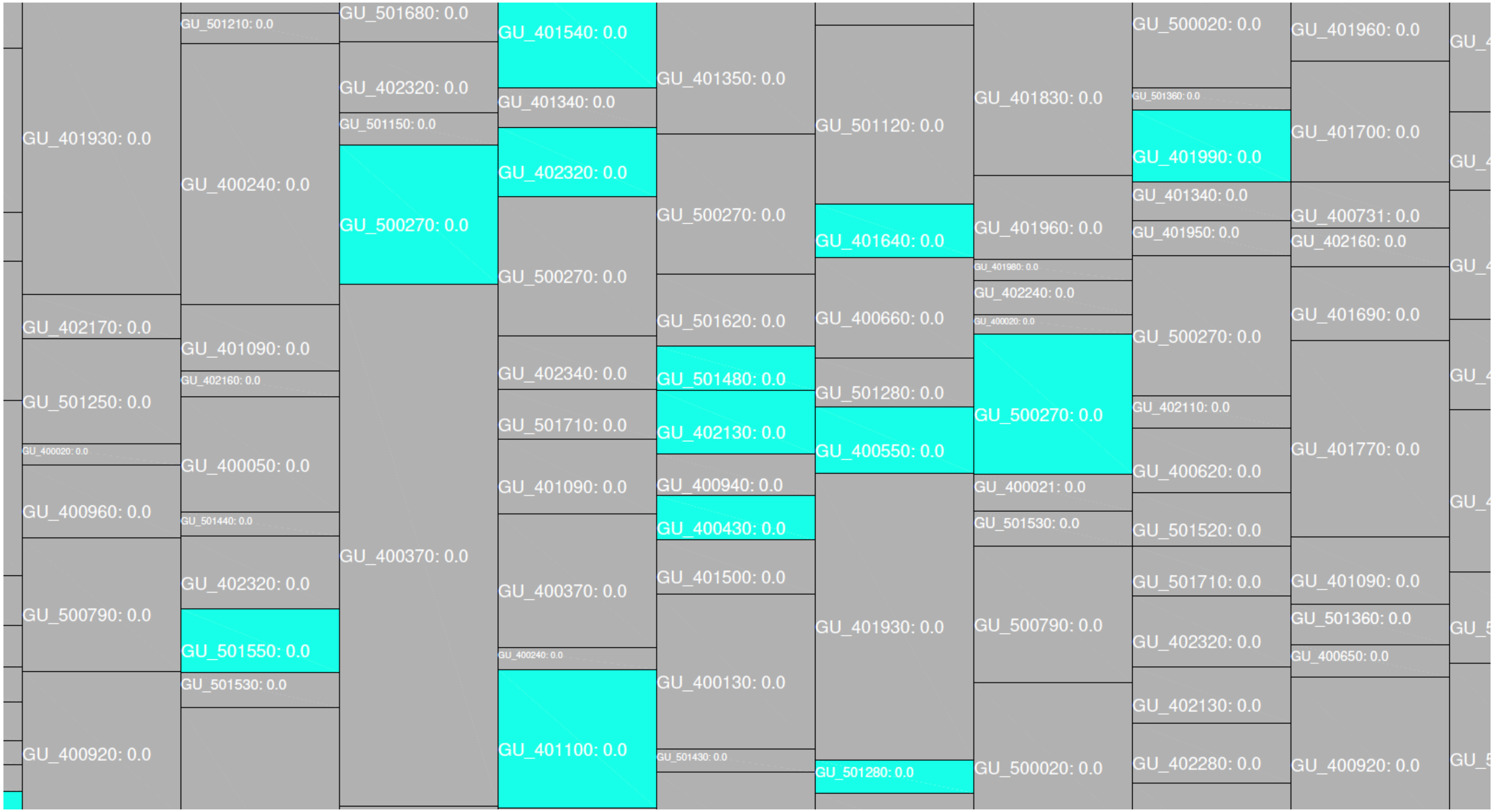
Imbalance Pricing - Key messages

- Balancing Market outcomes driven by:
  - Ex Ante Trading – DAM, IDAs and IDC
  - High wind, lower system margins
  - PNs and offers/bids
- Outcomes broadly reflective of fundamentals
  - Long → Low/negative prices; Short → Higher prices
  - Issue identified and fixed in relation to Negative Reserve Flagging



Yesterday’s Imbalance Pricing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GU_501530: 0.0
GU_500790: 0.0
GU_500020: 0.0
GU_500020: 0.0
GU_501360: 0.0
GU_401990: 0.0
GU_401340: 0.0
GU_401950: 0.0
GU_500270: 0.0
GU_402110: 0.0
GU_400620: 0.0
GU_501520: 0.0
GU_501710: 0.0
GU_402320: 0.0
GU_402130: 0.0
GU_402280: 0.0
GU_401960: 0.0
GU_401700: 0.0
GU_400731: 0.0
GU_402160: 0.0
GU_401690: 0.0
GU_401770: 0.0
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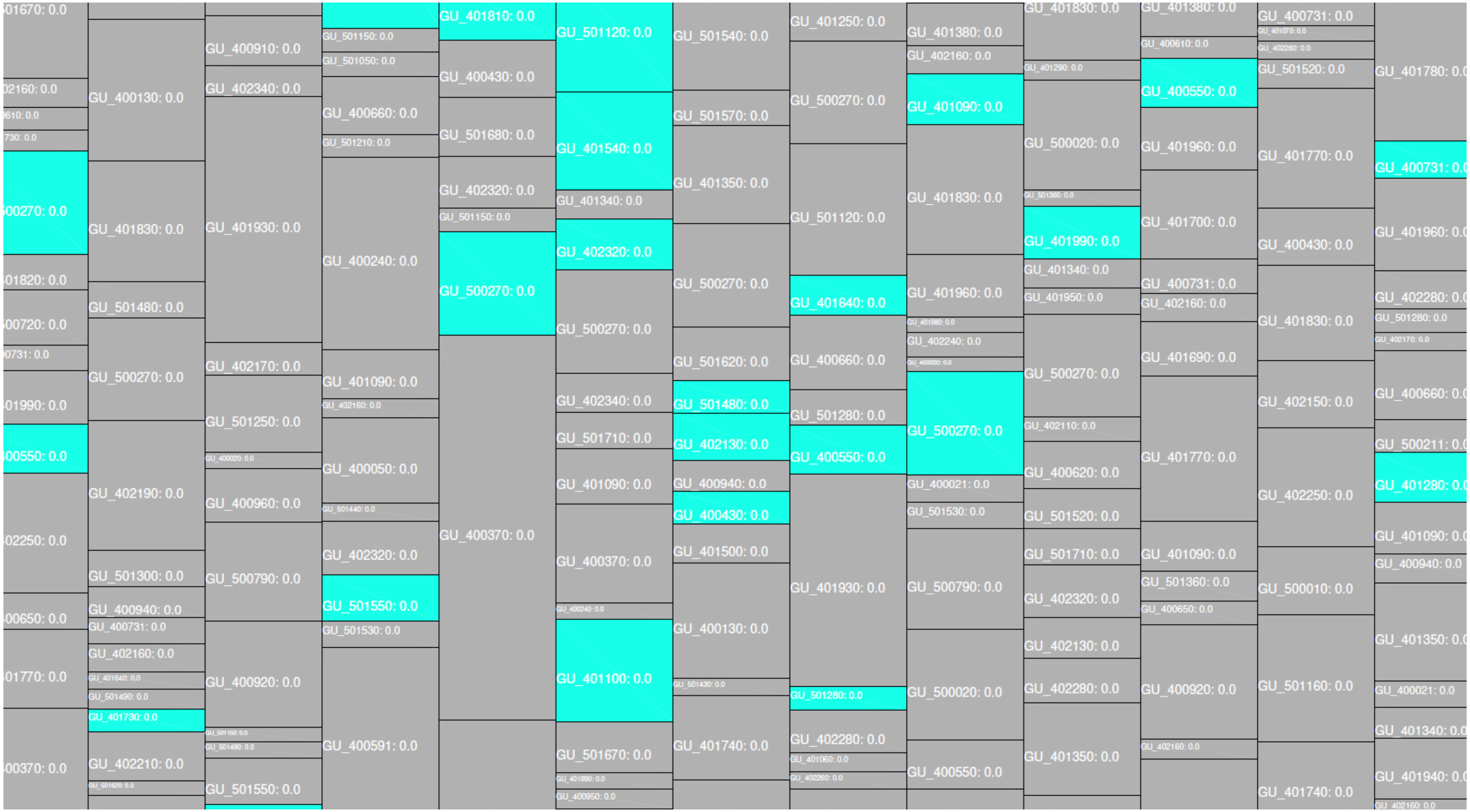
Diagrams are illustrative

Yesterday’s Imbalance Pricing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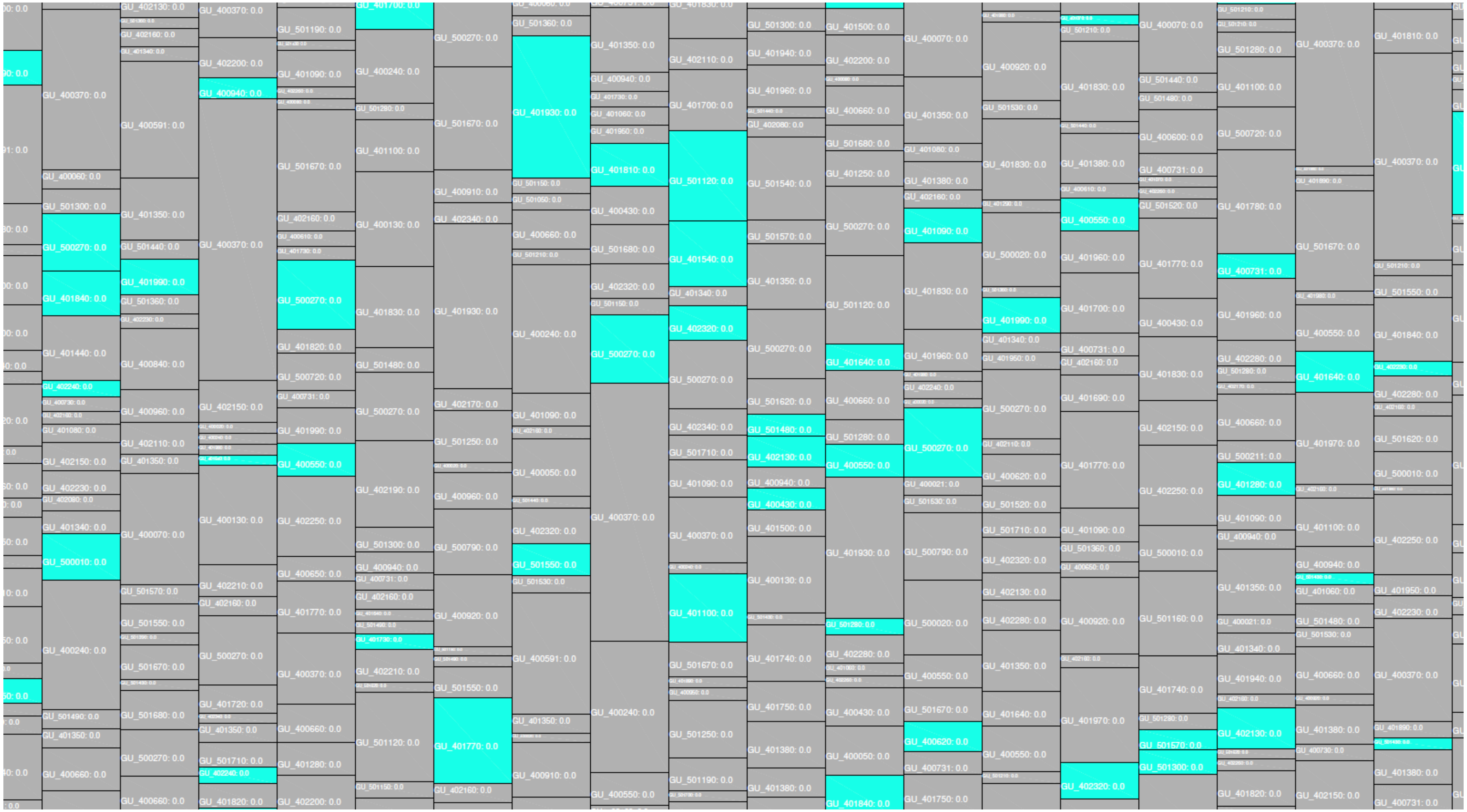
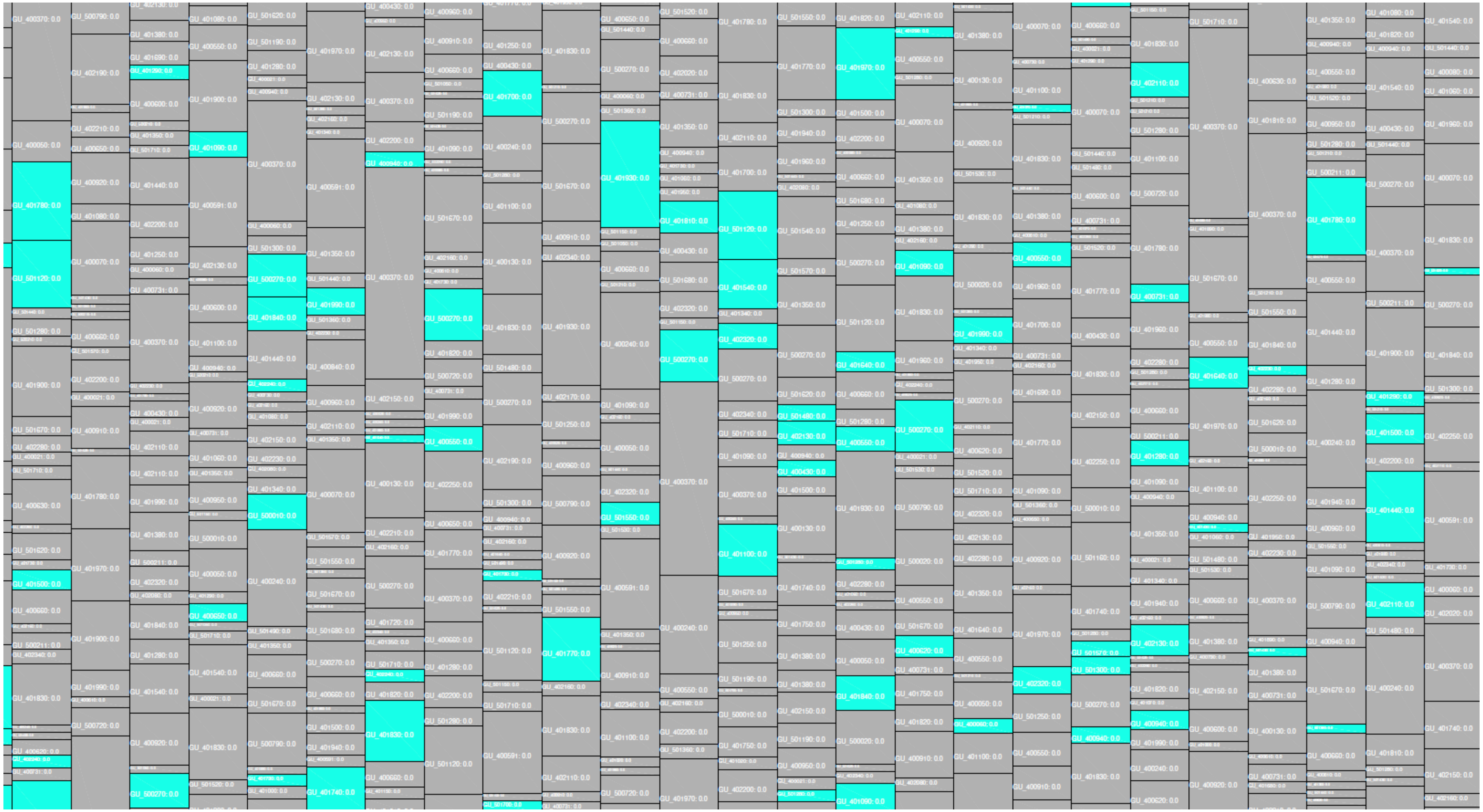
Diagrams are illustrative

