

# Chapter 10: Bid Offer Acceptance Quantities



# Bid Offer Acceptance Quantity Calculation

- Bid Offer Acceptances (BOAs) are the actions taken by the SOs in the Balancing Market. The quantities associated with Bid Offer Acceptances can be thought of as the energy procured by the SOs to balance the system for both energy and non-energy purposes, considering each unit's schedule from the ex-ante markets as a start point (as indicated by their Physical Notification submissions);
- If a unit is dispatched to a different level of output than it has stated in its Final Physical Notifications, then this is calculated as a Bid Offer Acceptance Quantity;
- Each Dispatch Instruction is a Bid Offer Acceptance. This includes the Physical Dispatch Instructions issued by the SOs in the real-time operation of the system, and also Pseudo Dispatch Instructions which are a settlement concept only, created to reflect the fact that the instructions issued in the operation of the system are open, while settlement of these actions is for closed volumes;
- BOAs are calculated based on what was instructed, not based on what was delivered:
  - Any adjustment to settlement amounts required for non-delivery is separately calculated, and information on non-delivery is not known in time for pricing calculations.
- There are a number of pieces of functionality needed to correctly calculate BOAs:
  - Differences between Imbalance Settlement Periods, and within those periods with multiple Price Quantity Pair Bands and multiple acceptances;
  - Open instructions in operations with closed acceptances in settlement;
  - Substitutive PNs;
  - Availability.
- While all of this functionality builds in layers which can be complex, it could be simply thought of as calculating the correct quantity at the price which is active at the time the quantity was accepted;
- Bid Offer Acceptances relevant to Interconnector Units are an input from the SOs of the quantities and prices agreed for the cross-border SO-SO trade, and are not calculated as explained in this section.

# Bid Offer Acceptance Quantity Calculation

- Bid Offer Acceptances is the general term used to describe all actions taken by the SOs. When calculating quantities and prices to apply in pricing and settlement, they are split into two types of actions:
  - Accepted Offers, which are positive quantities (QAO), meaning the unit was dispatched greater than its Final Physical Notification Quantity (or previous closed dispatch position). These are also referred to as Increment actions, or “Incs”;
  - Accepted Bids, which are negative quantities (QAB), meaning the unit was dispatched less than its Final Physical Notification Quantity (or previous closed dispatch position). These are also referred to as Decrement actions, or “Decs”.
- A single Bid Offer Acceptance could have an Accepted Offer and an Accepted Bid, for example if the Dispatch Instruction requires the unit to ramp, with the start of this ramp being below its FPN and the end of that ramp being above its FPN, but there are different calculations needed to calculate positive and negative quantities;
- This means that for each Bid Offer Acceptance, the quantity calculation needs to be carried out twice: once with inputs for Incs, and once with inputs for Decs. If there are only Incs or only Decs relevant to a Bid Offer Acceptance, the algebra is set up so that the irrelevant calculation will return a value of zero;
- When calculating Accepted Bid and Accepted Offer Quantities for each unit ( $u$ ) and each BOA ( $o$ ), the calculation splits these into the volumes present in each Imbalance Settlement Period ( $\gamma$ ) and present in each Price Quantity Pair Band ( $i$ ). This is done to have a single price which applies to the quantity;
- The calculations are carried out ex-post close to real-time for a five minute period for use in calculating the Imbalance Price, and then carried out again within settlement timelines for use in calculating settlement amounts. Most of the information between the two will be the same, however there may be situations where data which was not present in time for the pricing calculations is present for the settlement calculations, for example the logging of a manual Dispatch Instruction or updating in EDIL the availability declaration of a unit which has tripped. Therefore in a small number of cases the quantities in settlement could be different to those calculated for pricing.

