The webinar will start shortly.
To maximise participation and minimise disruption we will be taking questions via MS Teams Chat, therefore your microphones are muted.
Please note that the webinar will be recorded.

DC, DM & DR mock auction review webinar

08 March 2022

nationalgridESO

Agenda

1. Mock Auction review
2. Merit Order deactivation
3. DM and DR update
4. Q&A

Mock Auction review

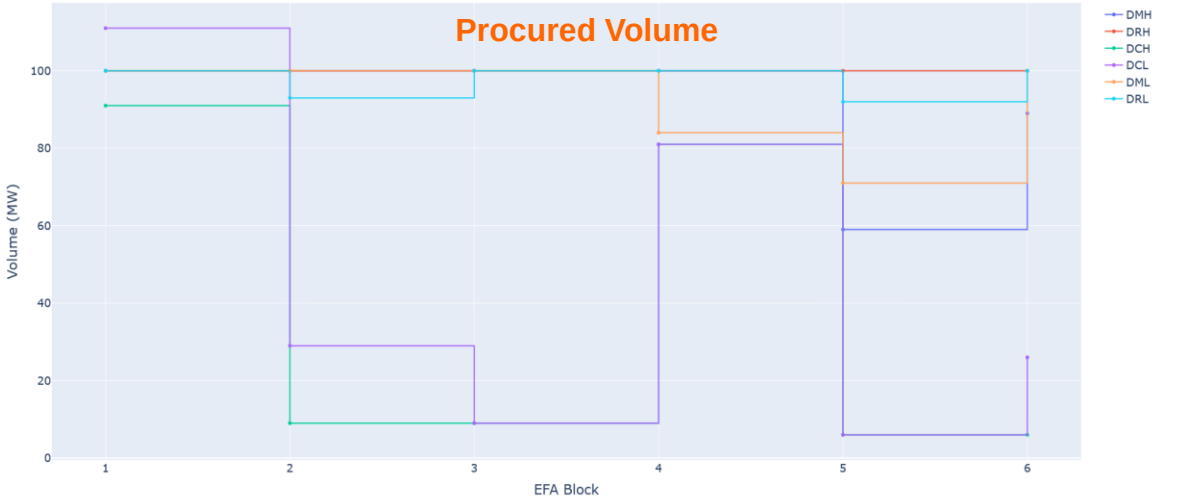
Mock Auction - Summary

Mock auction took place on 23th Feb with NGESO, EPEX and Market providers. Results were published on NGESO data portal

11 Active participants	29 Portfolios / units	413 Submitted block orders

Approx. **9** *seconds*

Total duration of all individual actions which have been performed by the system from the start of the price calculation until the creation of the extended market results file for the mock auction



Note: The market clearing prices and procured volumes are simply for mock auction purposes, and do not reflect actual volumes and prices for when we complete the first auction

No technical or major operational issue encountered. Difficulties linked to bid submission were solved by Market Providers using error messages

Issues faced by	Type of issue	Description	Resolution
Suppliers	Connection	Supplier did not receive the login email details. Turned out that the email was received but mistakenly took the email for production.	Change the title of the email and make it more clear in the future that this email is related to mock auction login details
…			

Merit Order deactivation

Previous Market Design

Determine accepted quantity for each order	**Objective** Maximize market welfare across all delivery periods	**Rules / constraints** - Balance: supply = demand - Matched order volume ≤ submitted volume - Block properties (fill-or-kill, link families, etc.) - **Merit order rules for basic block orders**
Determine prices for all products and delivery periods	**Objective** Minimize market clearing prices across all delivery periods	**Rules / constraints** - No paradoxically accepted curve/block order (Every accepted order must generate a positive surplus)

Merit Order - **Rationale & Complex Set of Rules**

Rationale
Truly single-period block orders should not be PRB*

Translates into two naturally-complementary rules

1. Block cannot be rejected if more expensive block orders are accepted
2. Block cannot be rejected if there remains buy volume at a compatible price

**PRB: paradoxically rejected block, ie sell order rejected while order price is below the clearing price*

Merit Order Rule for **C01 basic block**	
Definition of Merit Order Rules	- If rejected, then the sum of accepted quantities of the *Upper bids* must be less than the block quantity. - If rejected, then the demand at the block price or more expensive than the block price minus the sum of accepted quantities of the *Lower bids* must be less than the block quantity.

Merit order rule for **C02 basic block**	
Definition of Merit Order Rules	- If rejected or partially accepted while parent C01 block is accepted, then all Upper bids must be rejected. - If rejected or partially accepted while parent C01 block is accepted, then the unserved demand at the block price must be 0.

Merit Order - **Rationale & Complex Set of Rules**

Sell orders in FRA - Basic blocks

Definition of single period blocks

Basic blocks are defined as either:

- Non-curtailable single period block
  - Modeled as a single period C01 block
- Partially curtailable single period block
  - Modeled as a single period C01 block linked to a C02 block
  - C01 and C02 blocks are each considered as a basic block
  - Both blocks must have the same period and same price. Otherwise they are not considered as basic blocks

For a basic block “B”, merit order constraints are enforced using “lower” and “upper” bids concept

Definition of lower and upper bids

Lower bids: set of bids defined in the same period as B, including

All basic blocks with merit order id strictly lower than the merit order id of B

The parent C01 block of B if B is a C02 block

All non-basic C01 blocks with a price strictly lower than the price of B

All non-basic C02 blocks such that both its price and its parent C01 block price are strictly lower than the price of B

All C88 blocks such that both its price and its loop block price are strictly lower than the price of B

Upper bids: set of bids defined in the same period as B, including:

All basic blocks with merit order id strictly greater than the merit order id of B

The child C02 block of B if B is a C01 block

All non-basic C01 blocks with a price greater than or equal to the price of B

All non-basic C02 blocks such that either its price or its parent C01 block price is greater than or equal to the price of B if defined in the period of B.

All C88 blocks such that either its price or its loop block price is greater than or equal to the price of B if defined in the period of B and the product of B.

Merit order Constraint - **Consequences**

Market Design

- Distinction between *basic* and *non-basic* block orders

- For market participants … non-basic blocks (bids) are sometimes PRBs just because of merit order
  … and if accepted would have generated more welfare for the market

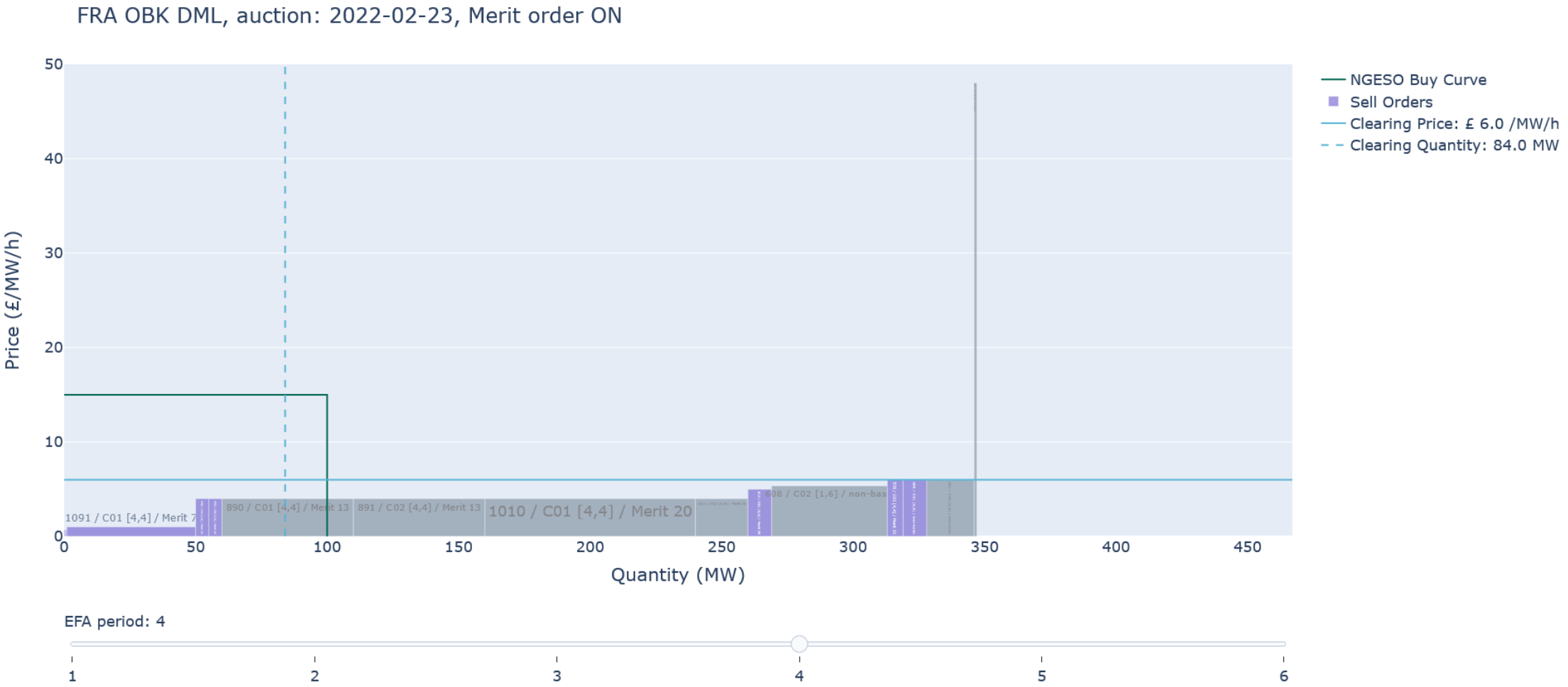
- Market results are complicated to understand

New Market Design

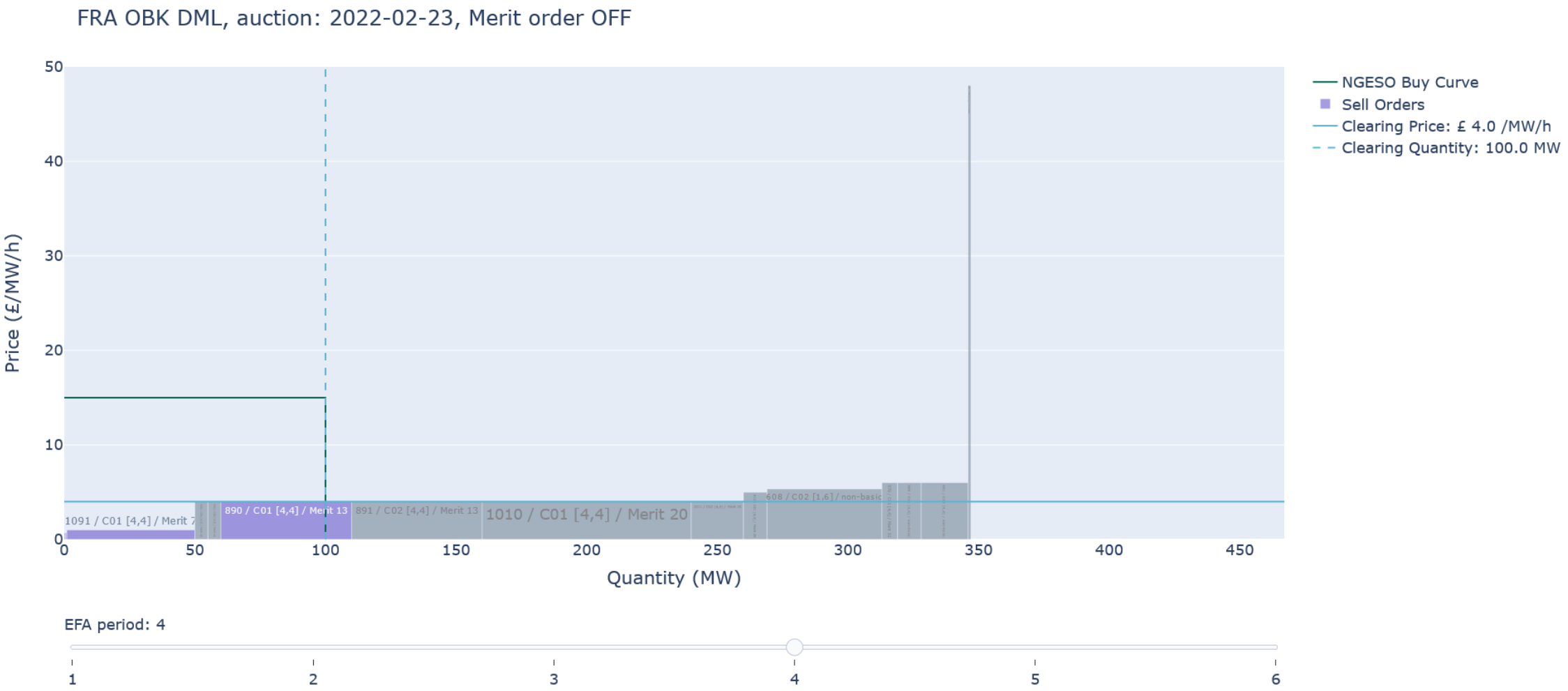
Removal of the merit order constraint results in a new version of the Helena Algorithm being deployed in production. This is scheduled on **21st March** and will have an effect on the auction of **22nd March**.

Determine accepted quantity for each order	**Objective** Maximize market welfare across all delivery periods	**Rules / constraints** - Balance: supply = demand - Matched order volume ≤ submitted volume - Block properties (fill-or-kill, link families, etc.) ~~- Merit order rules for basic block orders~~
Determine prices for all products and delivery periods	**Objective** Minimize market clearing prices across all delivery periods	**Rules / constraints** - No paradoxically accepted curve/block order (Every accepted order must generate a positive surplus)

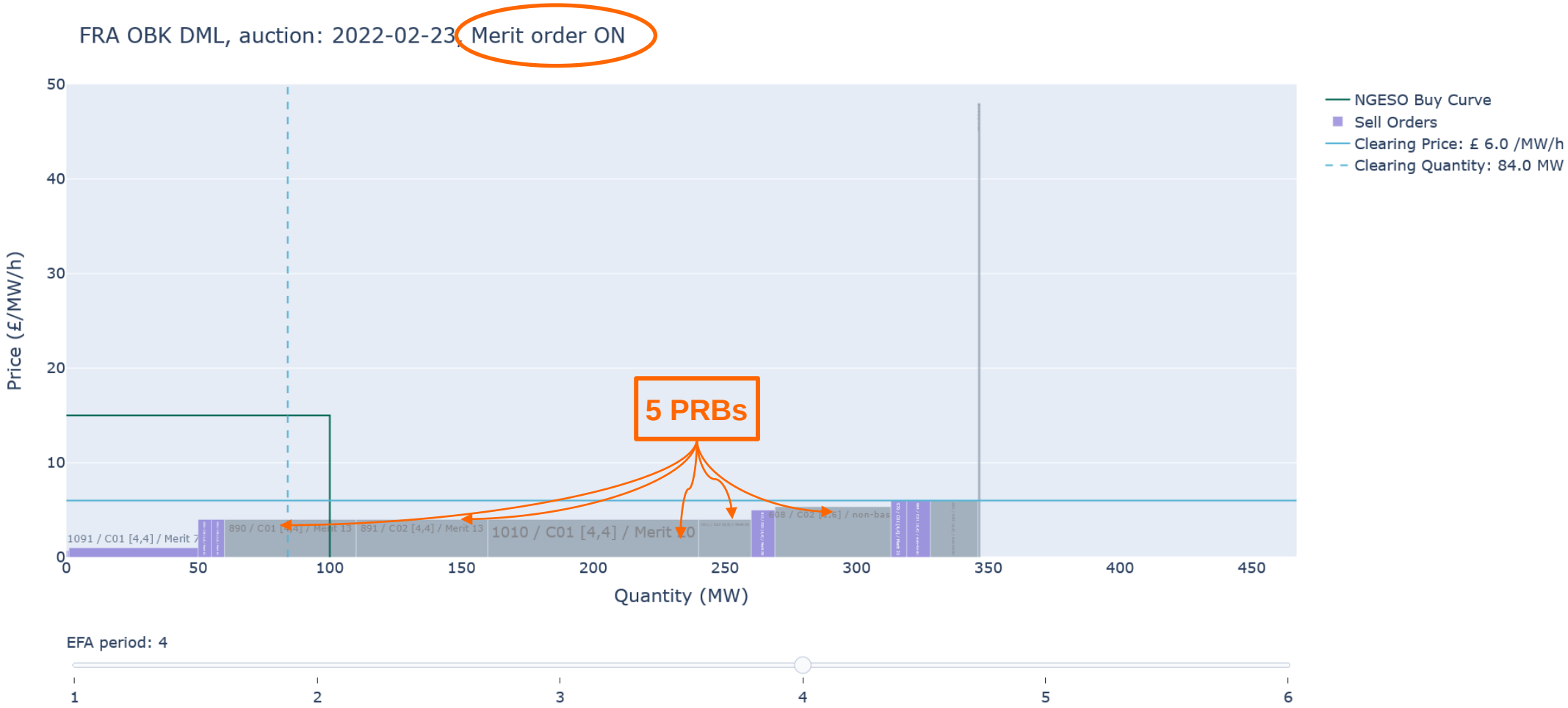
Example from Mock Auction **with Merit Order**



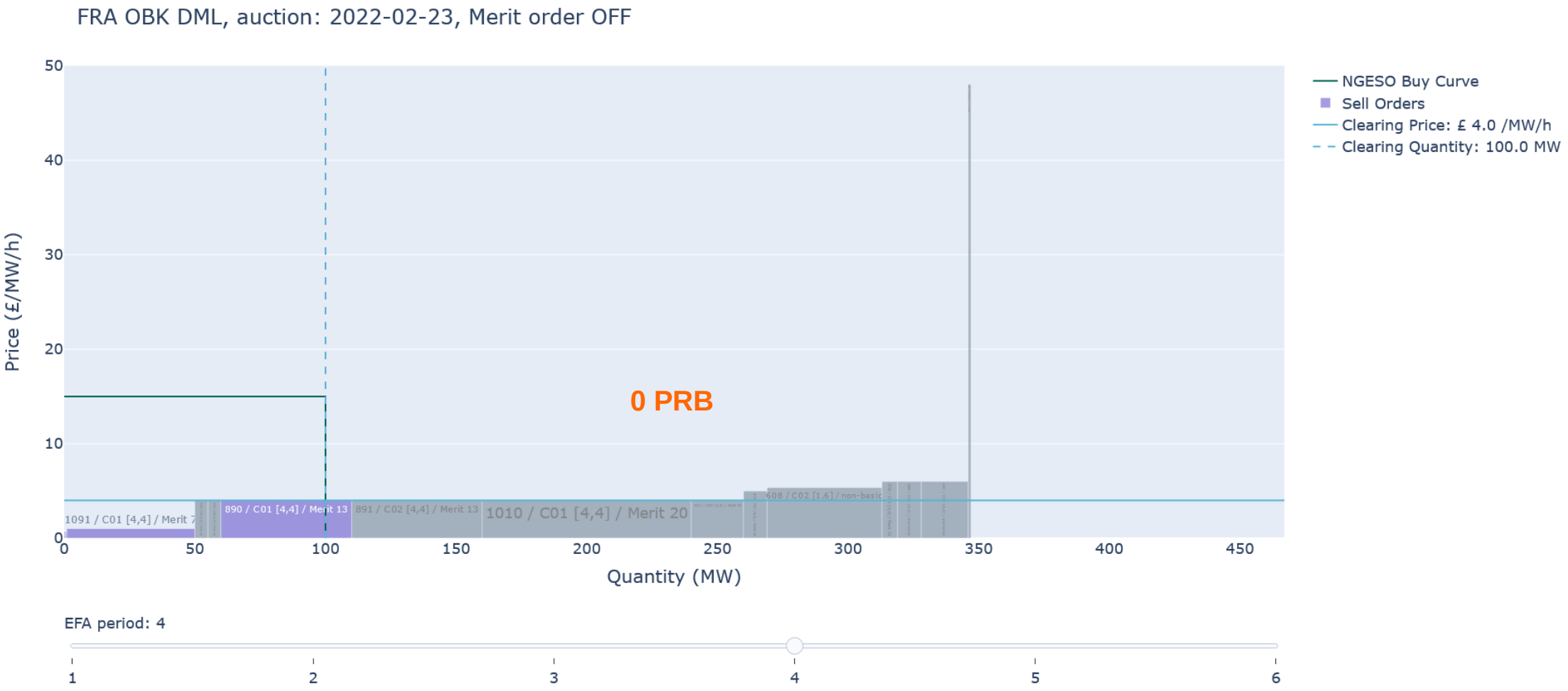
Example from Mock Auction **without Merit Order**



Example from Mock Auction **with Merit Order** causing PRBs



Example from Mock Auction **without Merit Order** causing no PRBs in this specific case

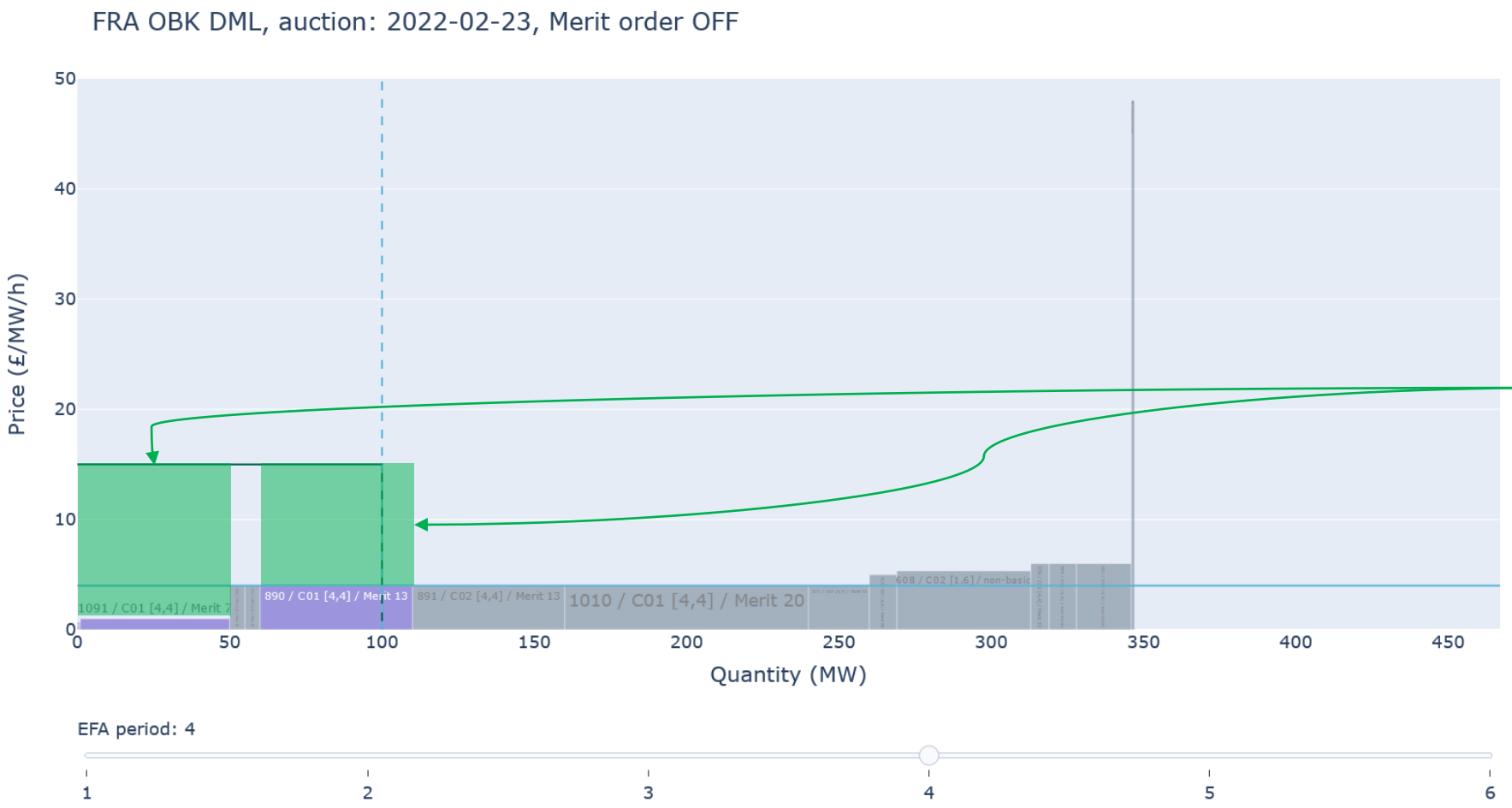


Example from Mock Auction **with Merit Order** - Welfare

Welfare

= (15 - 1) * 50
+ (15 - 4) *10
+ (15 - 5) * 9
+ (15 - 9) * 15
= 990 £

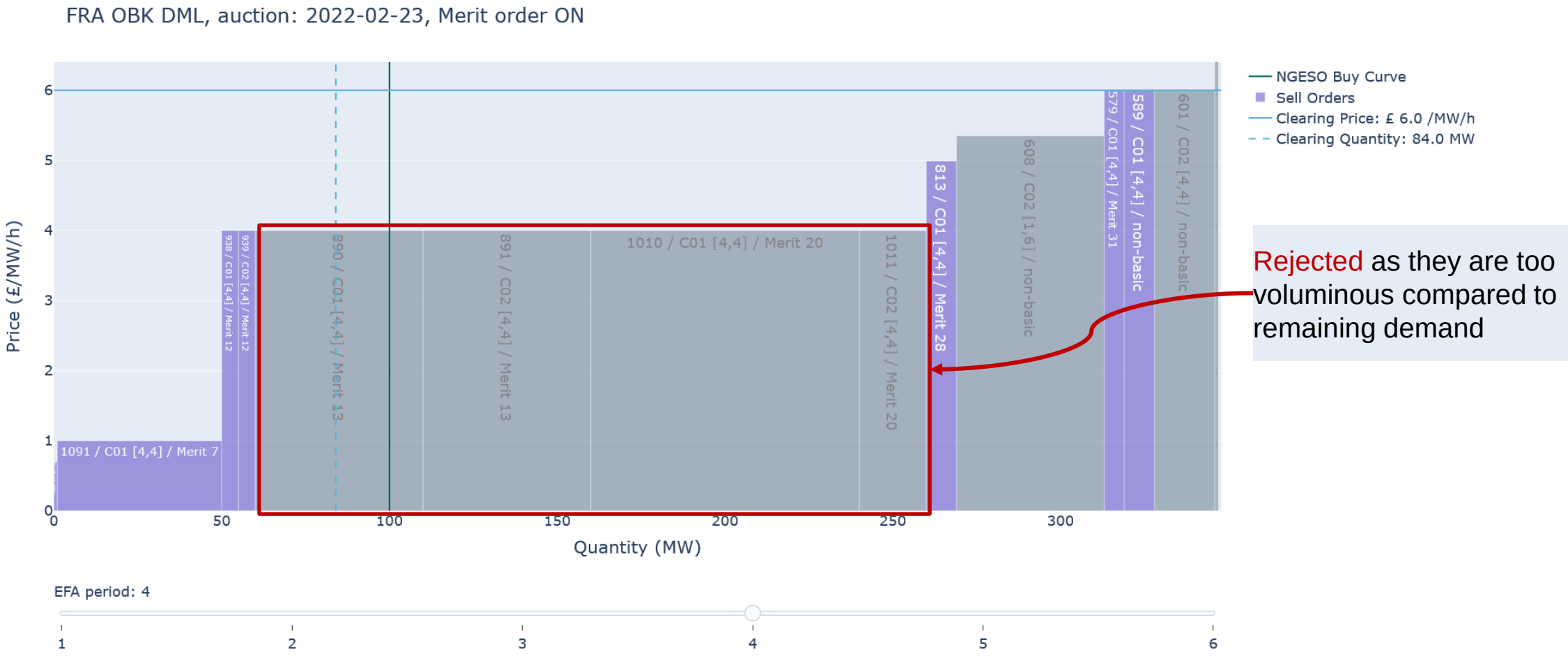
Example from Mock Auction **without Merit Order** - Welfare



Welfare

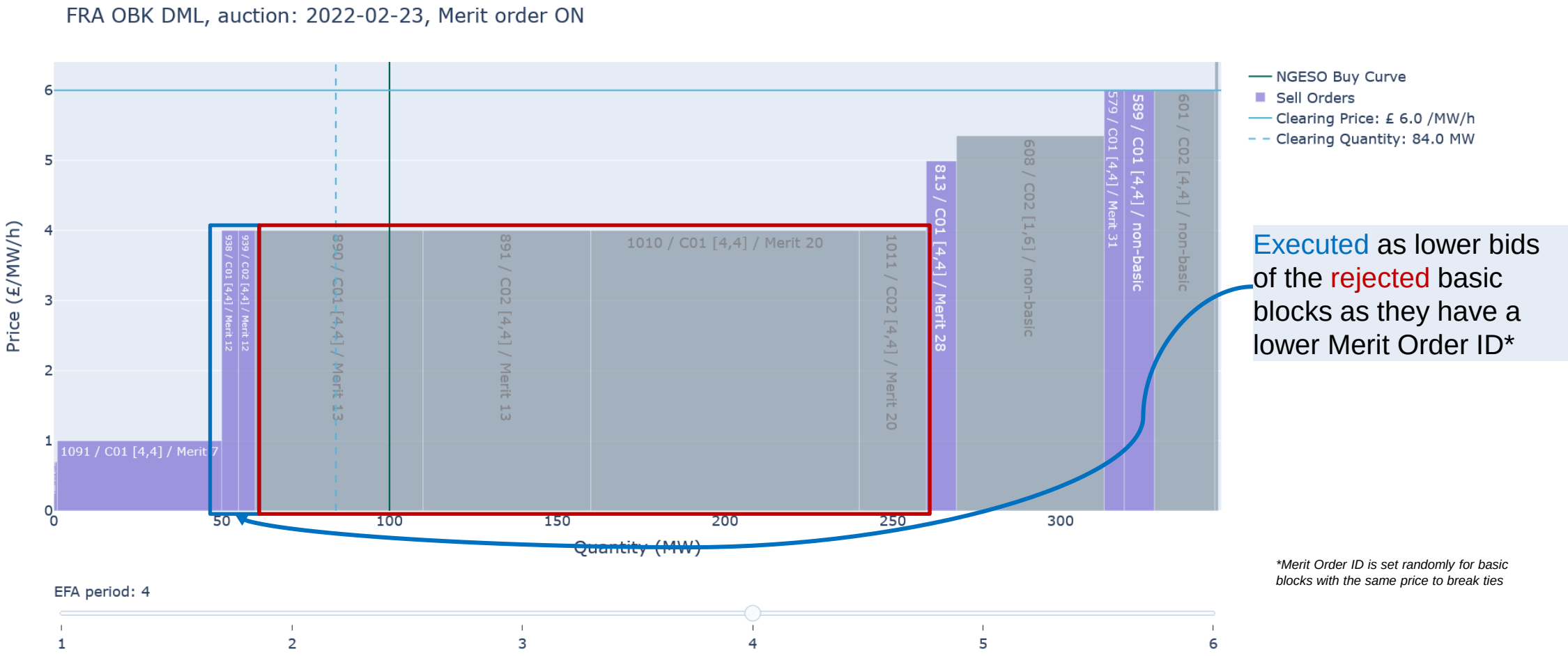
= (15 - 1) * 50
+ (15 - 4) * 50
= 1250 £

Example from Mock Auction **with Merit Order**
Explanation 1/3



Rejected as they are too voluminous compared to remaining demand

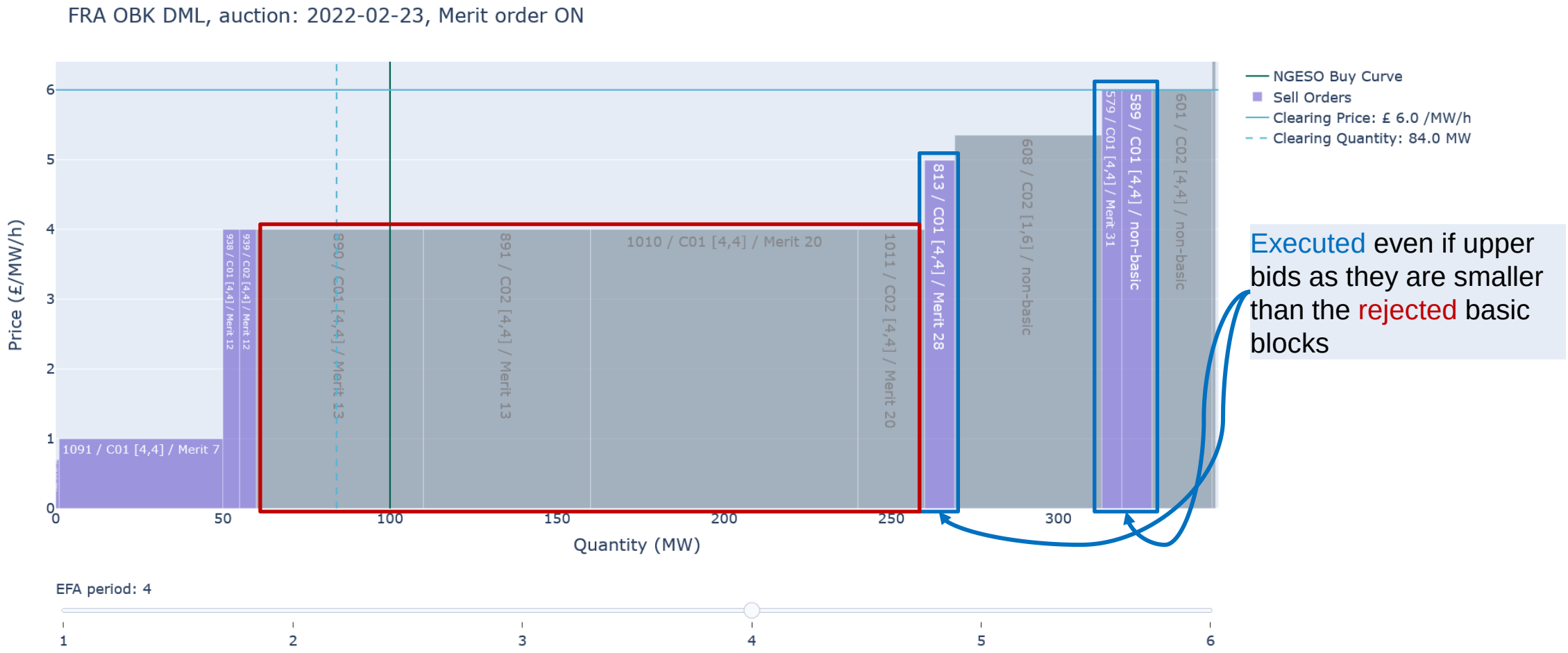
Example from Mock Auction **with Merit Order**
Explanation 2/3



Executed as lower bids of the rejected basic blocks as they have a lower Merit Order ID*

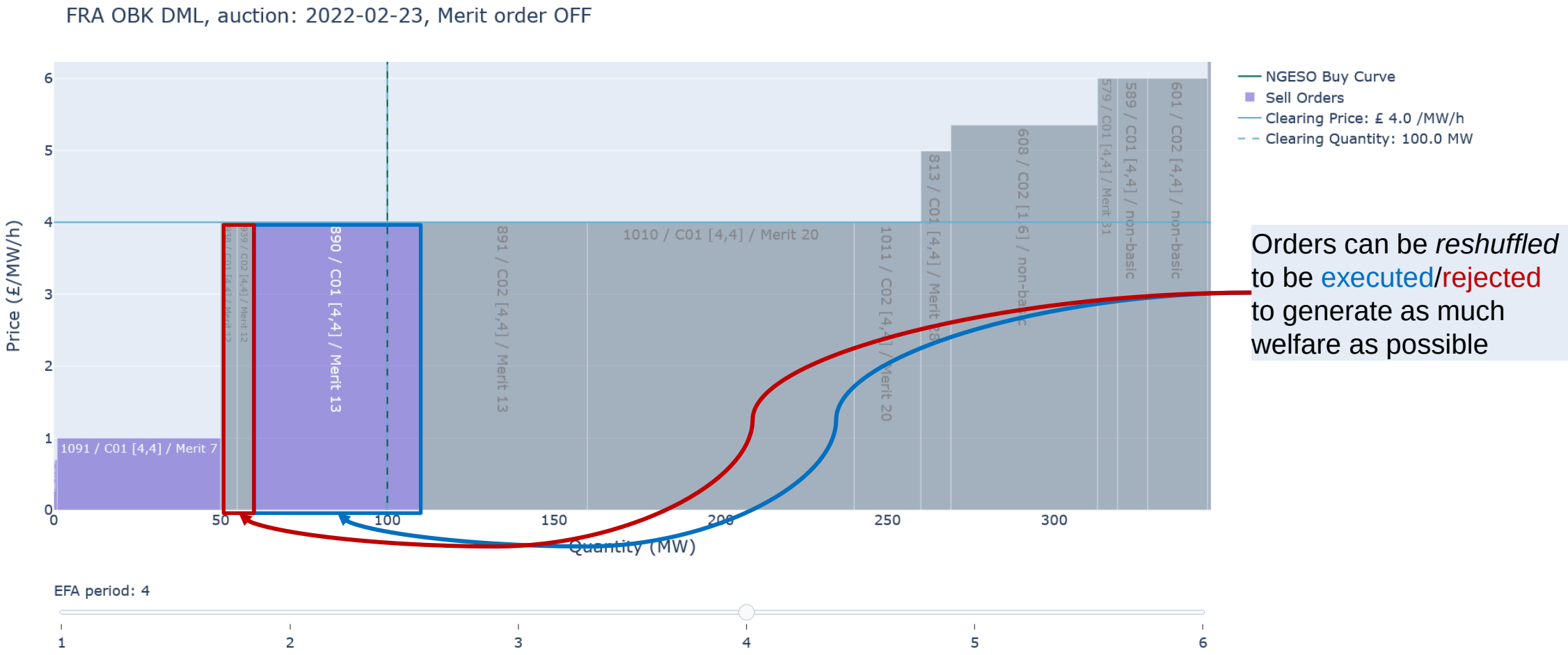
**Merit Order ID is set randomly for basic blocks with the same price to break ties*

Example from Mock Auction **with Merit Order**
Explanation 3/3



Executed even if upper bids as they are smaller than the rejected basic blocks

Example from Mock Auction **without Merit Order**
Explanation 1/1

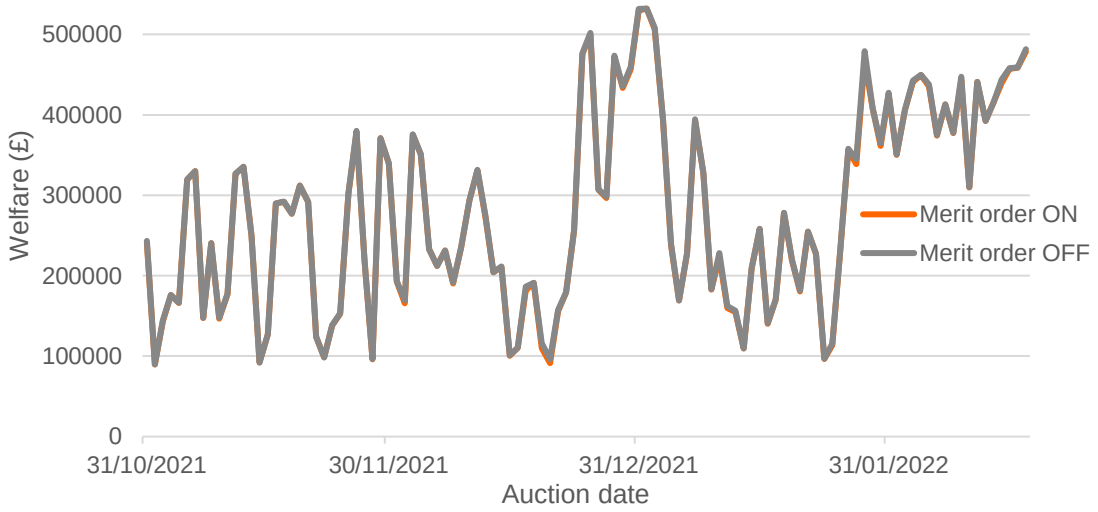


Orders can be *reshuffled* to be executed/rejected to generate as much welfare as possible

Effect on past auctions - **Welfare and PRBs**

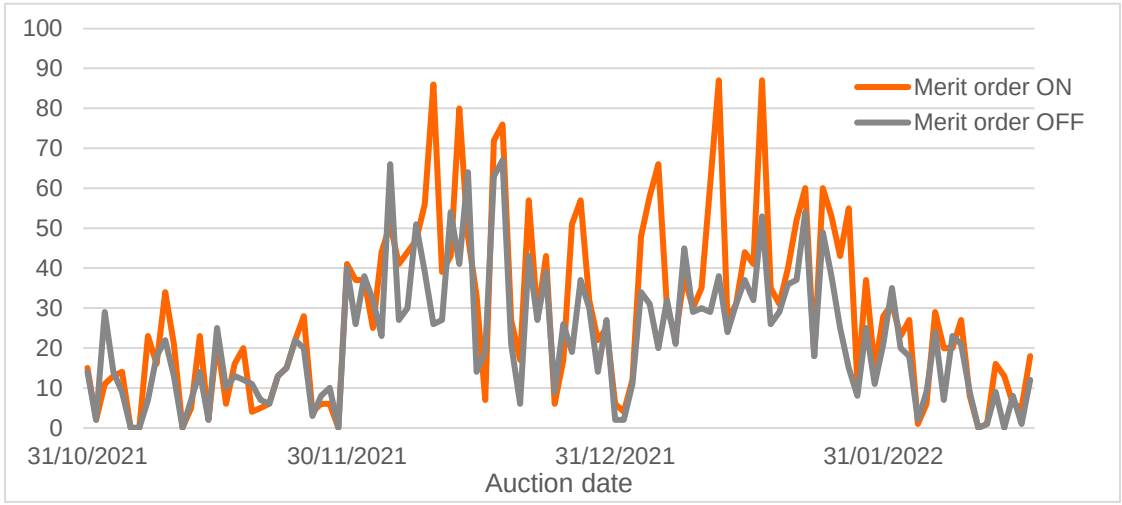
Comparison of auction results with and without merit order on past daily auctions

Welfare



	Merit order ON	Merit order OFF
Average	279 685	280 810
Sum	30 765 384	30 889 122

Number of PRBS per Auction

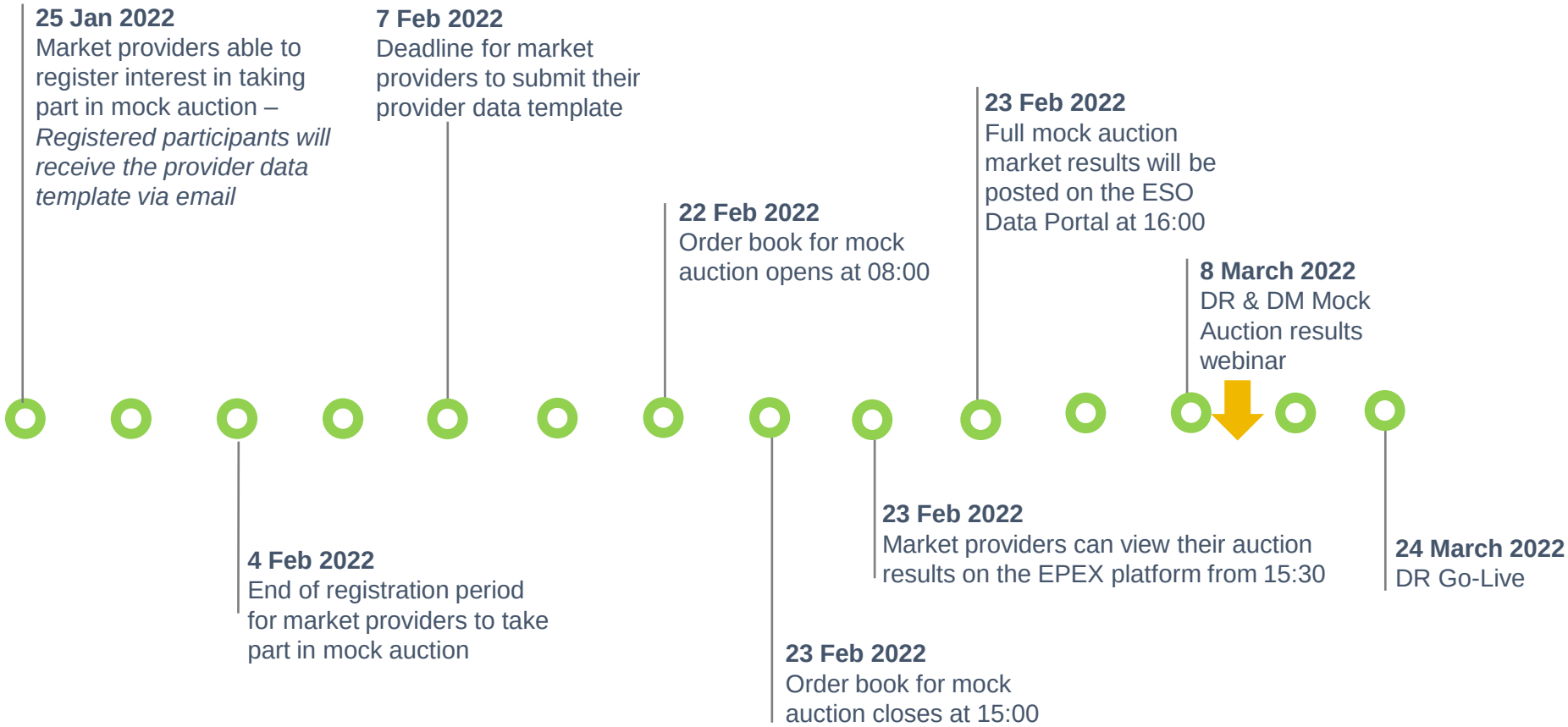


		Merit order ON	Merit order OFF
Average	C01_WO_CHILD	11,3	12,8
	C01_W_CHILD	5,5	2,9
	C02	3,2	1,5
	C88	8,7	5,2
	All	28,7	22,4
Total	C01_WO_CHILD	1243	1406
	C01_W_CHILD	609	316
	C02	349	164
	C88	957	577
	All	3158	2463

DISCLAIMER: Likely changes in bidding strategies not anticipated. The data provided is for illustrative purpose only and we should not draw any conclusions for future results.

DM & DR update

Mock Auction timeline



SMP & Provider data template

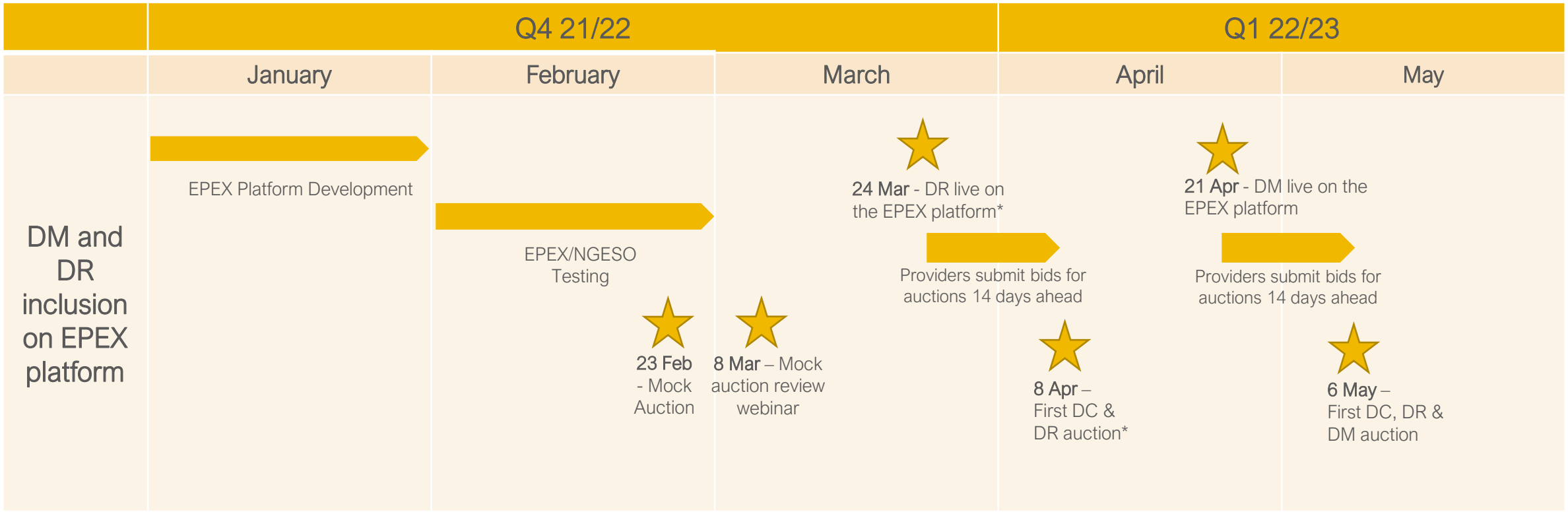
Onboarding via Single Market Platform (SMP)

- Now that SMP is live, we invite you to onboard any new assets through the platform. The functionality for DR and DM has been available since 10 March
- As we move from our old onboarding process to SMP, we would ask providers for a short period of time to still notify NGESO of any changes to your unit portfolio or accounts accessing the EPEX platform by continuing to send the provider data template through to Commercial.Operation@nationalgrideso.com
- This allows the ESO to conduct checks to ensure the smooth transition to SMP

Note, if we receive any amendments on a Wednesday or later in the week, these won't be reflected in the EPEX platform until the following Wednesday at 23:00. This is reflected in the 'Participation Guidance Document' available to view online.

We encourage any changes to be sent as early as possible to NGESO.

Timeline of events



*Awaiting outcome for DR derogation on Clean Energy Package Art. 6(2)

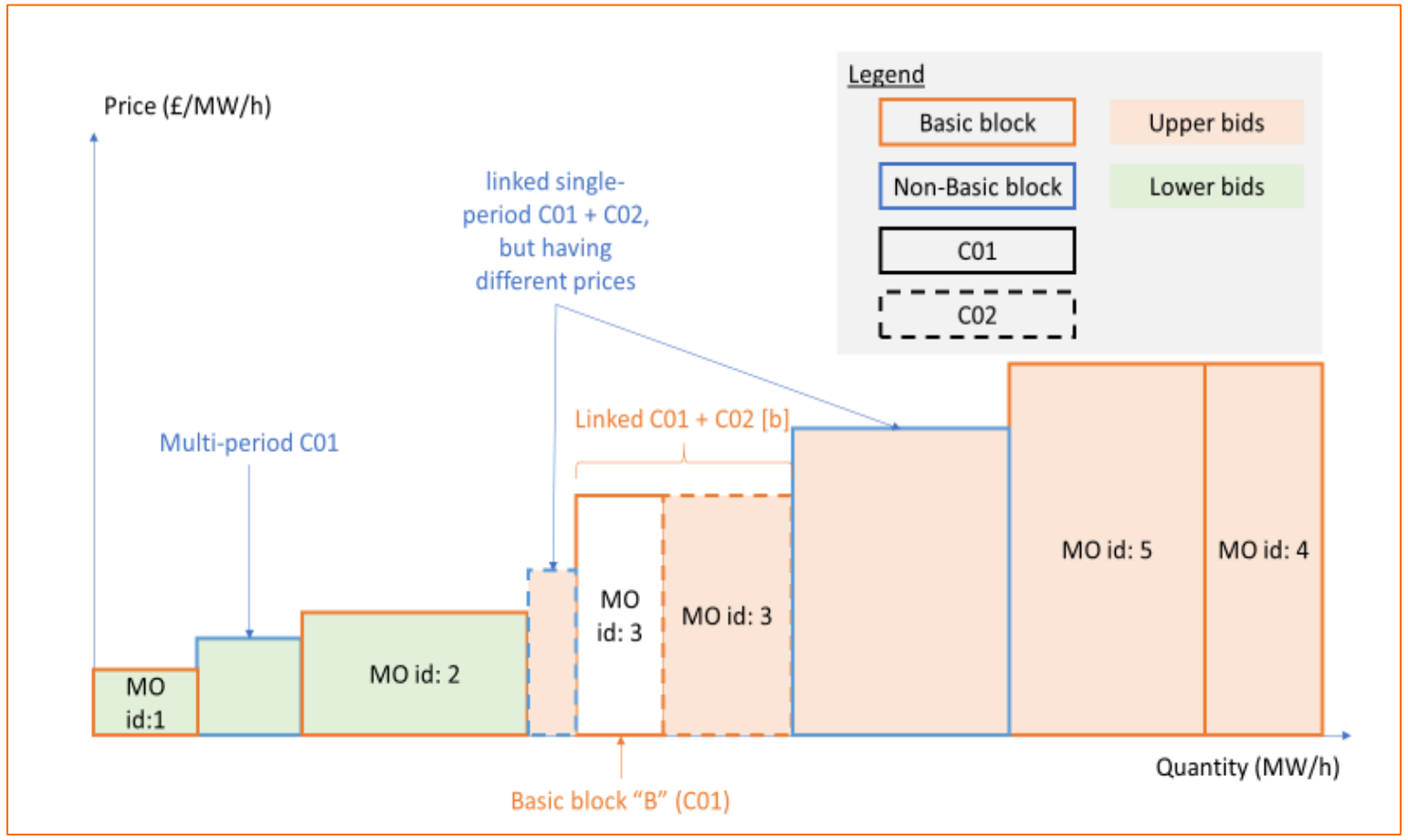
Q&A

Please submit your questions via Teams chat

If you have further questions or feedback, please send them to:
box.futureofbalancingservices@nationalgrideso.com

nationalgridESO

Merit Order – **Example of upper bids and lower bids**

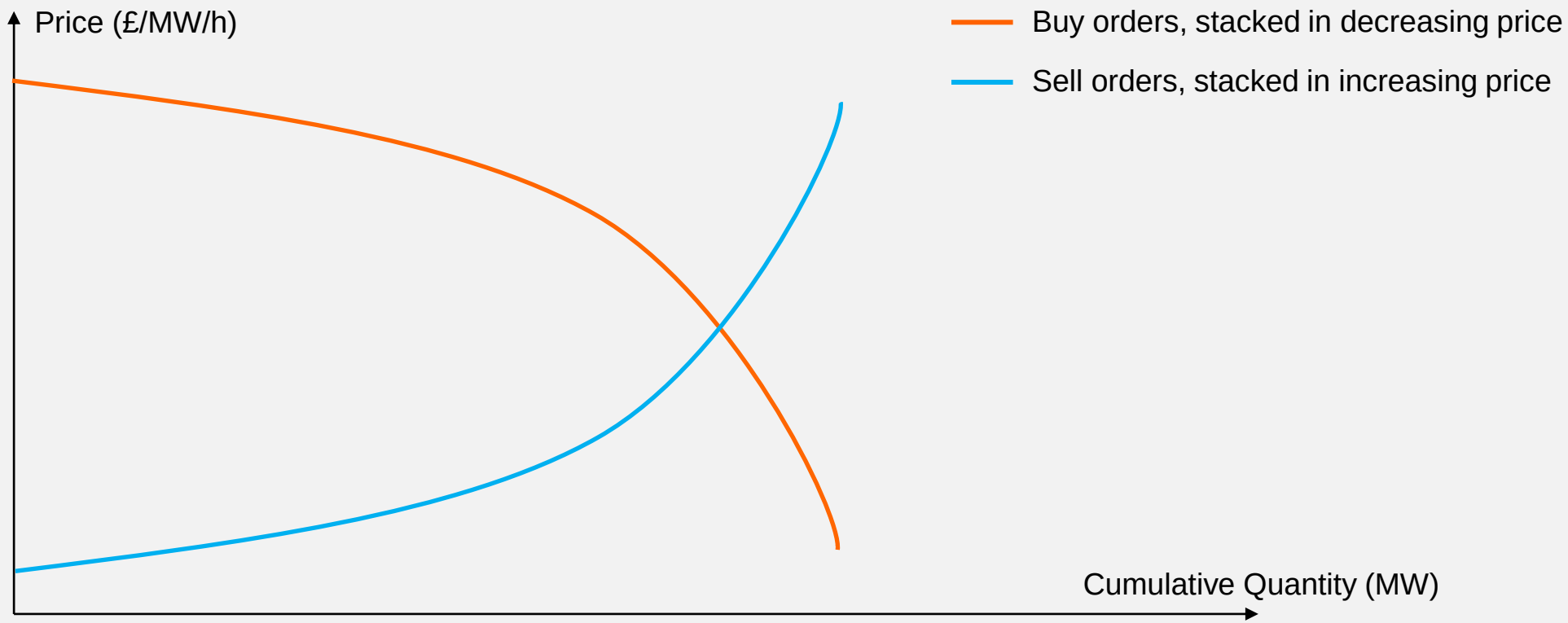


Explanation…

Welfare - graphical representation of Order Book (OBK)

Sell (resp. buy) orders are stacked in increasing (resp. decreasing) price

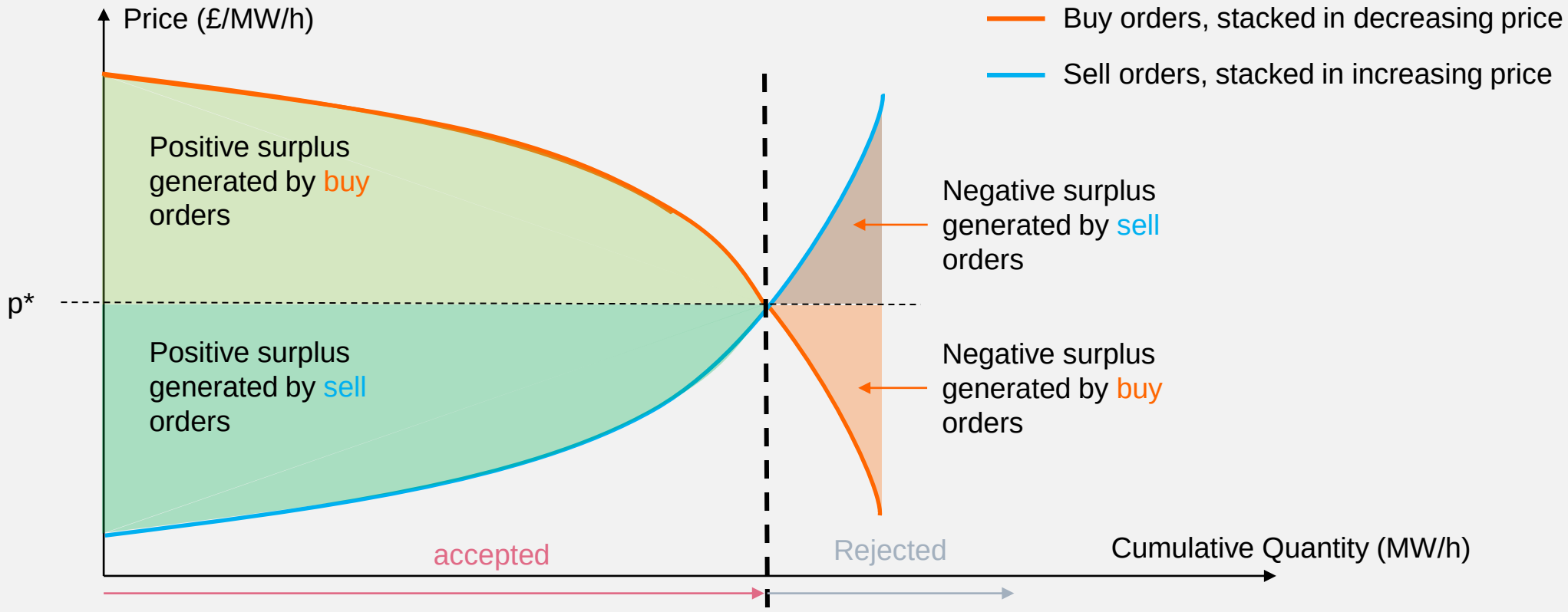
Graphical representation, for a given delivery period and product



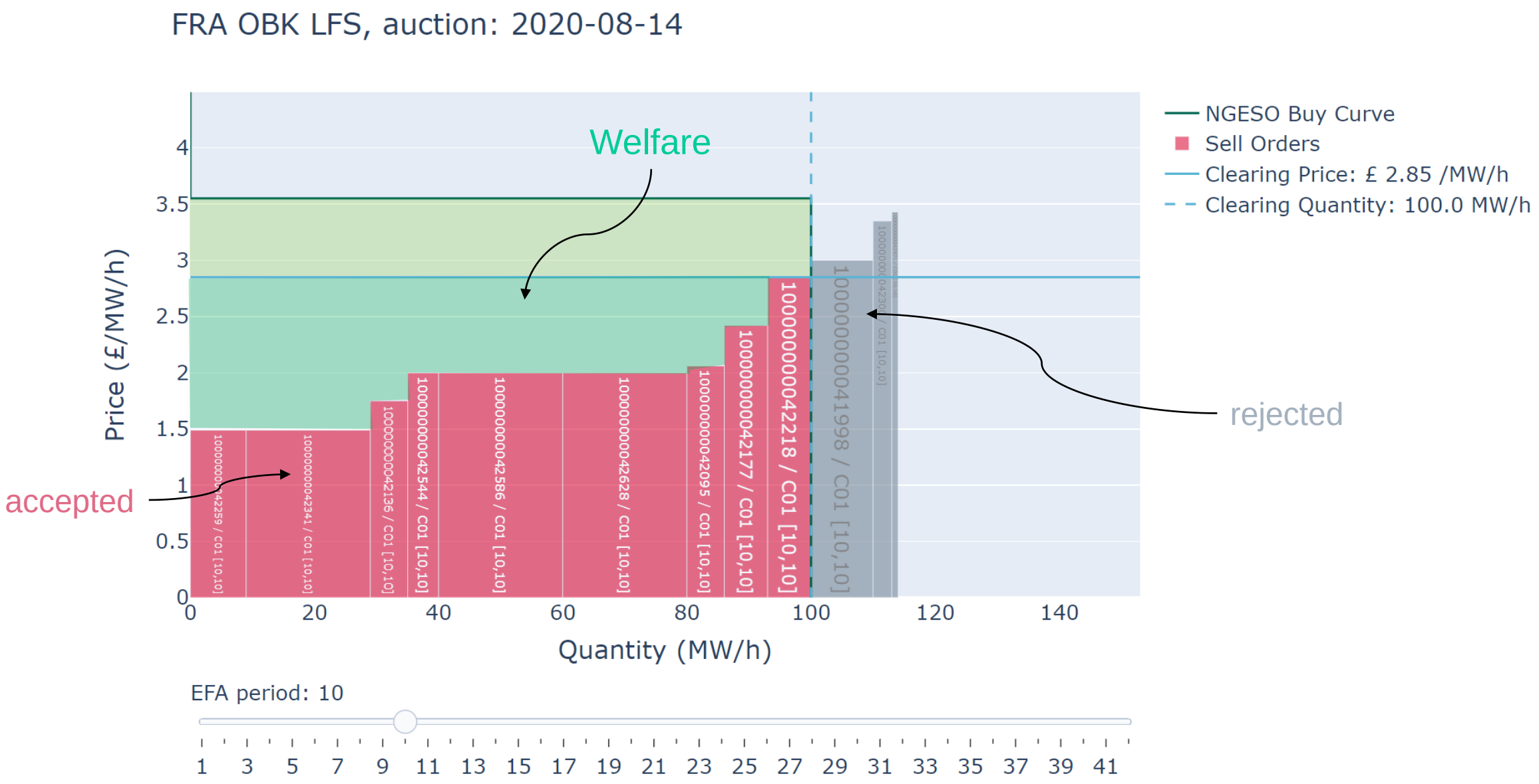
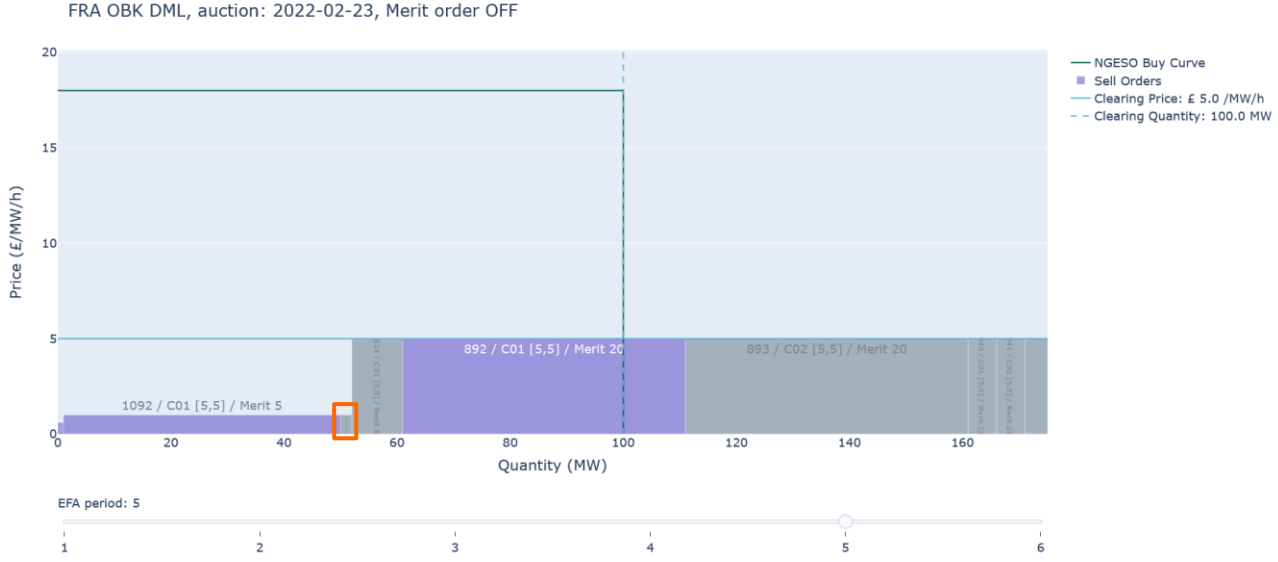
Welfare - definition

Welfare = the total surplus generated by the auction for all orders

- Surplus represents what a sell (resp. buy) order “receives” (resp. “pays”) compared to what it was willing to receive (resp.pay)
  - Eg, over 1 hour, if you are willing to sell £ 1 /MW for 10 MW and receive £ 1.5 /MW, you *earned* a surplus of £ 5
  - Eg, over 1 hour, if you are willing to buy £ 2 /MW for 10 MW and receive £ 1.5 /MW, you *earned* a surplus of £ 5



Welfare example



New market design: PRBs will still exist