Yesterday's Imbalance Pricing



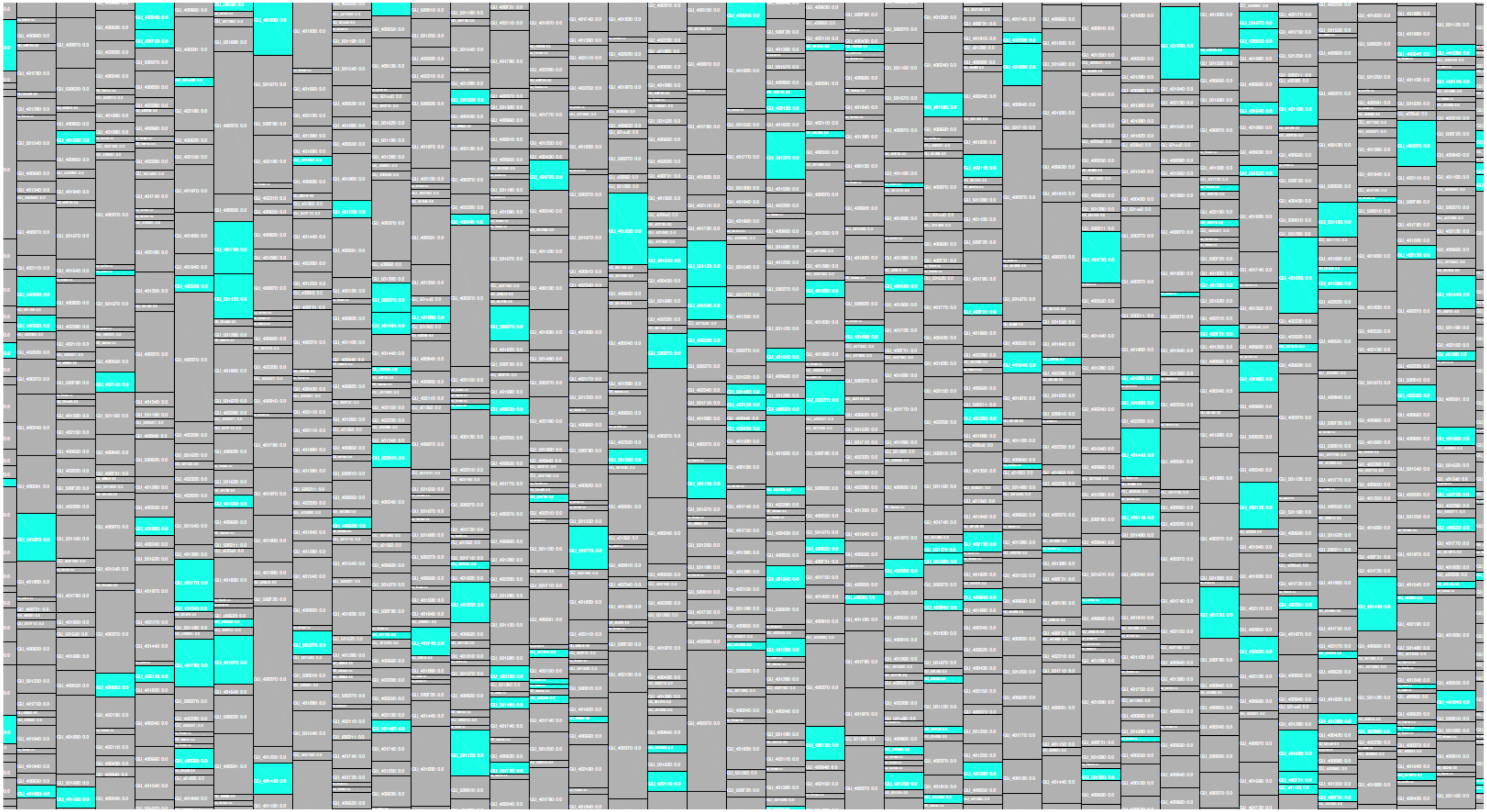
Diagrams are illustrative

Yesterday’s Imbalance Pricing



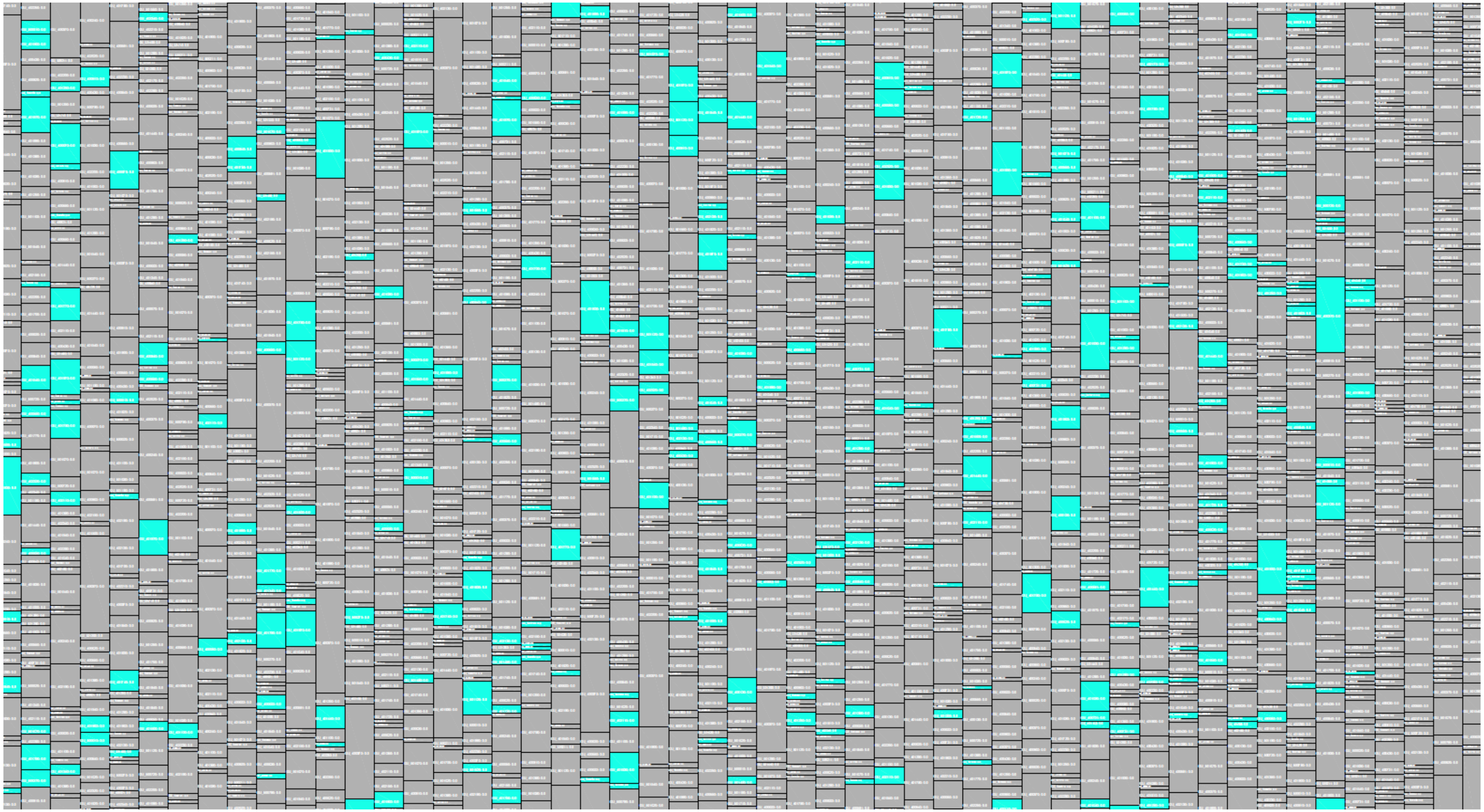
Diagrams are illustrative

Yesterday’s Imbalance Pricing



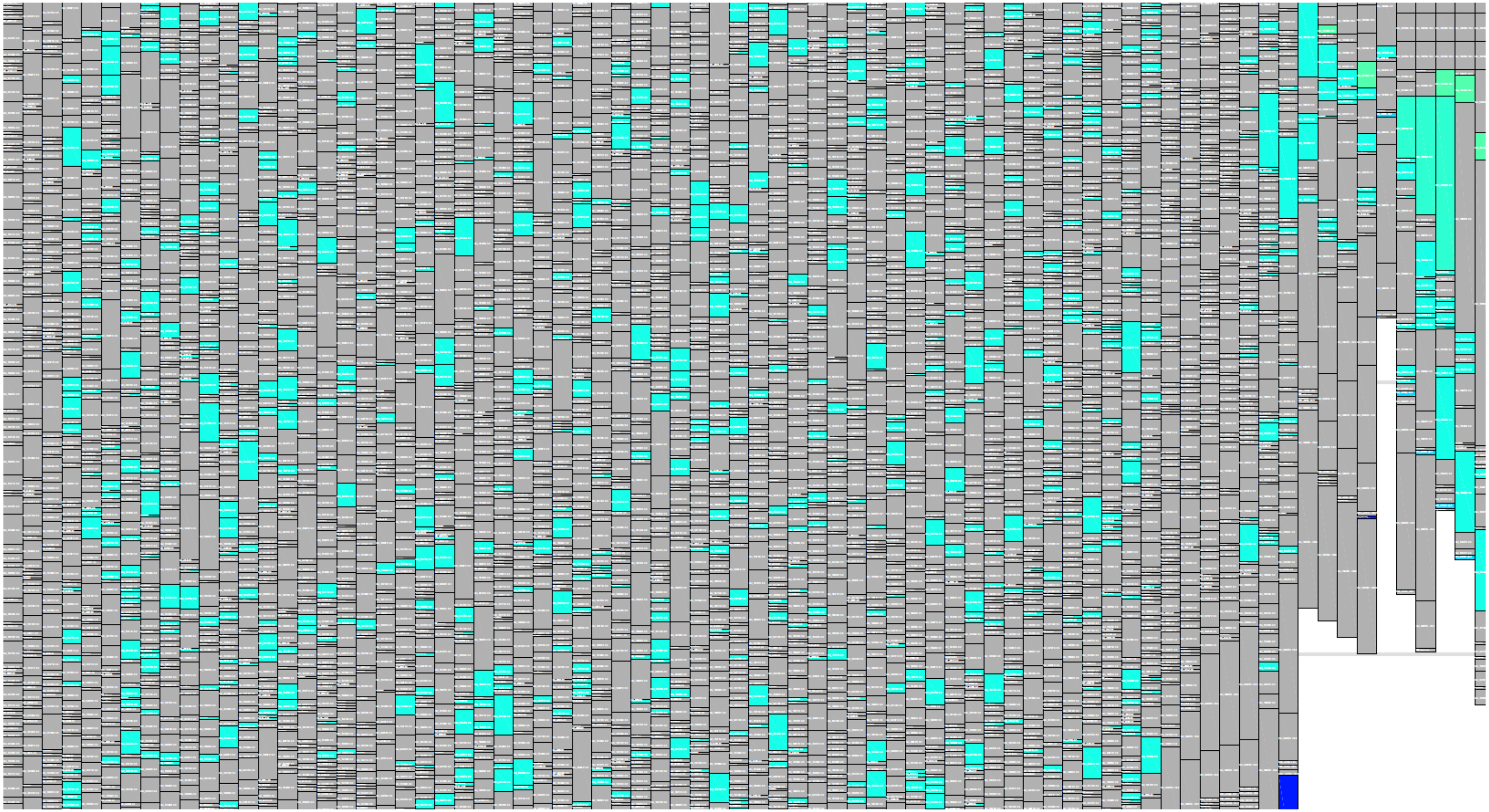
Diagrams are illustrative

Yesterday's Imbalance Pricing



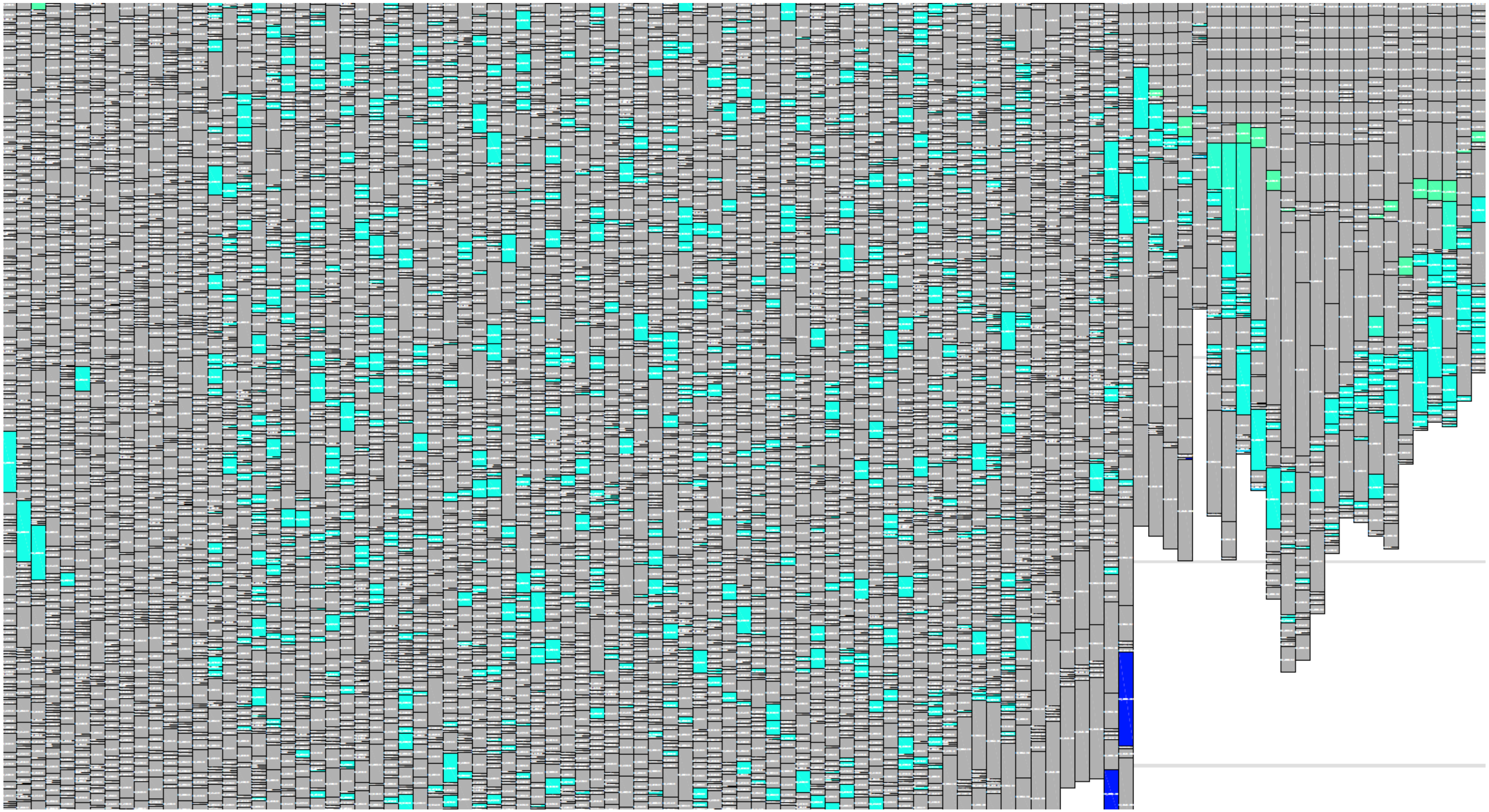
Diagrams are illustrative

Yesterday's Imbalance Pricing



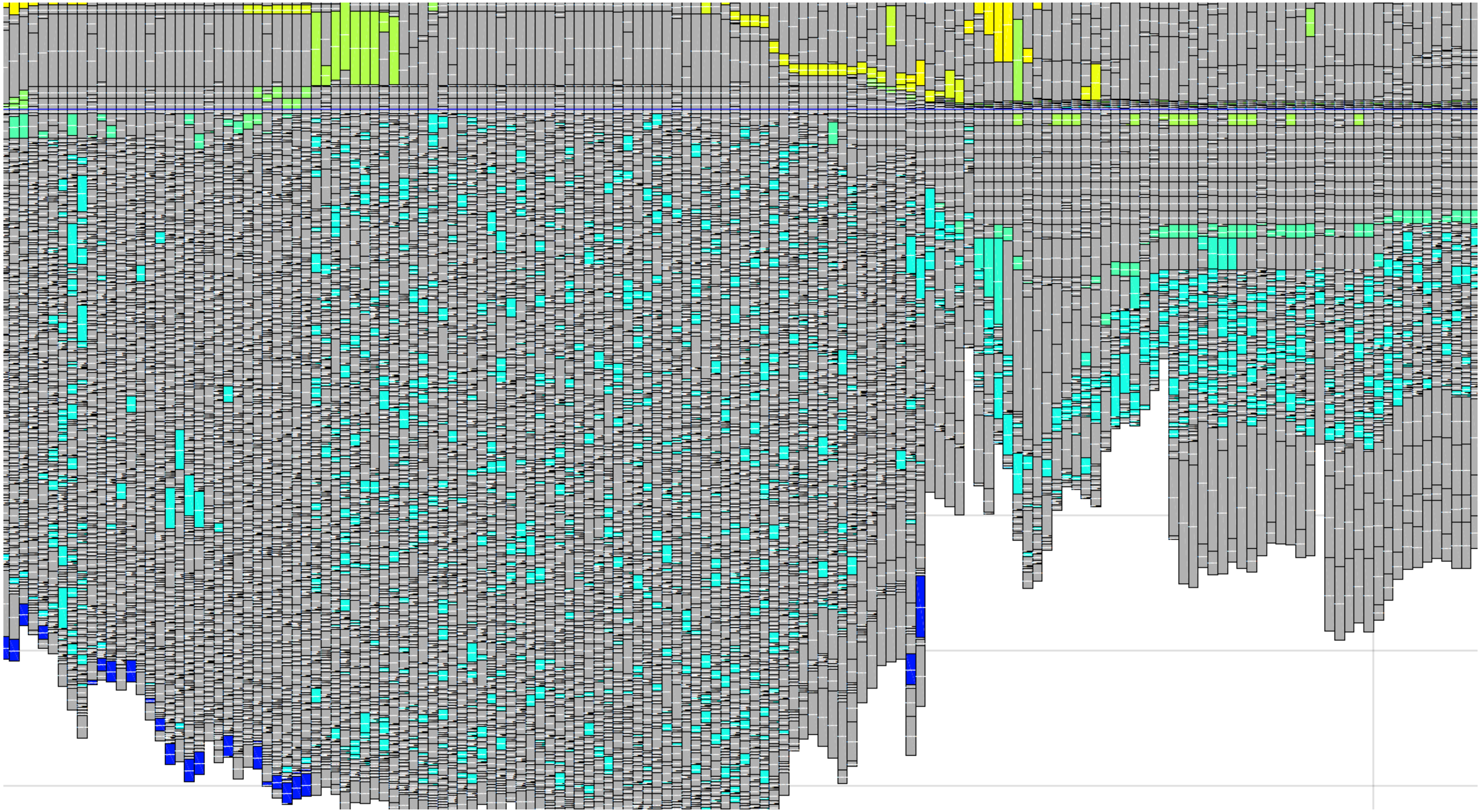
Diagrams are illustrative

Yesterday's Imbalance Pricing



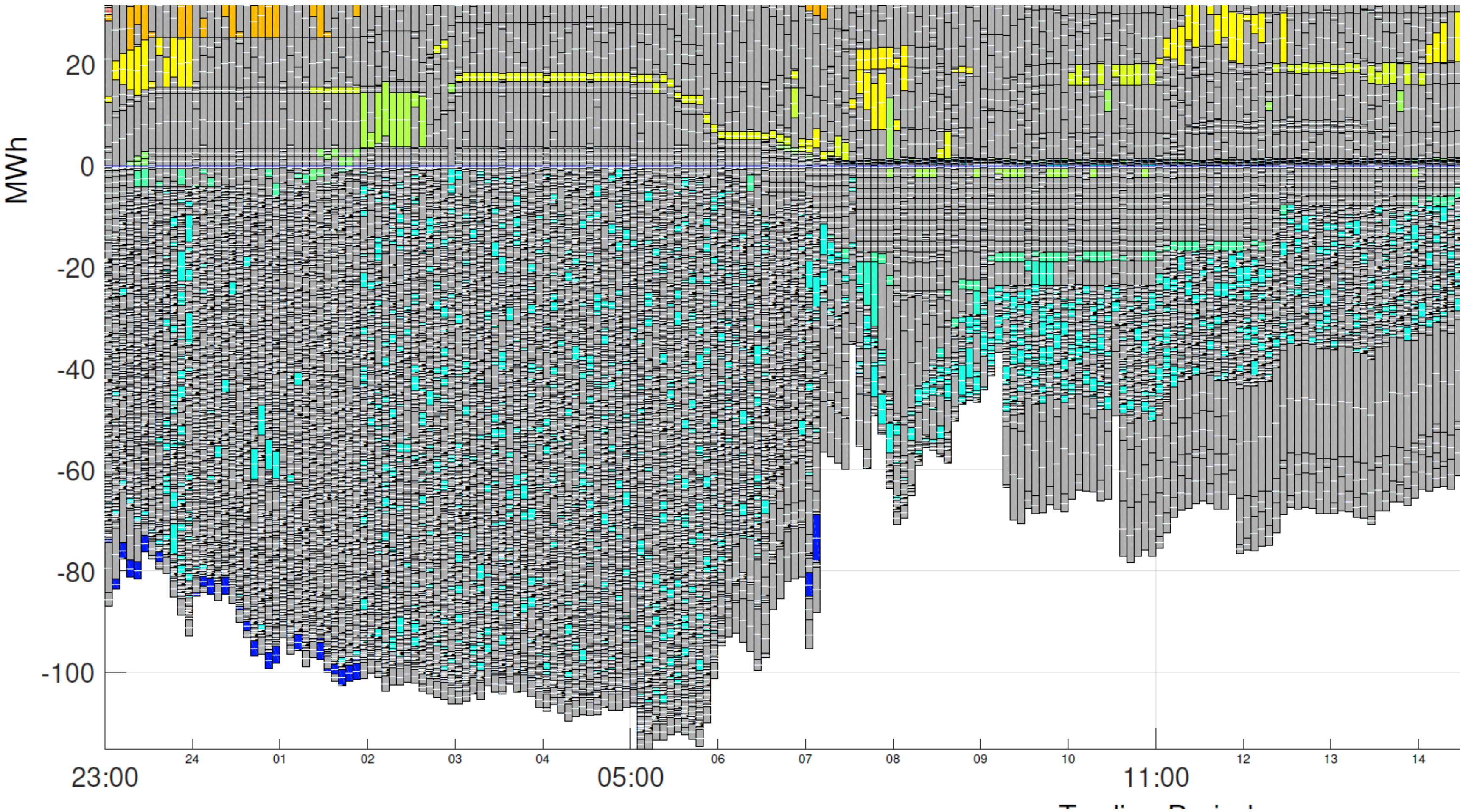
Diagrams are illustrative

Yesterday's Imbalance Pricing



Diagrams are illustrative

Yesterday's Imbalance Pricing



Diagrams are illustrative

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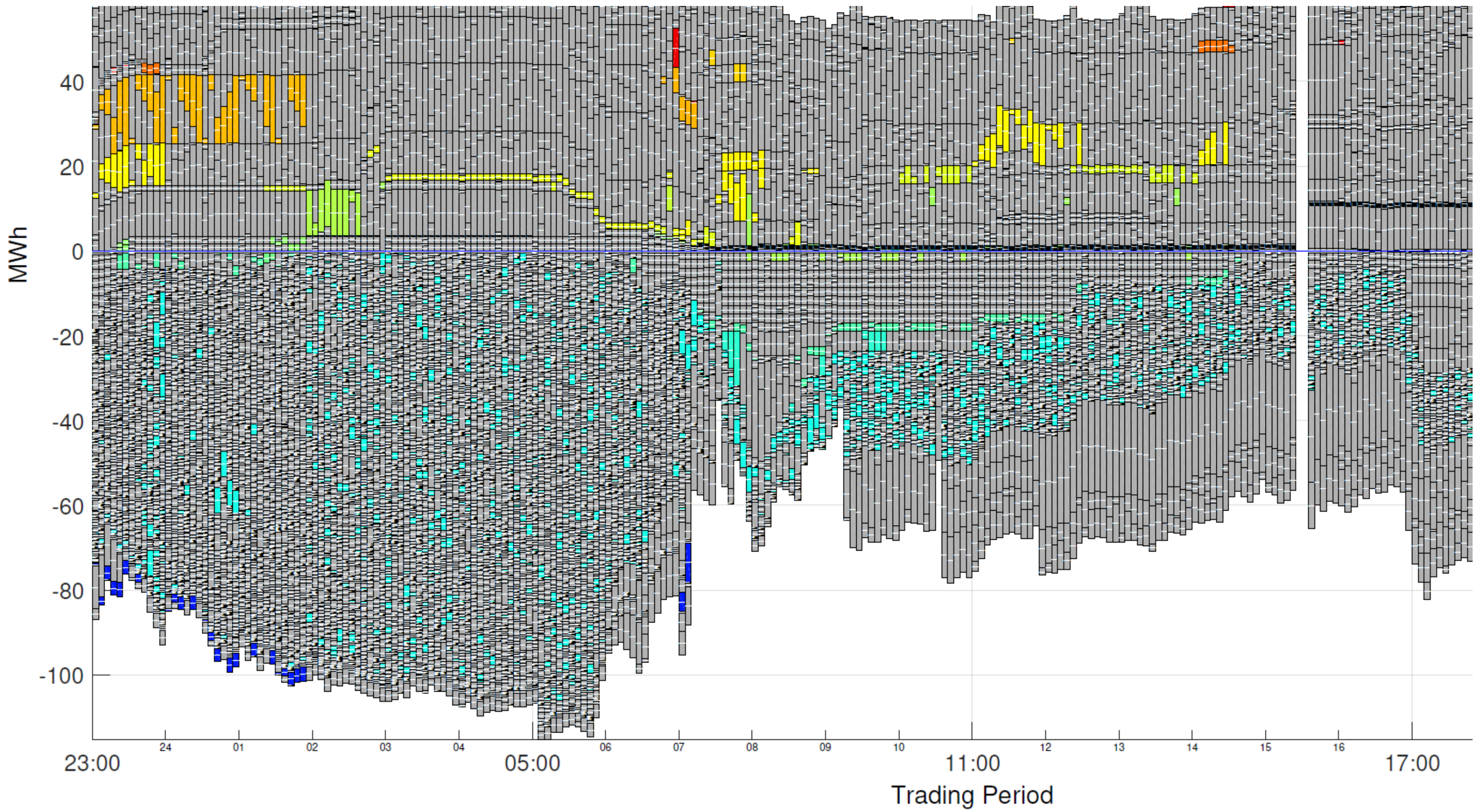

Diagrams are illustrative

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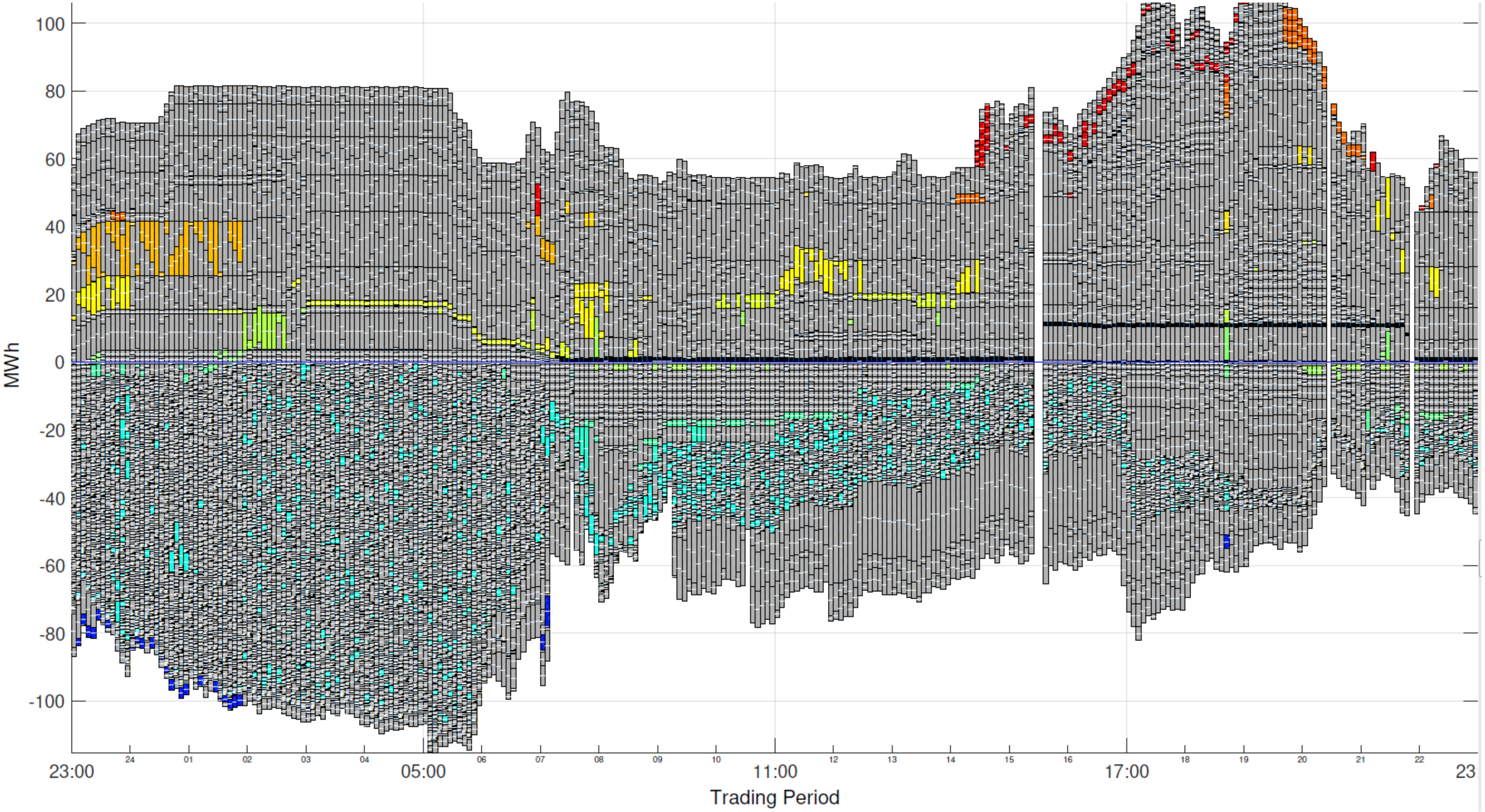

Diagrams are illustrative

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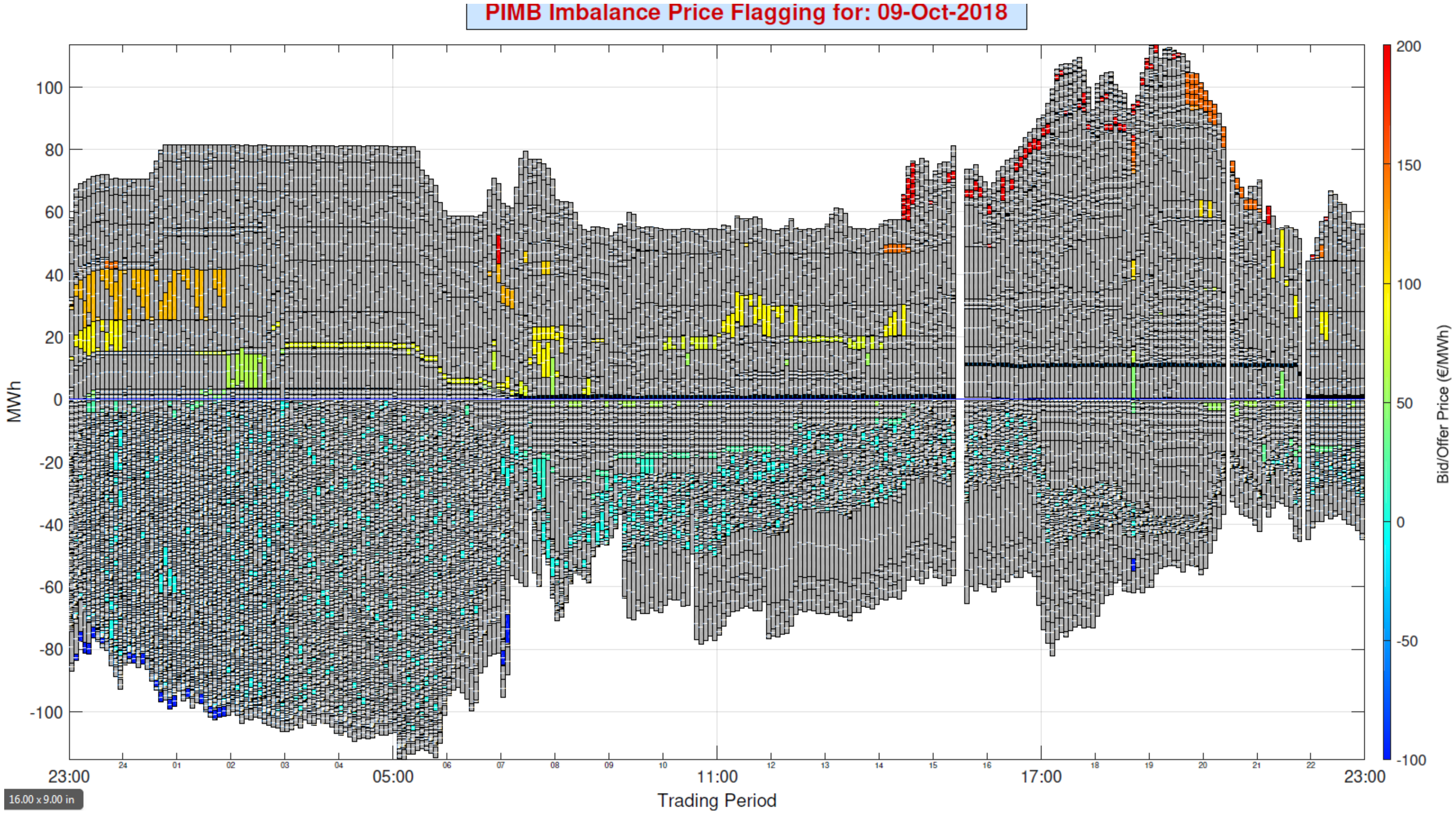
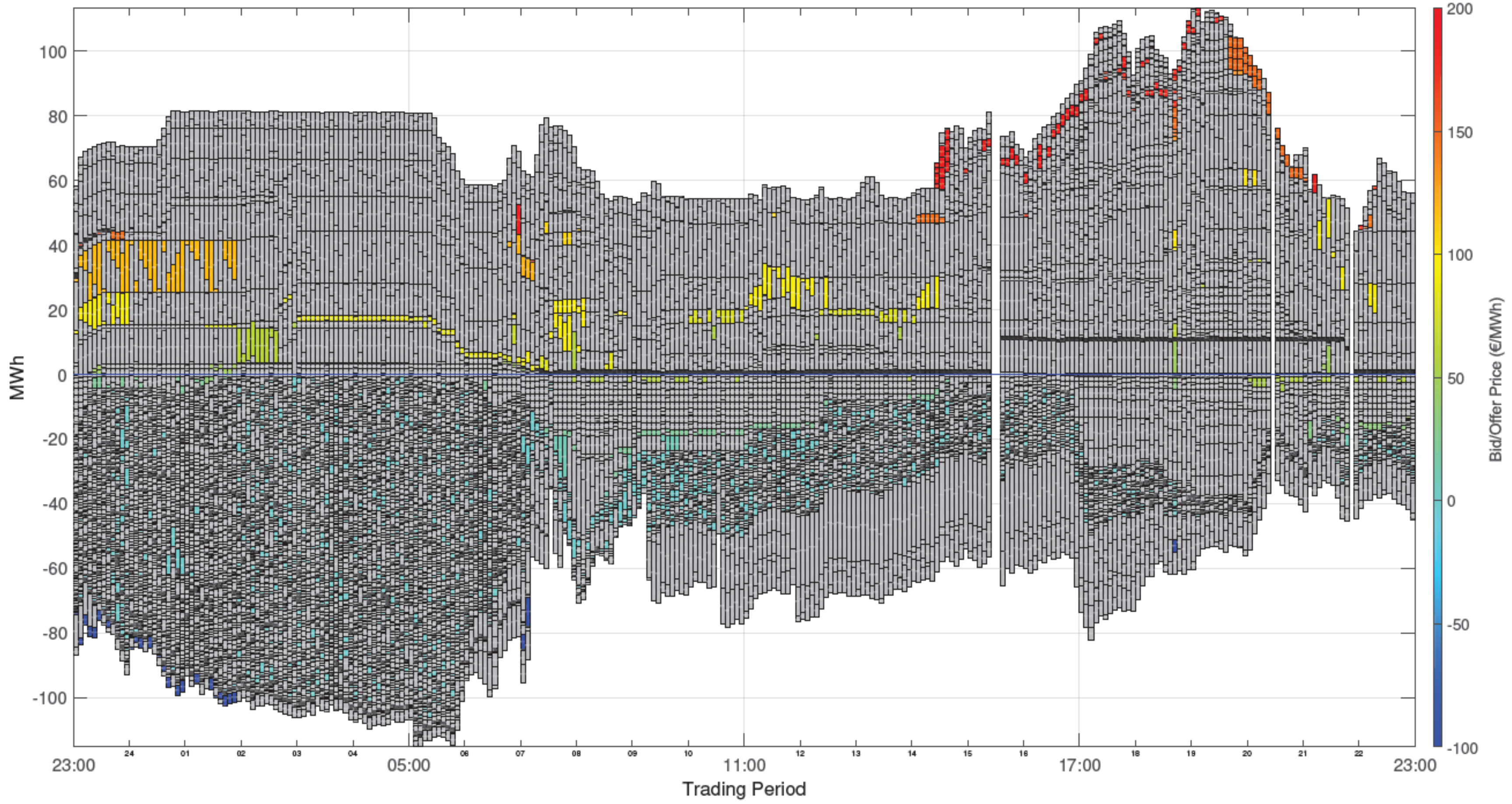


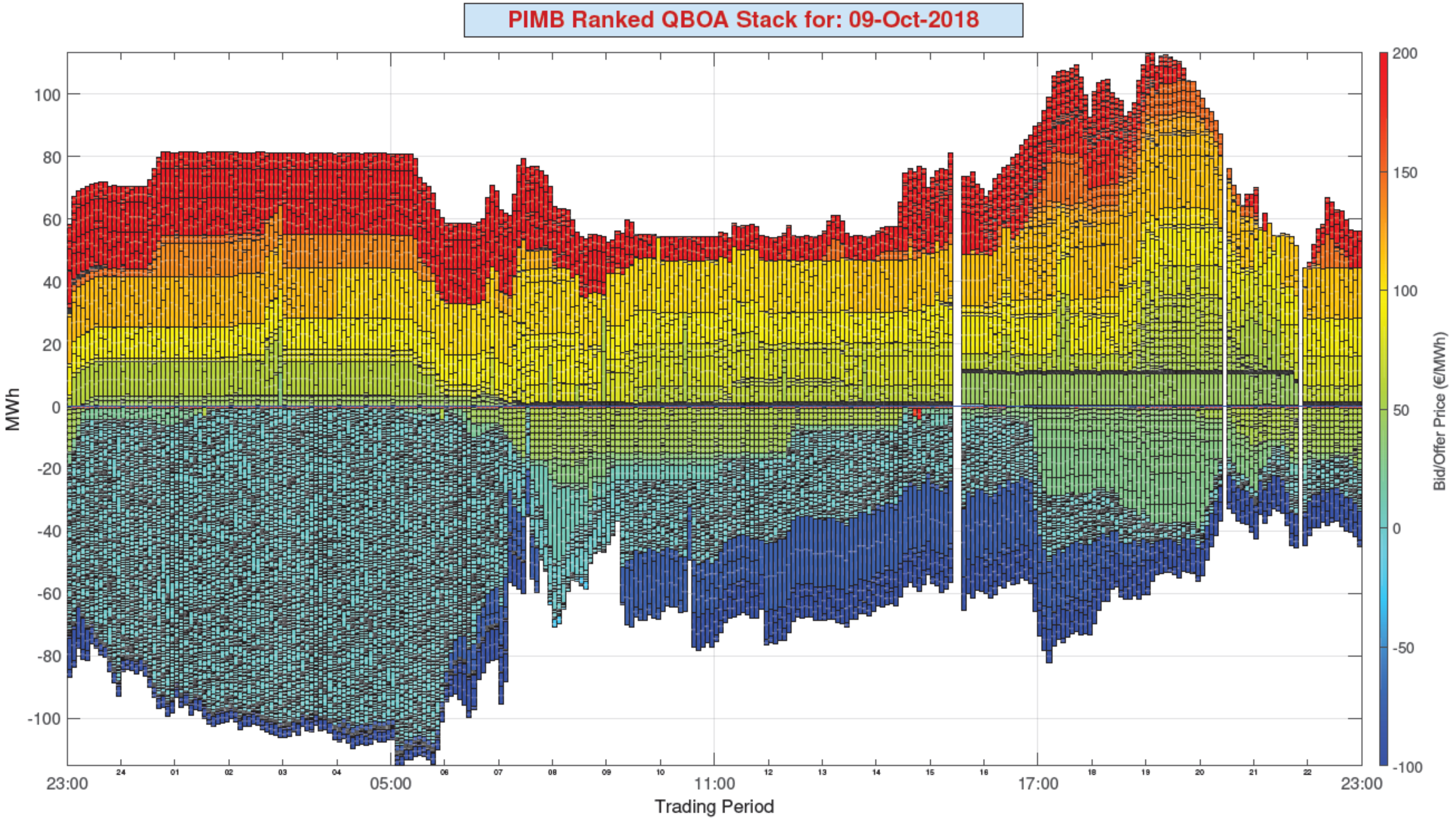
Diagrams are illustrative

Yesterday’s Imbalance Pricing


PIMB Imbalance Price Flagging for: 09-Oct-2018

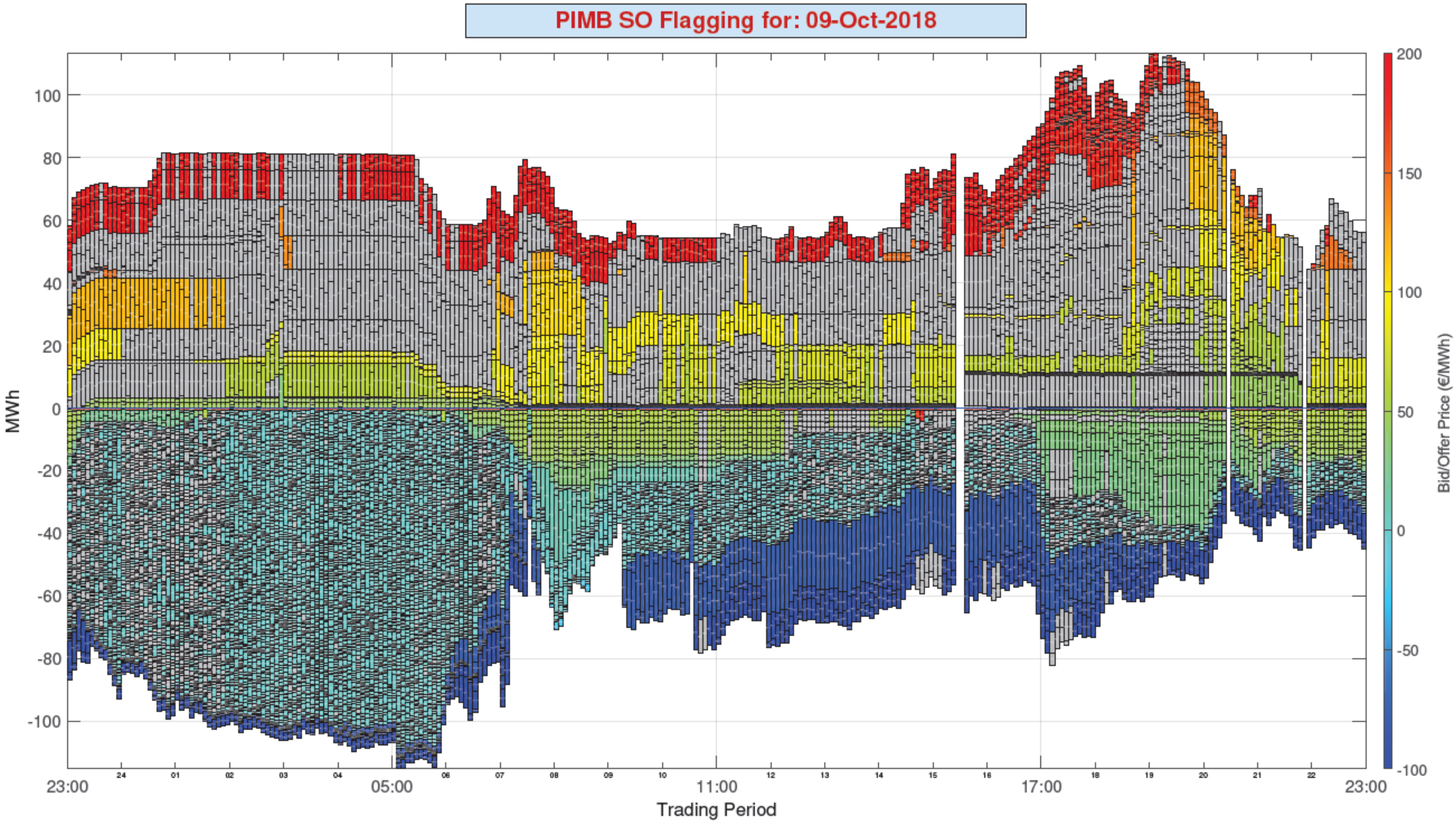
Diagrams are illustrative

Yesterday's Imbalance Pricing


PIMB Ranked QBOA Stack for: 09-Oct-2018

Diagrams are illustrative

Yesterday’s Imbalance Pricing



Diagrams are illustrative

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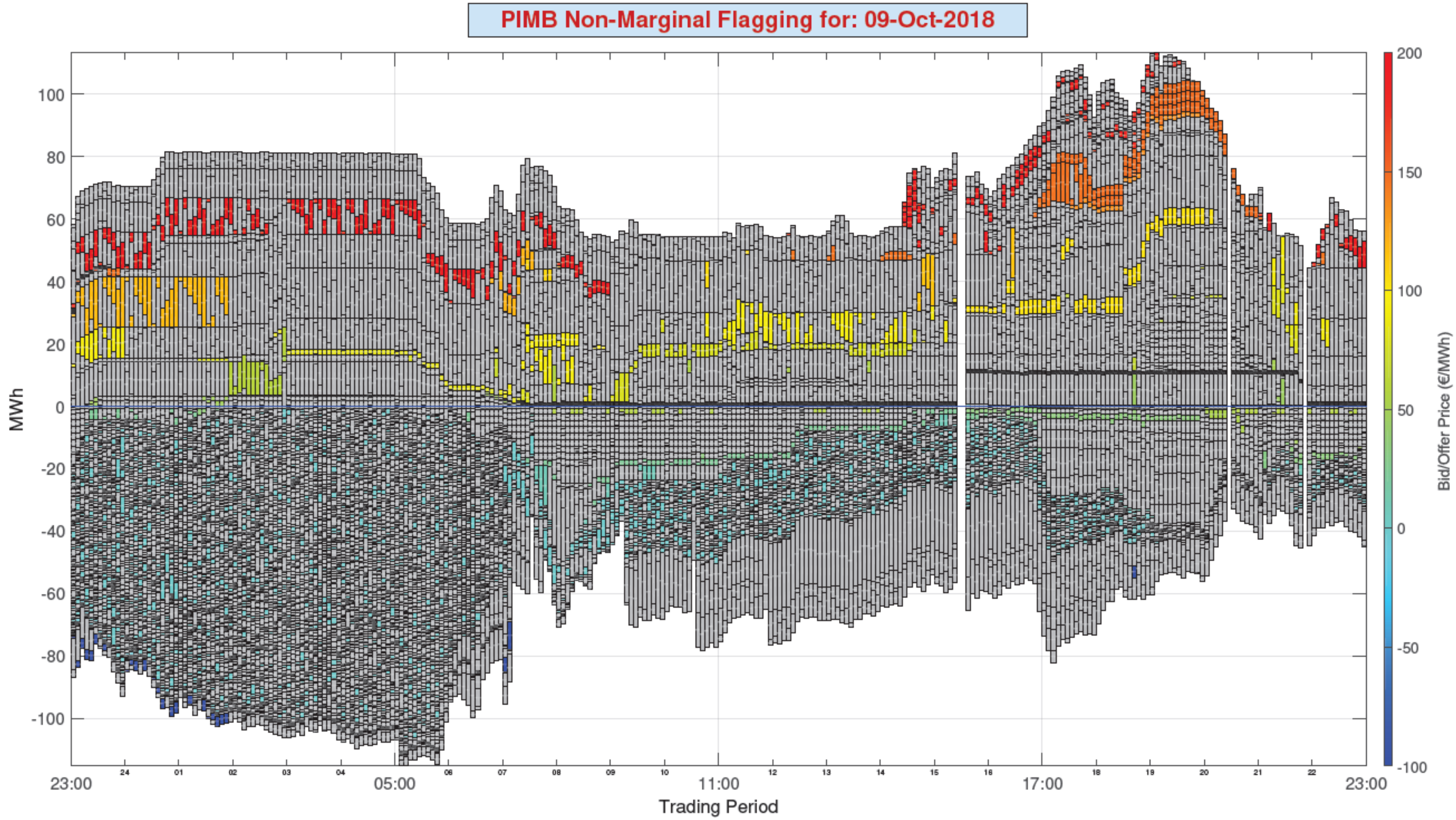

Diagrams are illustrative

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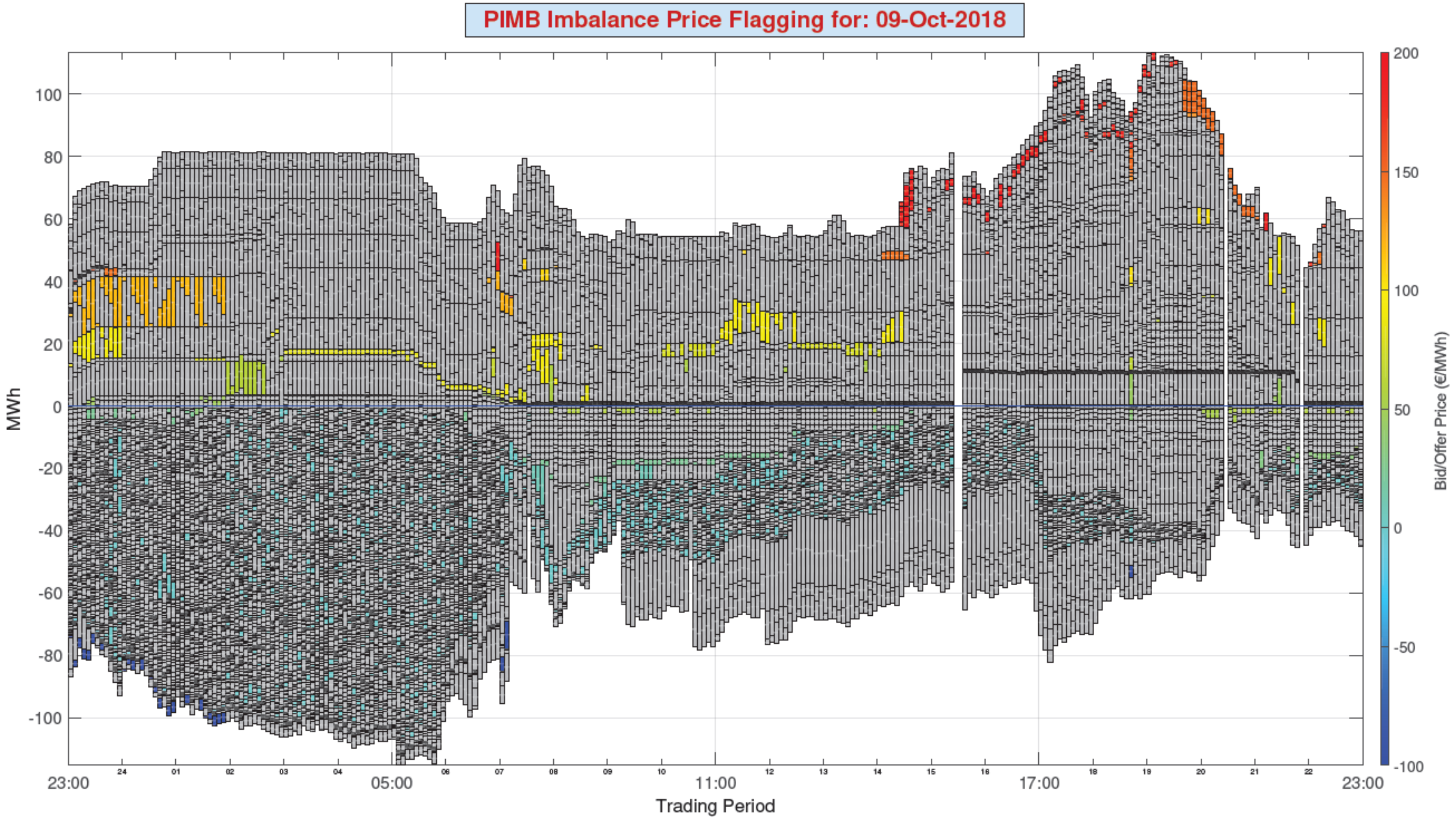

Diagrams are illustrative

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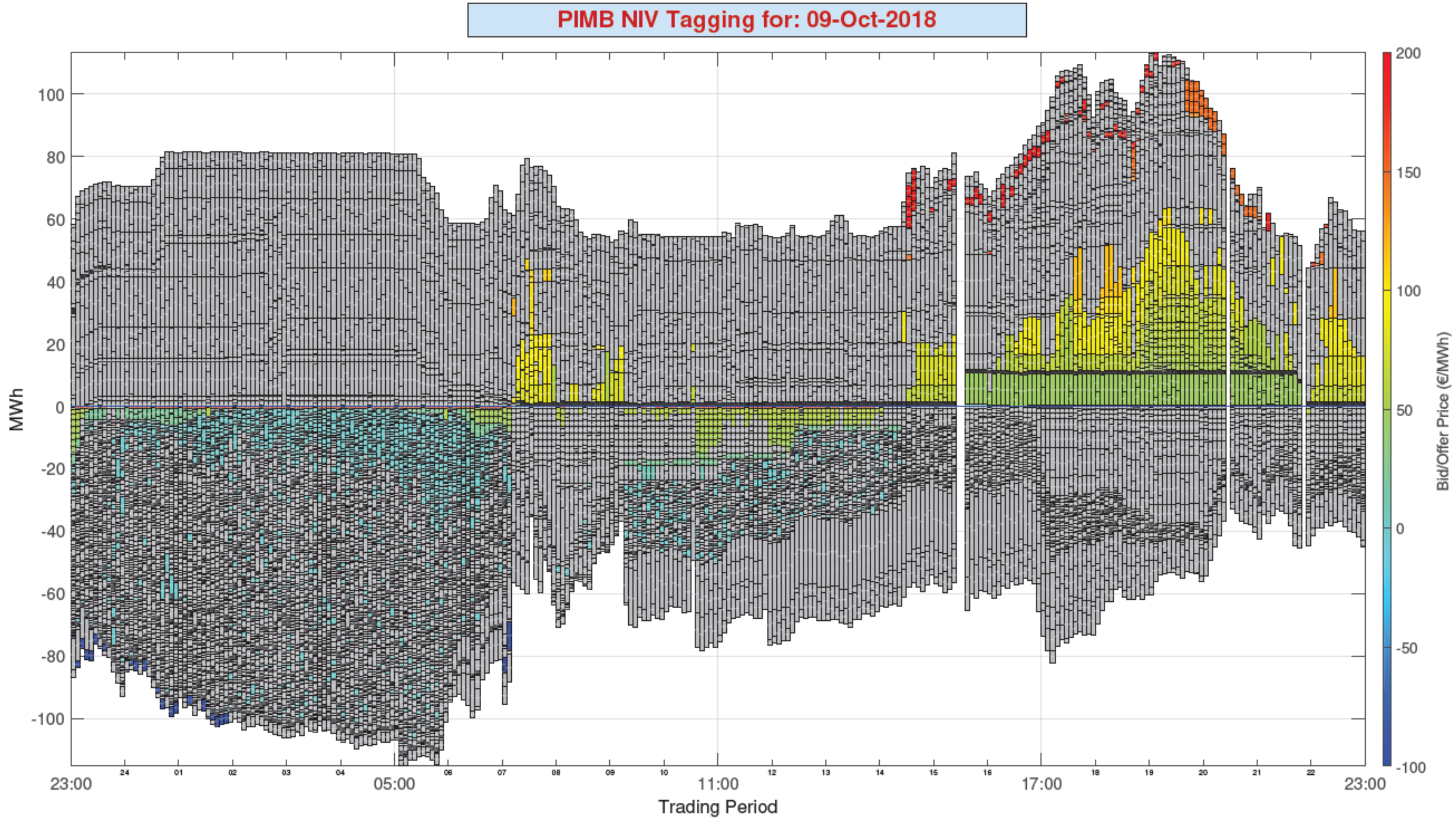
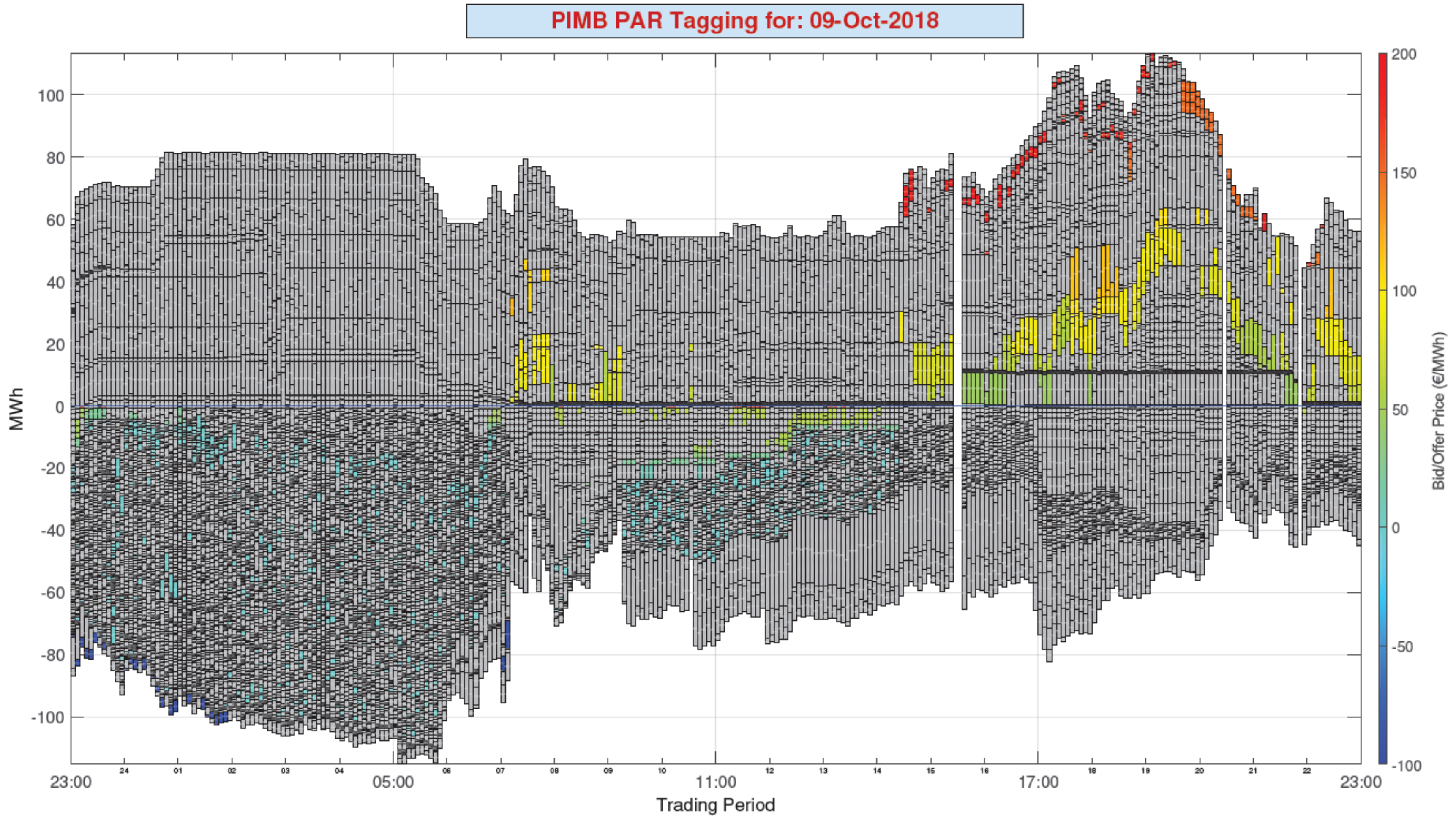


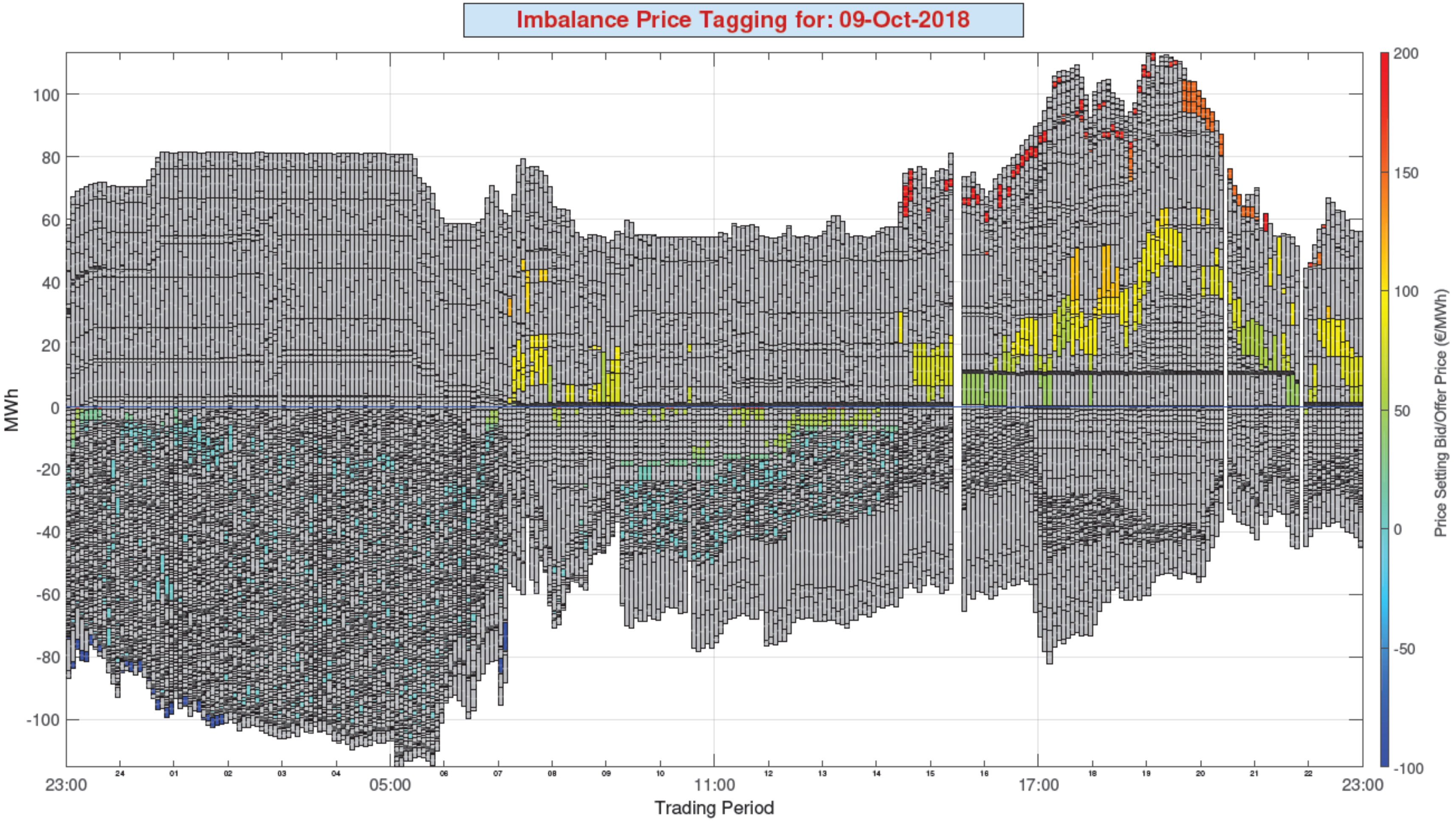
Diagrams are illustrative

Yesterday’s Imbalance Pricing



Diagrams are illustrative

Yesterday’s Imbalance Pricing



Diagrams are illustrative

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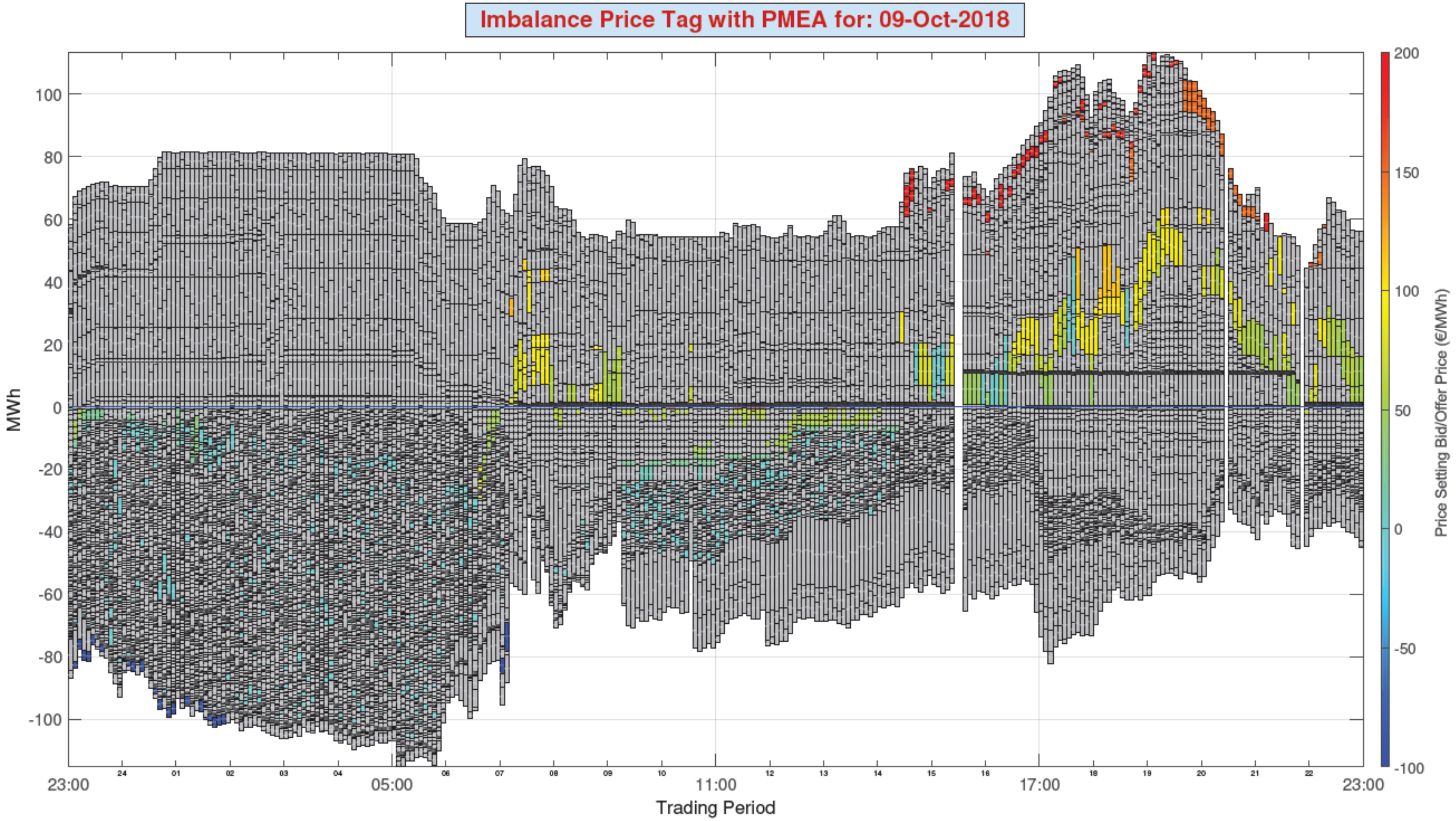
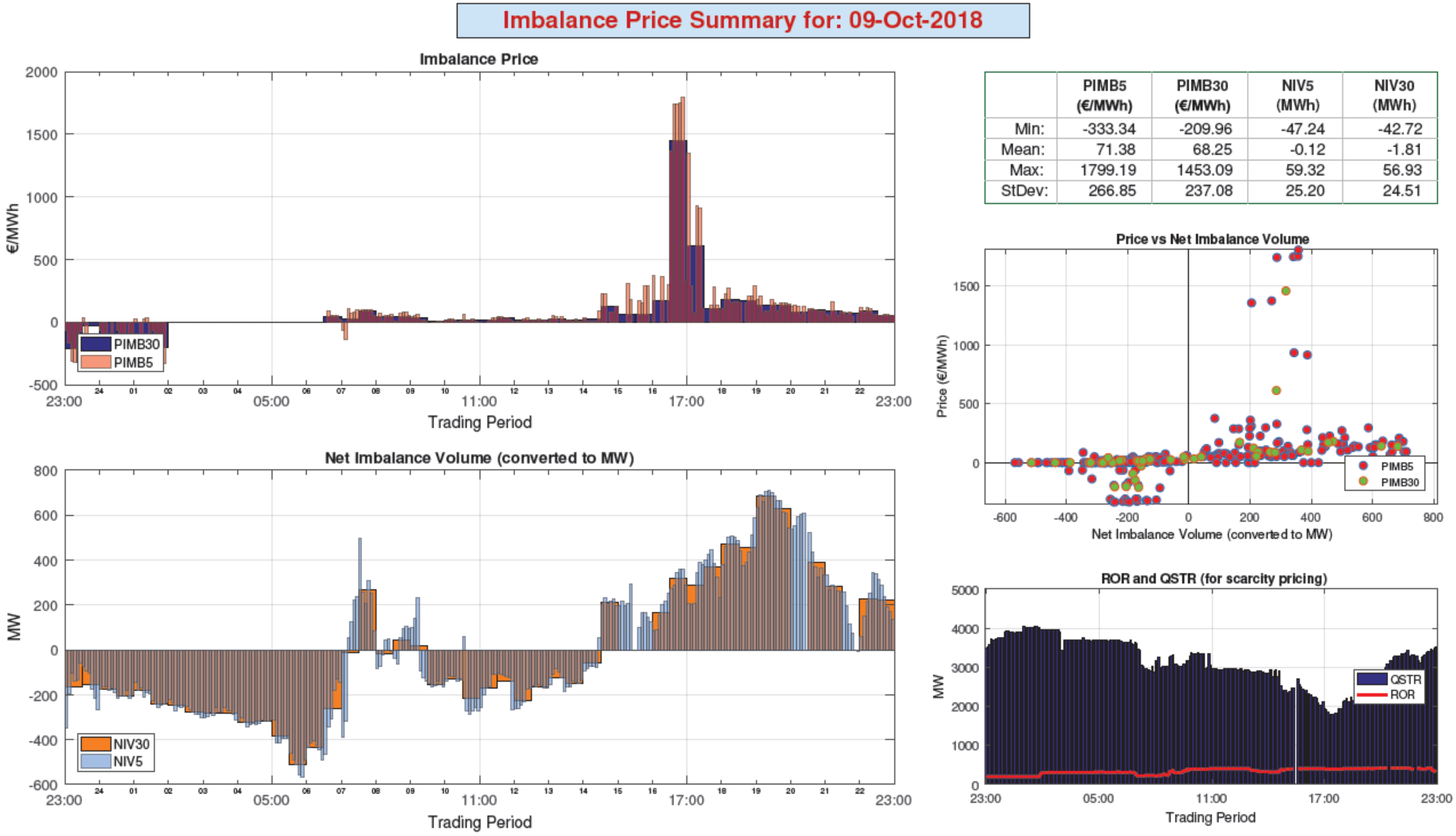


Diagrams are illustrative

Yesterday’s Imbalance Pricing

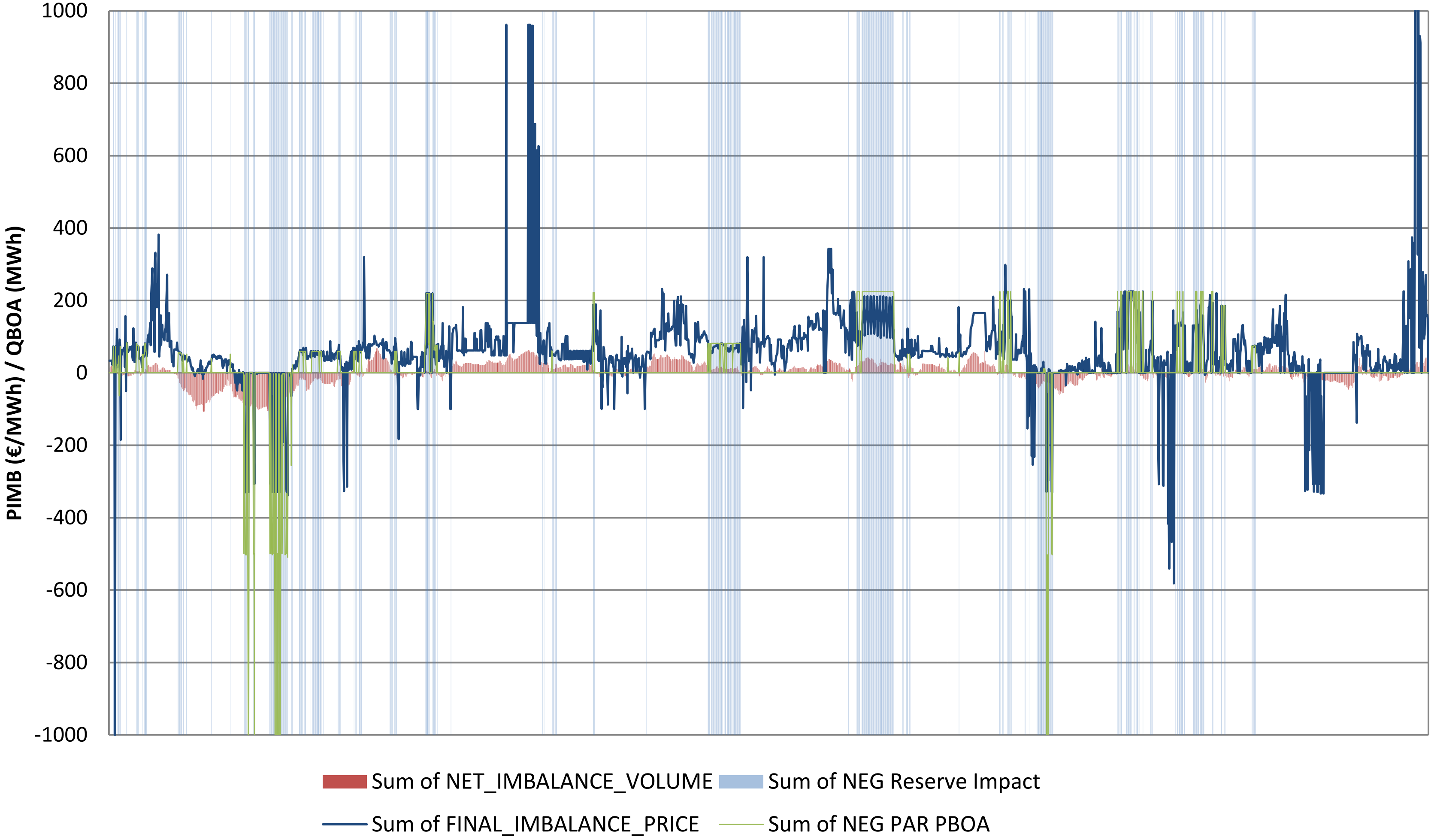


Imbalance Price Summary for: 09-Oct-2018

	PIMB5 (€/MWh)	PIMB30 (€/MWh)	NIV5 (MWh)	NIV30 (MWh)
Min:	-333.34	-209.96	-47.24	-42.72
Mean:	71.38	68.25	-0.12	-1.81
Max:	1799.19	1453.09	59.32	56.93
StDev:	266.85	237.08	25.20	24.51

Diagrams are illustrative

Imbalance Prices 1st – 9th Oct – Negative Res Flag



Impact for most periods will be low

Signature of issue

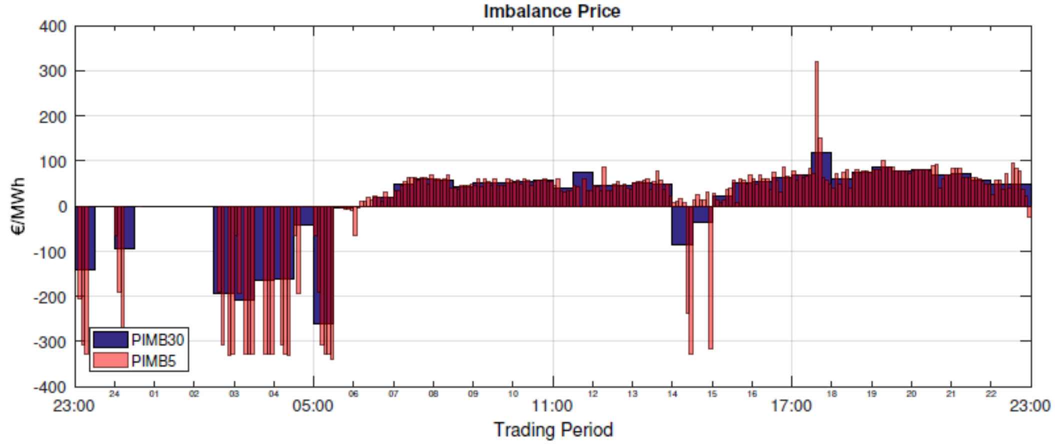
- PAR Effect – When unflagged unit in PAR
  - constraint_id = 'S_NEGROI‘ or 'S_NEGNI‘
  - Non-energy flag = 1 … was not being flagged
  - PAR tag>0; and,
  - Replaced_bod_price = pboa
- PMEA Effect – When unflagged unit sets PMEA
  - constraint_id = 'S_NEGROI‘ or 'S_NEGNI‘
  - Non-energy flag = 1 … was not being flagged
  - price_marginal_engy_action = pboa
- N.B. Other constraints can have Non Energy Flags = 1.
- Issue was addressed in the systems on Monday 8th Oct.

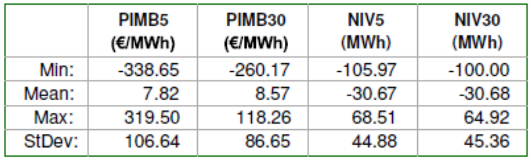
Imbalance Pricing

- Other lesser issues identified:
  - Very small QBOAs related to non-controllable wind
  - QBOAs for GU_400180 up to 15:00 on 2nd Oct.
  - QBOAs for GU_400202
- These issues will be considered with the Negative Reserve periods.

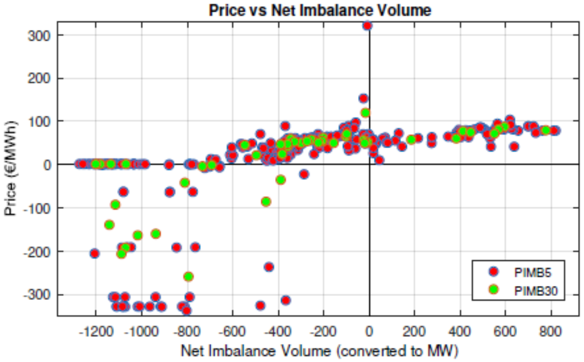
Imbalance Pricing – 2nd Oct

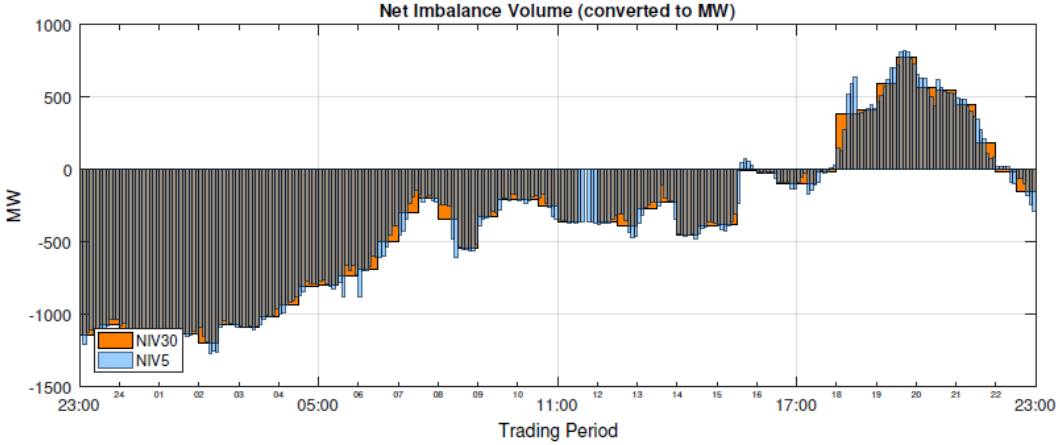
Imbalance Price Summary for: 02-Oct-2018

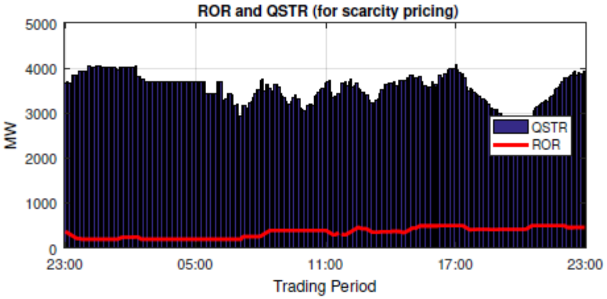

Imbalance Price



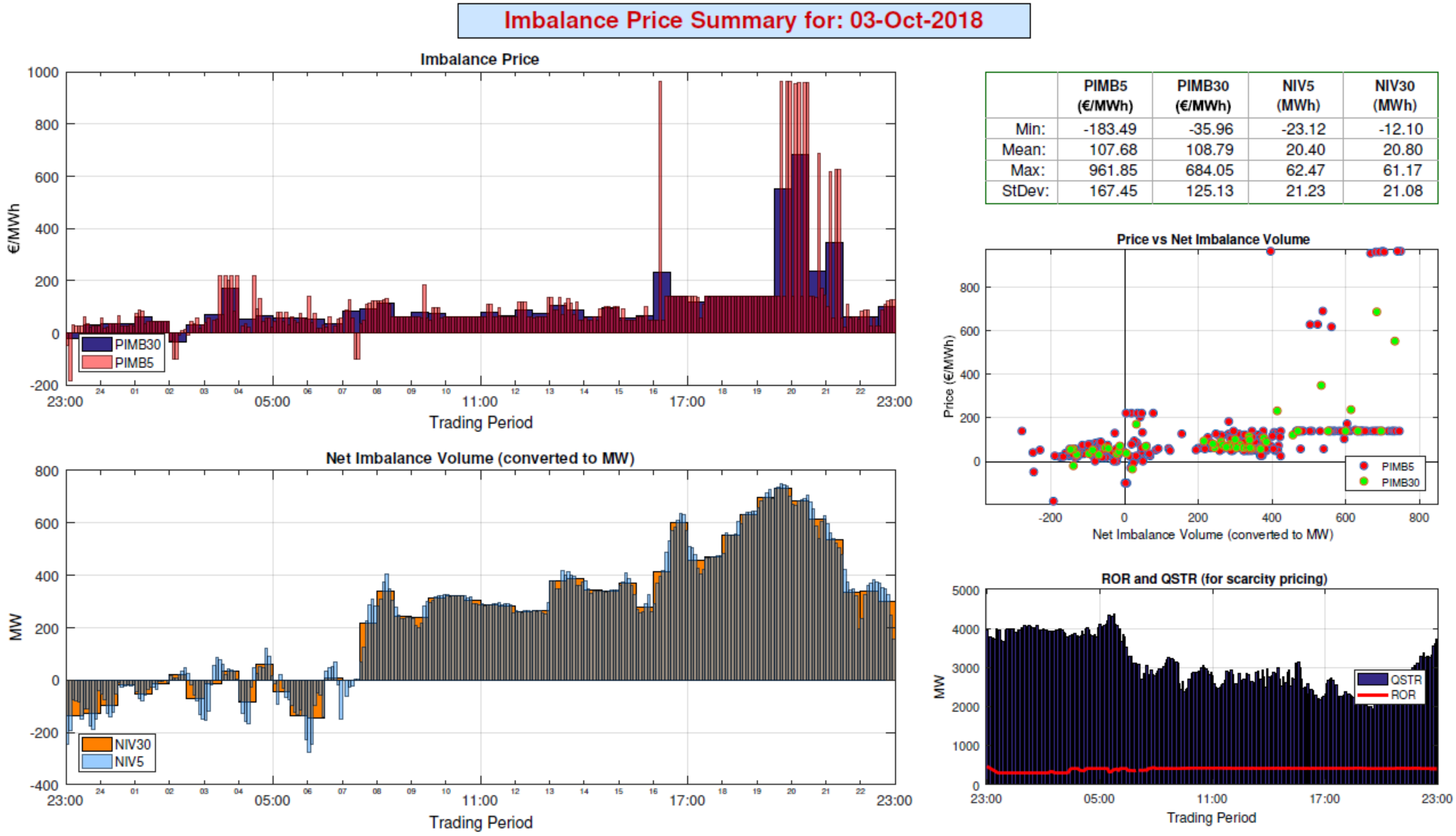
	PIMB5 (€/MWh)	PIMB30 (€/MWh)	NIV5 (MWh)	NIV30 (MWh)
Min:	-338.65	-260.17	-105.97	-100.00
Mean:	7.82	8.57	-30.67	-30.68
Max:	319.50	118.26	68.51	64.92
StDev:	106.64	86.65	44.88	45.36


Price vs Net Imbalance Volume


Net Imbalance Volume (converted to MW)


ROR and QSTR (for scarcity pricing)

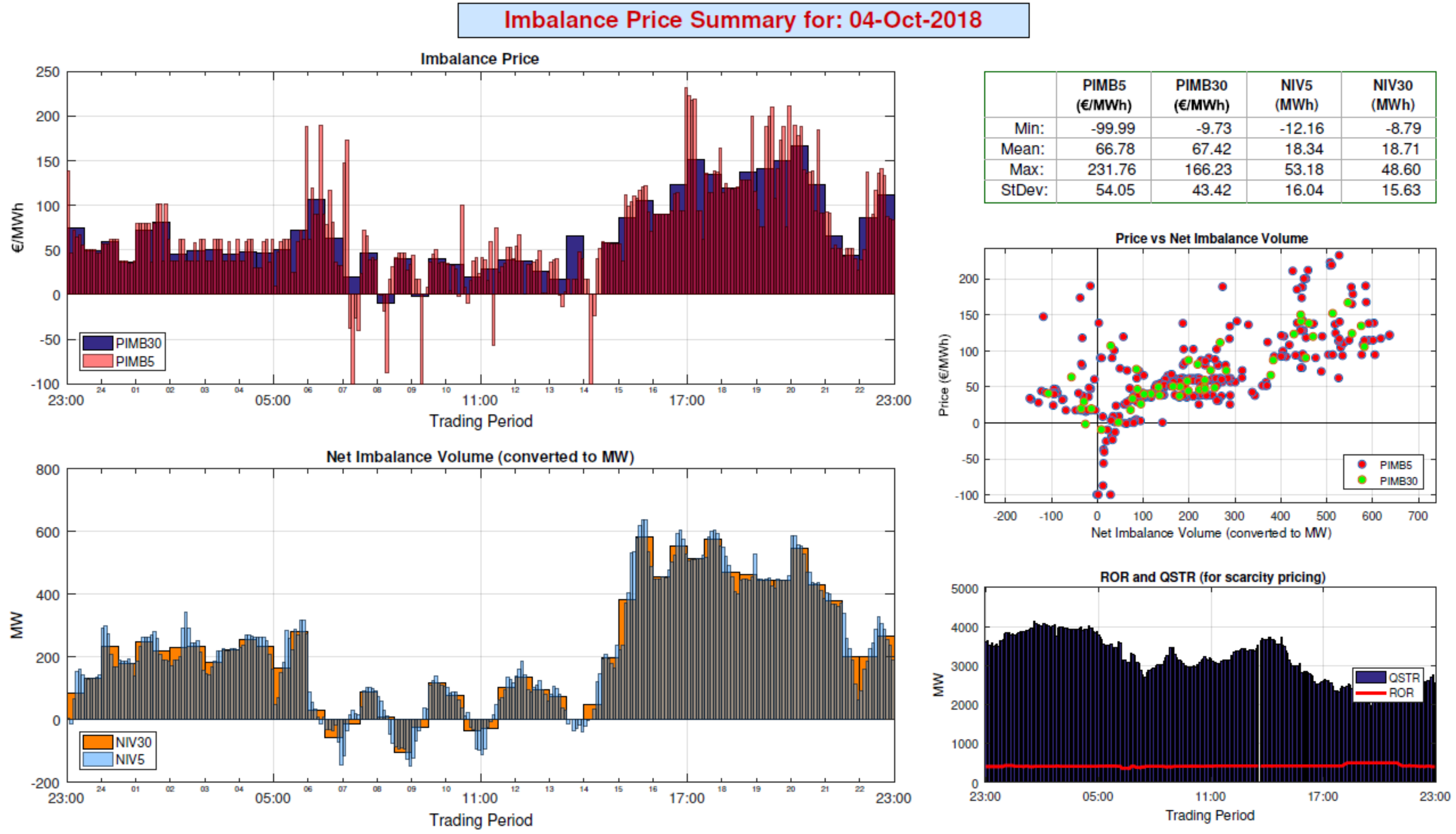
Imbalance Pricing – 3rd Oct



Imbalance Price Summary for: 03-Oct-2018

	PIMB5 (€/MWh)	PIMB30 (€/MWh)	NIV5 (MWh)	NIV30 (MWh)
Min:	-183.49	-35.96	-23.12	-12.10
Mean:	107.68	108.79	20.40	20.80
Max:	961.85	684.05	62.47	61.17
StDev:	167.45	125.13	21.23	21.08

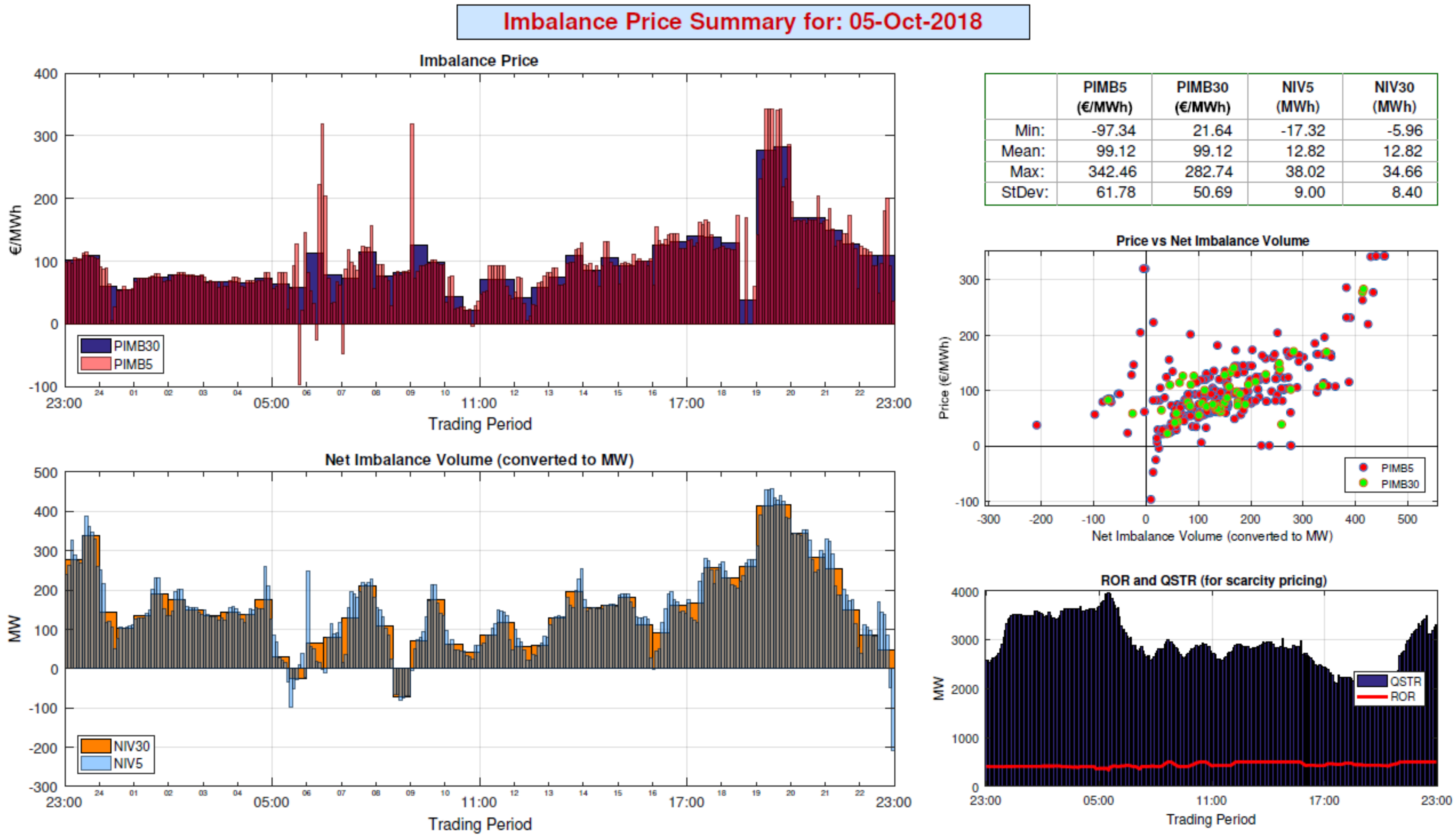
Imbalance Pricing – 4th Oct



Imbalance Price Summary for: 04-Oct-2018

	PIMB5 (€/MWh)	PIMB30 (€/MWh)	NIV5 (MWh)	NIV30 (MWh)
Min:	-99.99	-9.73	-12.16	-8.79
Mean:	66.78	67.42	18.34	18.71
Max:	231.76	166.23	53.18	48.60
StDev:	54.05	43.42	16.04	15.63

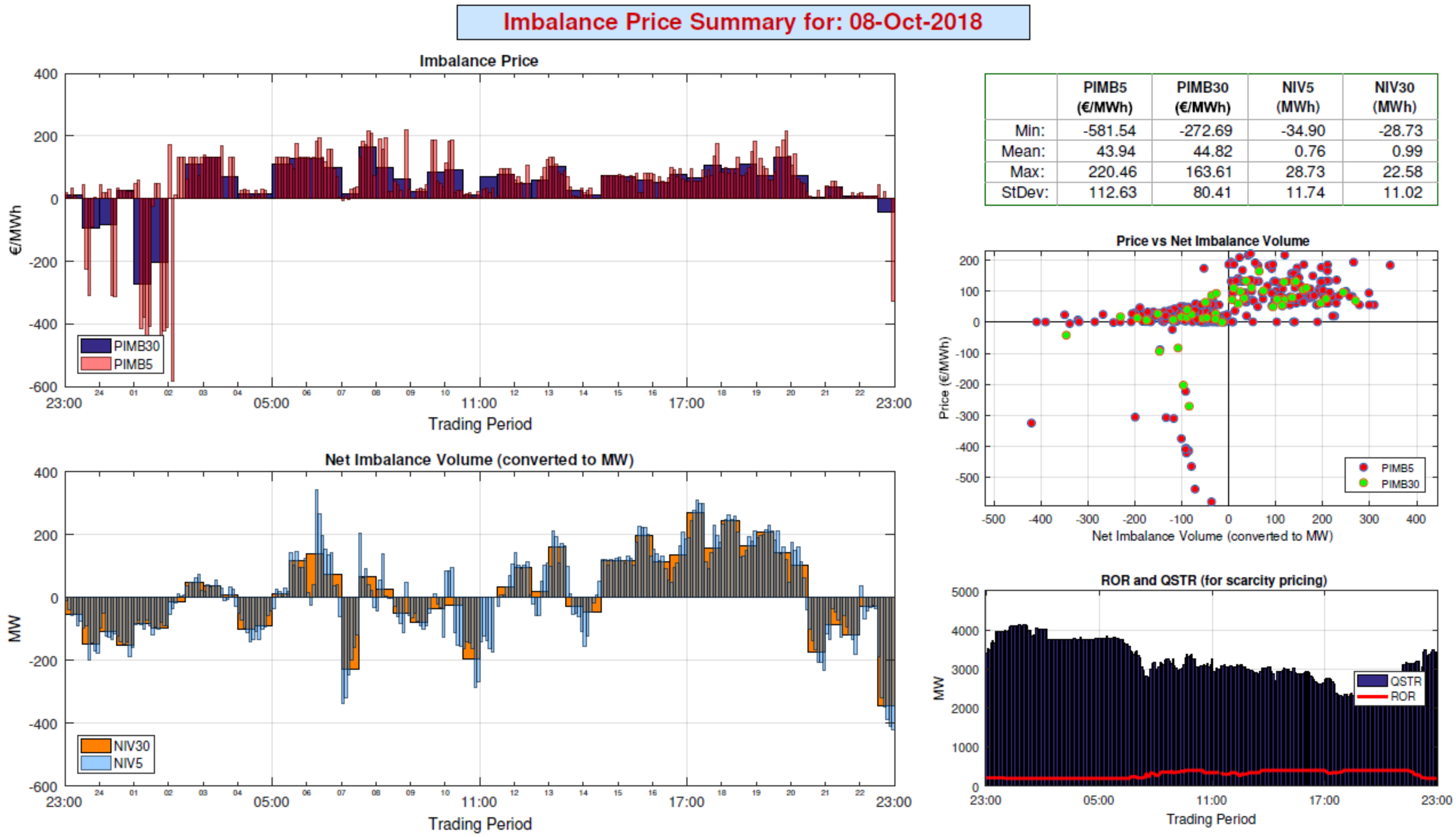
Imbalance Pricing – 5th Oct



Imbalance Price Summary for: 05-Oct-2018

	PIMB5 (€/MWh)	PIMB30 (€/MWh)	NIV5 (MWh)	NIV30 (MWh)
Min:	-97.34	21.64	-17.32	-5.96
Mean:	99.12	99.12	12.82	12.82
Max:	342.46	282.74	38.02	34.66
StDev:	61.78	50.69	9.00	8.40

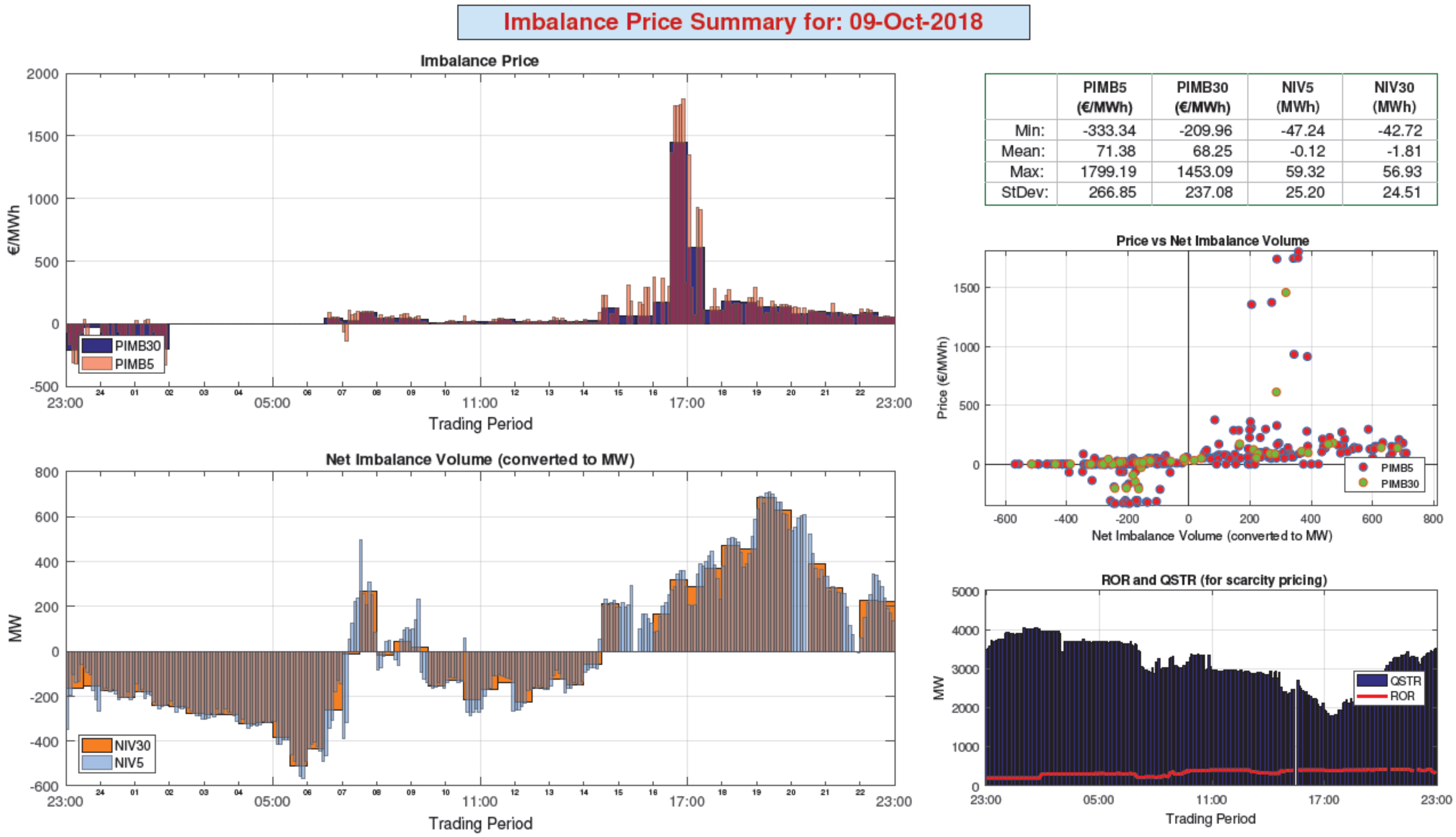
Imbalance Pricing – 8th Oct



Imbalance Price Summary for: 08-Oct-2018

	PIMB5 (€/MWh)	PIMB30 (€/MWh)	NIV5 (MWh)	NIV30 (MWh)
Min:	-581.54	-272.69	-34.90	-28.73
Mean:	43.94	44.82	0.76	0.99
Max:	220.46	163.61	28.73	22.58
StDev:	112.63	80.41	11.74	11.02

Imbalance Pricing – 9th Oct

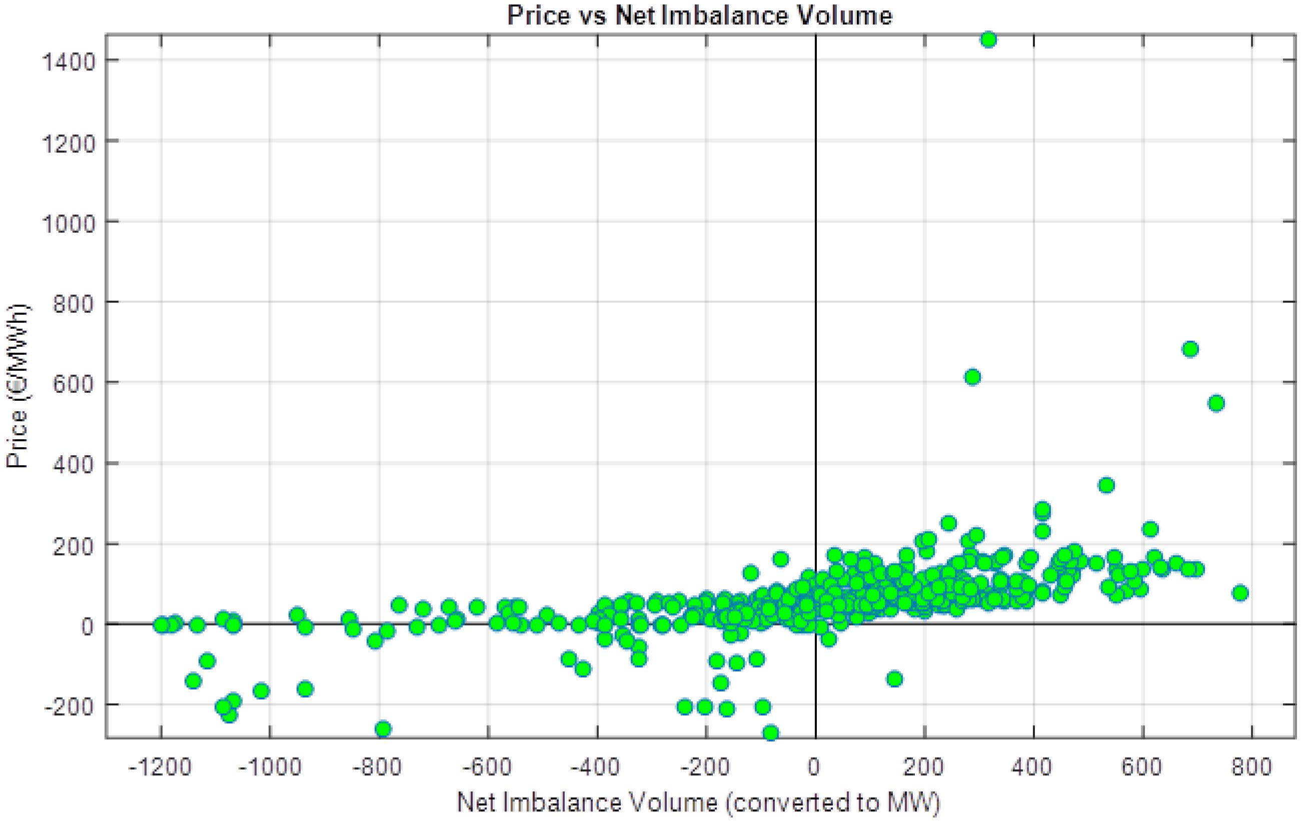


Imbalance Price Summary for: 09-Oct-2018

	PIMB5 (€/MWh)	PIMB30 (€/MWh)	NIV5 (MWh)	NIV30 (MWh)
Min:	-333.34	-209.96	-47.24	-42.72
Mean:	71.38	68.25	-0.12	-1.81
Max:	1799.19	1453.09	59.32	56.93
StDev:	266.85	237.08	25.20	24.51

Imbalance Sett Price vs Net Imbalance Volume

Imbalance Settlement Prices vs Net Imbalance Quantity
1st – 9th Oct 2018



Route to correct pricing errors

- Pricing errors cannot be subject to **Settlement Queries**
- The intent of this is to ensure imbalance prices are firm as soon as possible and not subject to recalculation barring in exceptional circumstances
- A **Pricing Dispute** provides the route for a participant to challenge the published imbalance settlement prices
- A participant should submit a **Dispute Notice** within **five Working Day** of the publication
- Separately, paragraph **E.3.8.1** does allow the MO to identify a **manifest error** within **five Working Days** of publication of an imbalance price
- A recalculation and amendment of the imbalance price can only occur under paragraphs **E.3.8.1** and **E.3.8.2**

Route to correct pricing errors

- While the MO can initiate the process directly, it is felt that the Pricing Dispute provisions provide greater transparency and impose obligations on the MO around activities related to the resolution of the Dispute
- As part of the **Dispute Resolution Form**, the timeframe for any resolution activities must be agreed
- This is then communicated to the **Disputing Participant**, the SEM RAs and all other **Affected Participants**
- For a Pricing Dispute, all registered Participants become Affected Participants

Route to correct pricing errors

- SEMO has received Pricing Disputes in relation to the trade dates of **October 1st** and **October 2nd** submitted in accordance with paragraph **B.19.1.3**
- In accordance with paragraph **E.3.8.1**, SEMO has determined that a manifest error has occurred on these days (in that the Negative Reserve Constraint flags were not applied correctly in the calculation of the prices)
- Given this, SEMO will respond to these Disputes within five Working Days in accordance with paragraph **B.19.2.2(a)**
- As per paragraph **B.19.2.2(b)**, as SEMO has determined that a manifest error has occurred, the other provisions (referral to a Dispute Resolution Board) are not required

Route to correct pricing errors

- SEMO will set out in the Dispute Resolution Form
  - The specific five minute Imbalance Prices that have been calculation incorrectly;
  - Those that are required to be recalculated;
  - The timeline for re-calculation and publication of these Imbalance Price and related Imbalance Settlement Prices; and
  - The timeline for any special **ad-hoc Settlement Reruns**
- Note
  - In the resolution of each five minute Imbalance Price that has been calculated incorrectly, SEMO will apply the **Price Materiality Threshold** to assess if recalculation is required;
  - When Imbalance Settlement Prices have been recalculated, SEMO will apply the **Settlement Recalculation Threshold** and the **Materiality** assessment to determine if a special ad-hoc Settlement Rerun is required

Route to correct pricing errors

- **Next Steps –**
  - SEMO will continue our assessment of the Price Materiality for each imbalance price calculated incorrectly;
  - We will propose to the Disputing Participant(s) and SEM RAs the timeline for resolution of the issue which may include recalculation of a number of imbalance prices and ad-hoc Settlement Reruns;
  - When agreed, all Affected Participants will be notified of the resolution of the Dispute and timelines for any activities that need to be applied;
  - This issue remained in place until October 8th,so there are a number of trade dates not yet under Pricing Dispute;

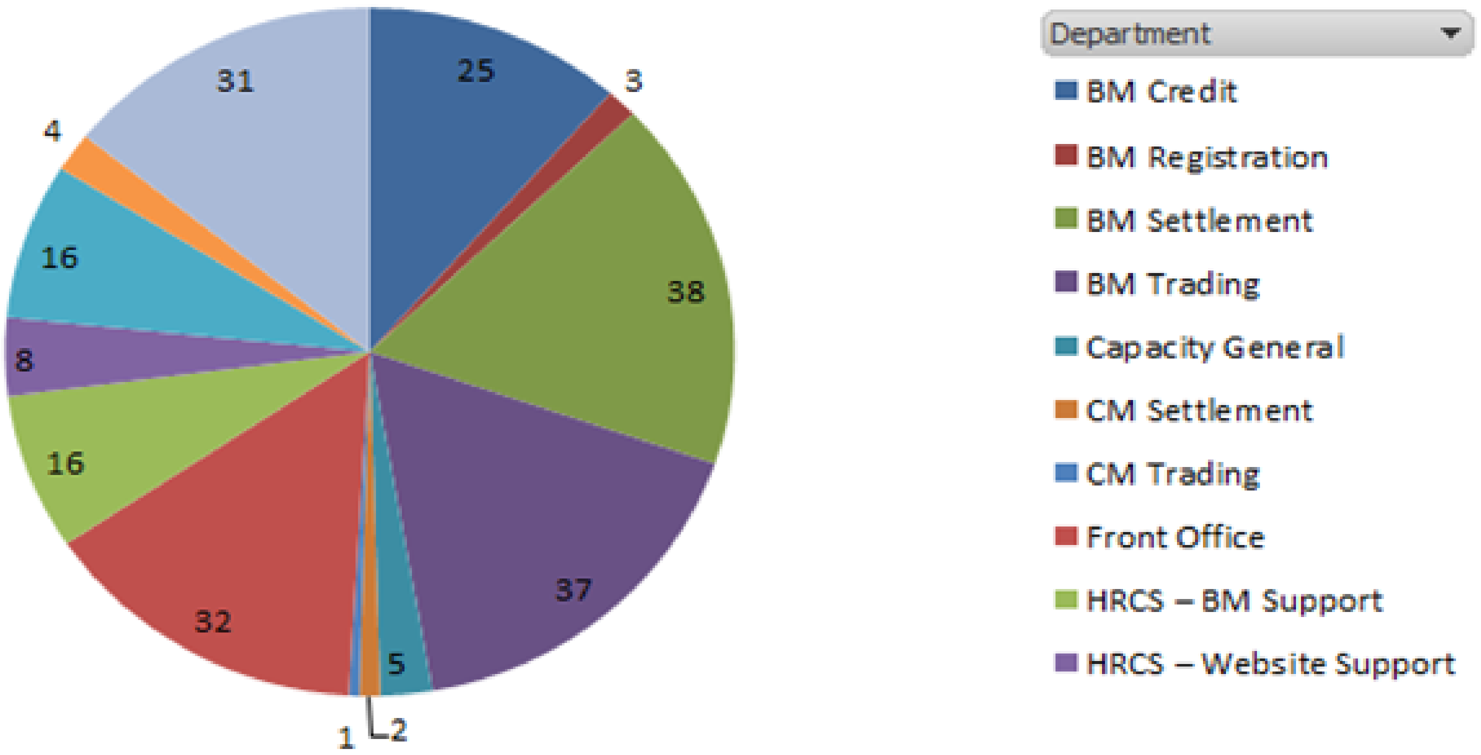
Agenda

The Agenda for the session is as follows:

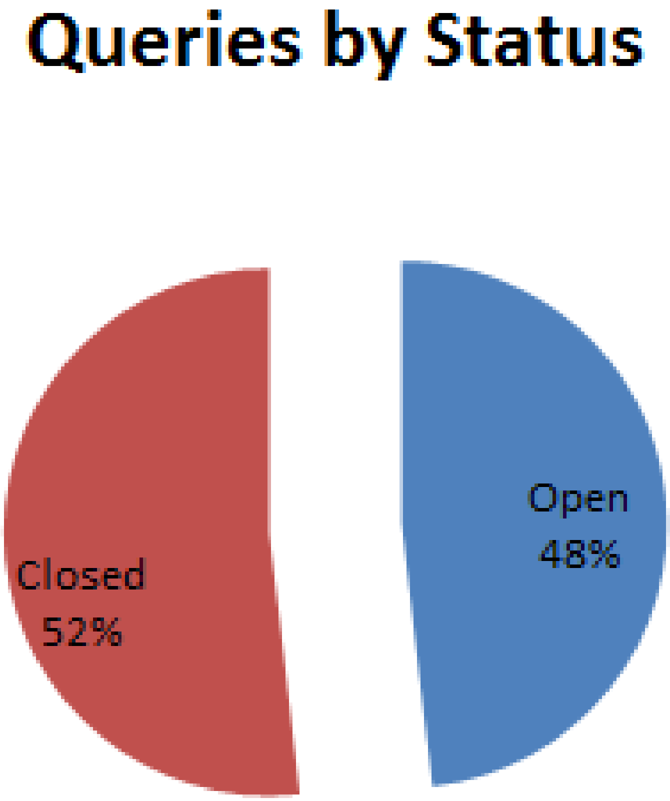
Item	Presenter
Welcome	Liam Ryan
Ex-Ante Market	Liam McAllister
Balancing Market	Diarmaid Gillespie, Simon Tweed
Settlement	Sean O’Rourke, John O’Dea, Nigel Thomson
Imbalance Pricing	Aodhagan Downey, Brendan O’Sullivan
Query management	Claire Breslin

Queries Received Since 1st of Oct 2018

Total Queries by Area - 227



Query Status – From Oct 2018



118 Completed – 109 Open Queries

Formal Queries and Disputes – From Oct 2018

- Four Pricing Disputes have been received relating to the pricing on the 1st and 2nd of October.

- Two Formal Settlement Queries have been received.

Close

- SEMO Website: http://www.sem-o.com/
- Semopx Website: http://www.semopx.com/
- Queries: Info@sem-o.com; Info@semopx.com

Thank you for your attendance.