# Bid Offer Acceptance Quantity Calculation

- When open instructions are issued in the physical operation of the power system, they need to be closed in settlement in order to calculate the quantity and price associated with a BOA. The principle used to determine how BOAs are closed and what quantity is calculated for a BOA is that each BOA accepts the minimum physically feasible quantity implied by the Dispatch Instruction and the unit's TOD;
- This means for Dispatch Instructions to change a unit's output level, a quantity is calculated which reflects the unit ramping from its previous position to its Target Instruction Level according to its TOD, then once it reaches this output level immediately ramping back to its FPN profile, closing the BOA. This could be thought of as an initial closed acceptance.
- To reflect the fact that in the physical operation of the power system the unit maintains its output at the Target Instruction Level, a new BOA is opened, where for every minute that passes in real-time operations where the previous instruction is not closed, there is a deemed acceptance of the quantity associated with ramping back to the FPN curve starting at the following minute. This could be thought of as continuous open acceptance until another instruction is issued.
- How instructions are opened and closed is handled in Instruction Profiling through Dispatch Instructions and Pseudo Dispatch Instructions:
  - Each instruction opens a new Bid Offer Acceptance and has an individual instruction profile to calculate the quantity vs the previous BOAs instruction profile – this approach allows for multiple acceptances in a single period to be considered with different sets of COD.

# Bid Offer Acceptance Quantity Calculation

- If change in prices affects quantities from continuous acceptance, a new BOA needs to be opened to reflect the time the data was updated to ensure that the new data can apply in the relevant periods for every subsequent continuously accepted minute;
- While conceptually quantities in continuous open acceptance are accepted for each minute that passes in real-time operations, there is no need to actually open and close a BOA to calculate quantities for every individual minute :
  - The exact events where a BOA should be opened can be tracked by timestamps of when other BOAs are opening and closing, profiles for minimum physically feasible quantity, gate closure for Imbalance Settlement Period boundaries, timestamps of then Participants update COD, etc.;
  - The exact events are managed through the instruction effective times of Dispatch Instructions and Pseudo Dispatch Instructions.
- The following examples are intended to visualise how quantities can be calculated for a certain Dispatch Instruction, and which prices apply to different BOAs depending on the timing of actions.

# Bid Offer Acceptance Quantity Calculation

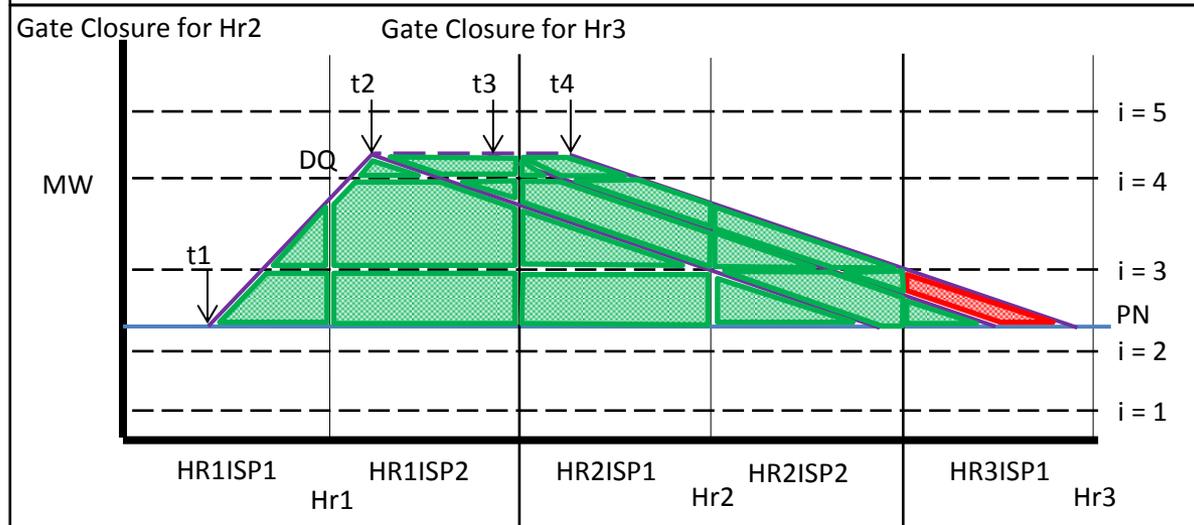
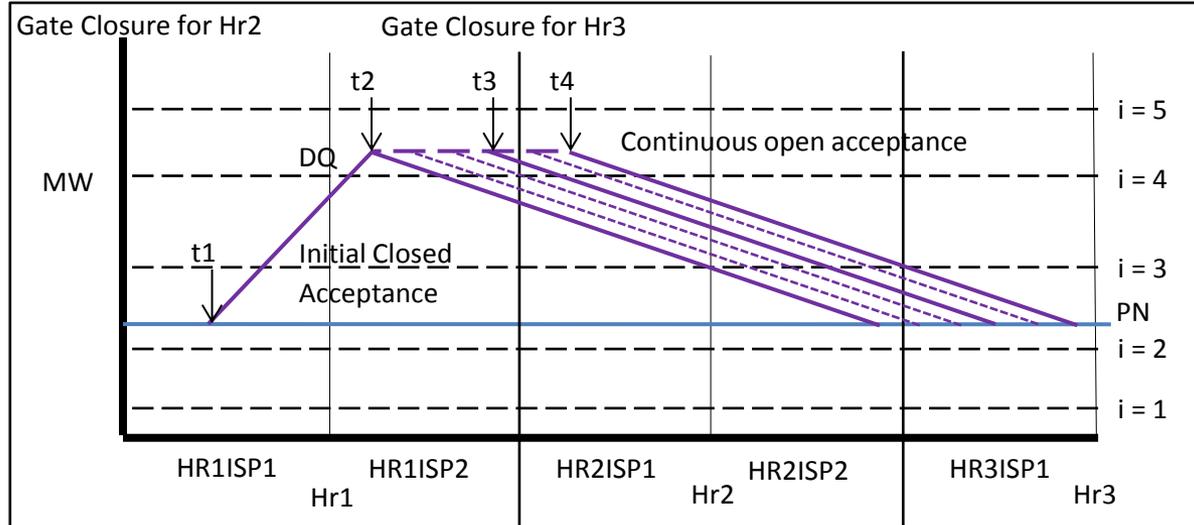
## Price Change in Hr1

t1: BOA 1 is opened through a dispatch instruction to go to a certain output level;

t2: BOA 2 opened as instruction is not closed;

t3: participant resubmits prices which apply from Hr3 onward where gate is not yet closed;

t4: TSO closes instruction by instructing participant go to a certain output level (equal to the PN).



With Price Set 1 before t3



With Price Set 2 after t3

# Bid Offer Acceptance Quantity Calculation

## Price Change before Hr1

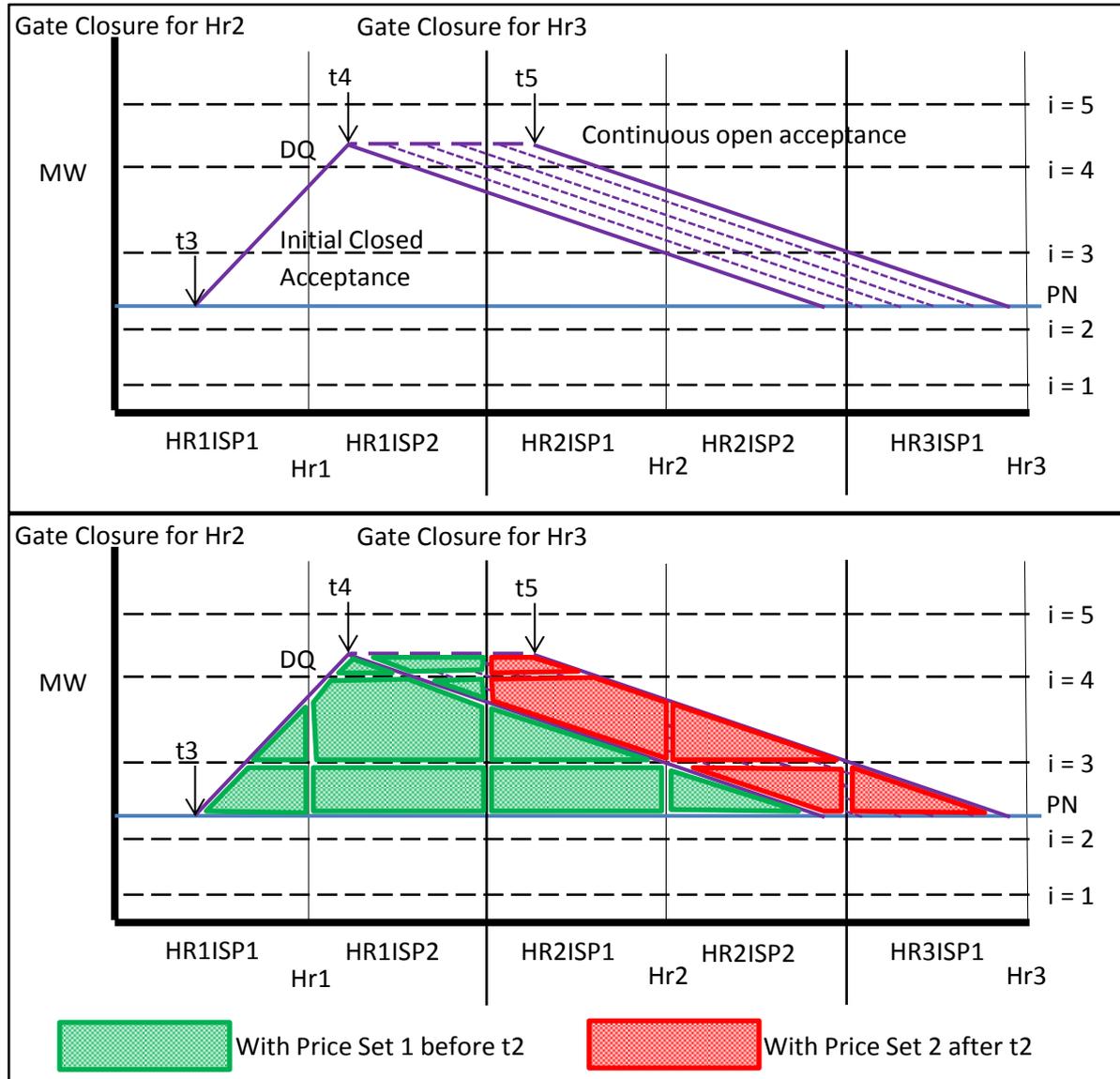
t1 before Hr1:  
Instruction issued by TSO to go to a certain output level;

t2 before Hr1 but after t1: participant updates price, applicable from Hr2 onwards where gate is not yet closed;

t3: BOA 1 is opened (after notice time of instruction, etc.);

t4: BOA 2 opened as instruction is not closed;

t5: TSO closes instruction by instructing participant to go to a certain output level (equal to the PN).



# Bid Offer Acceptance Quantity Calculation

- Outturn Availability in Bid Offer Acceptance Quantity (qBOA) calculation:
  - This is a separate data feed to the Physical Notifications, being updated in real-time (including after Gate Closure 2) through EDIL in accordance with the Grid Code.
- It is included in the calculations of BOAs for both pricing and settlement functions, in particular for the calculation of Dec actions;
- The decision to dispatch a unit away from its PN may be driven by availability, rather than based on energy or non-energy balancing economic merit, for example if a unit trips the SO must dispatch that unit to zero to match the fact it cannot provide power during the trip;
- Availability is included in the algebra for the calculation of Decs to ensure that any decrease in output from PNs due to reduced availability is seen as an imbalance, rather than an Accepted Bid;
- This is done by taking the minimum of the FPN and the Outturn Availability in the equation: if the availability is lower, then this is the point from which Decs are calculation, not from the FPN. The difference between the unit's trades / FPN and their availability would turn up through the metered quantity;
- For Non-Dispatchable units who do not need to submit PNs (e.g. wind units), their FPN quantity profile is taken to be their Outturn Availability profile.

# Bid Offer Acceptance Quantity Calculation

- Example of a unit tripping:

