

ELEXION

Project MARI

Discussions Points

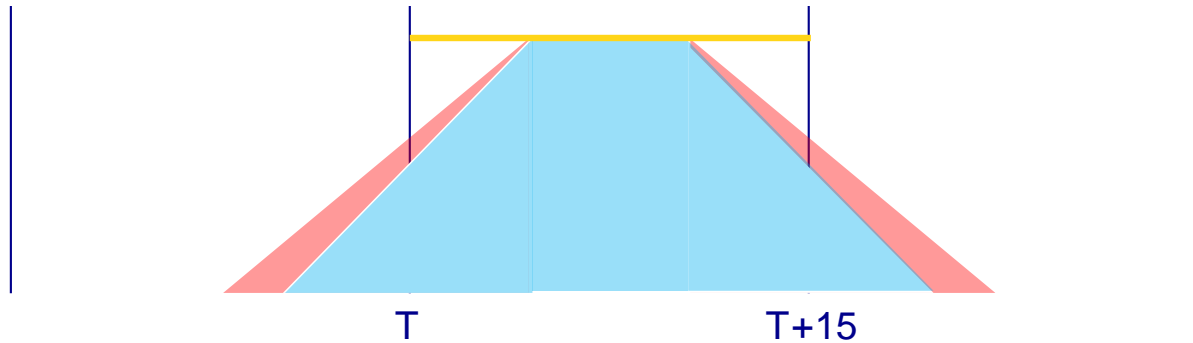
29 September 2020

MFRR INSTRUCTION DEVIATION CASHFLOW

Instruction Deviation Cashflow Discussion Point

'Workgroup to look at Instruction Deviation Cashflow in detail and, having agreed that activation specific cashflows are needed, consider if harmonisation is needed'

$$\text{SA mFRR Cashflow} = \text{SA Deviation Volume} * \text{SA BEDP (£???)}$$

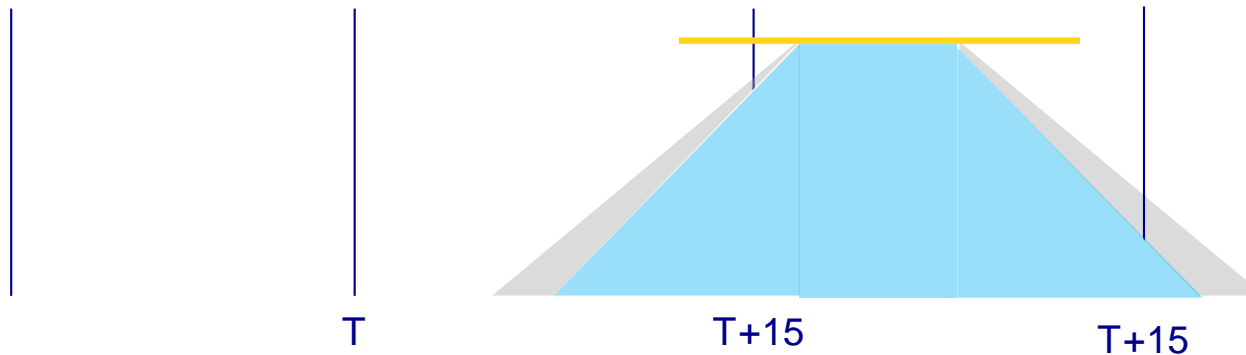


NOTE:

BEDP = Balancing Energy Deviation Price

RR BEDP set to £0

$$\text{DA mFRR Cashflow} = \text{DA Deviation Volume} * \text{DA BEDP (£???)}$$



The DA Standard Product Shape can have a maximum delivery duration > 5 min

Discussion Point – Instruction Deviation Cashflow

'Workgroup to look at Instruction Deviation Cashflow in detail and, having agreed that activation specific cashflows are needed, consider if harmonisation is needed'

Option A – SA & DA BEDP harmonised with RR and set to £0

Option B – SA & DA BEDP harmonised with each other but not harmonised with RR and set to a price that is cost reflective.

What is cost reflective?

- Imbalance price?
- SA / DA clearing price?
- New methodology?

Option C – SA & DA BEDP are not harmonised with each other nor RR and set to individual prices that are cost reflective.

Benefits

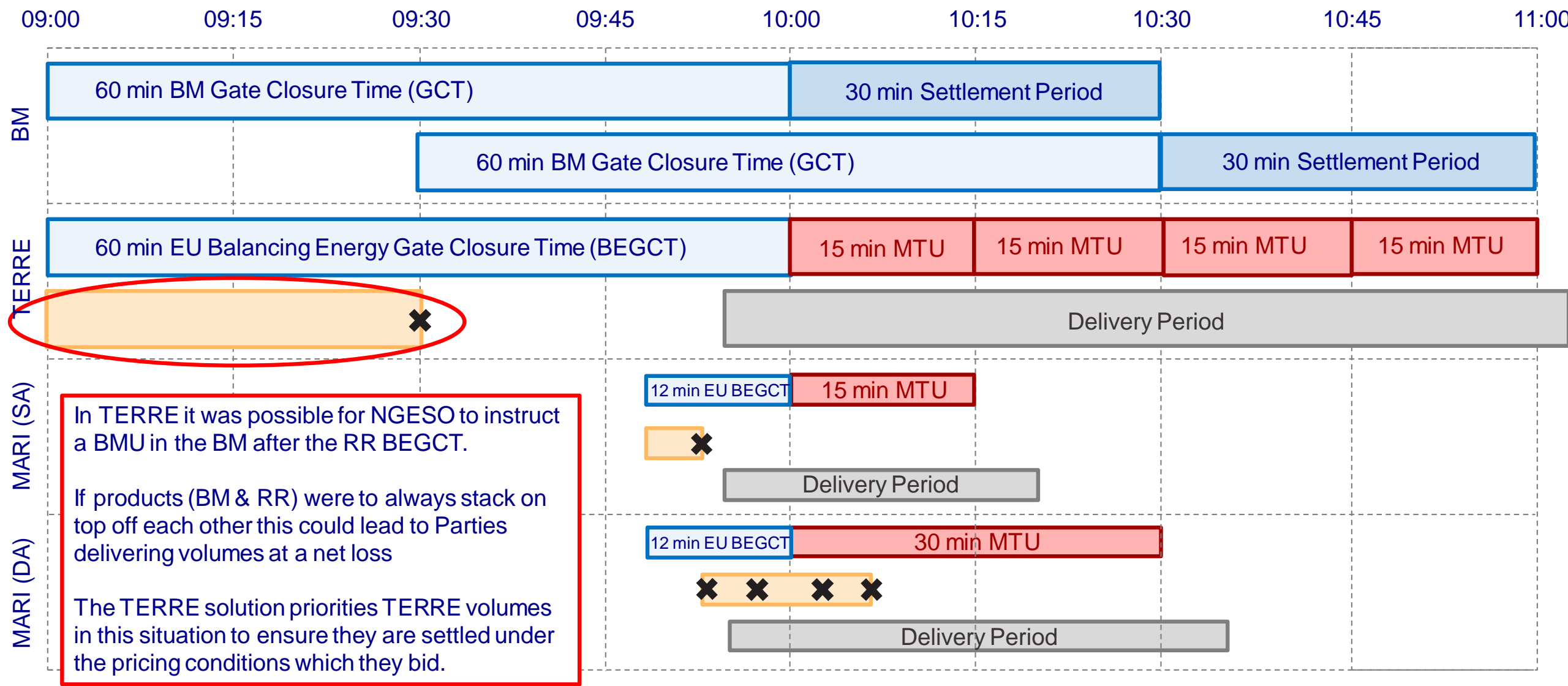
- Simple and consistent across markets
- Some control over genral mFRR delivery shape
- Easy to implement
- Easy to implement
- Most cost reflective option
- Greatest control over delivery shape

Disadvantages

- Specific activation types / products not incentivised
- Is this suitable for mFRR?
- Specific activation types not incentivised
- Not mFRR specific
- Overly punitive?
- More complex and needs development / maintenance
- Most complex solution

BM / RR / MFRR PRODUCT INTERACTIONS

BM / RR / mFRR Product Timings



BOA before Auction Results Problem

1. BSP @ BEGCT

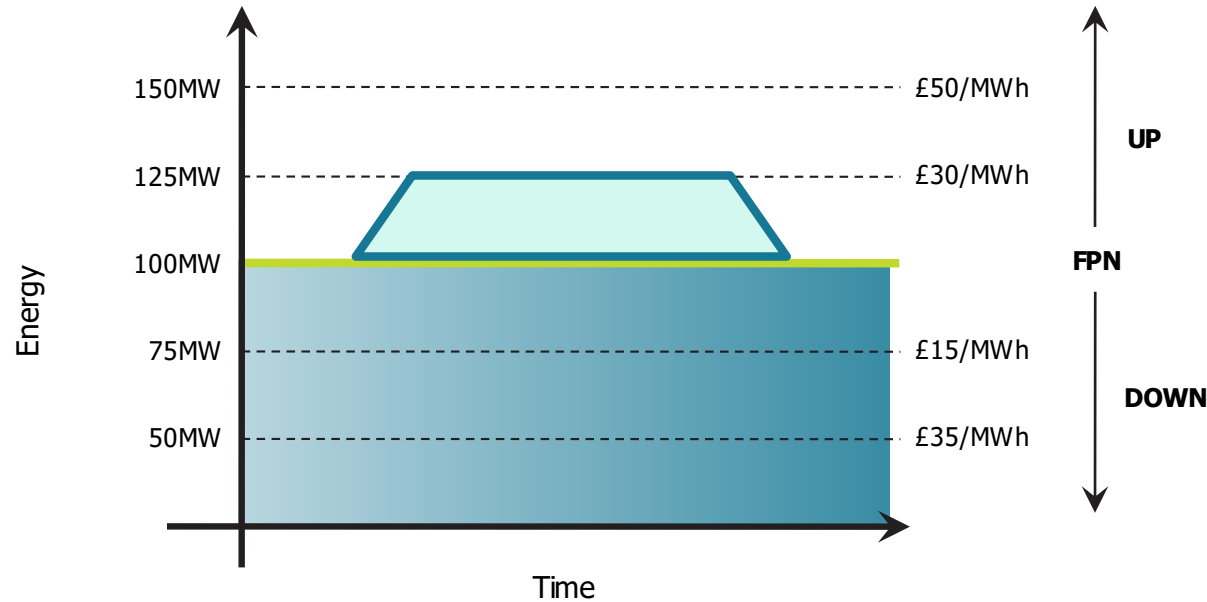
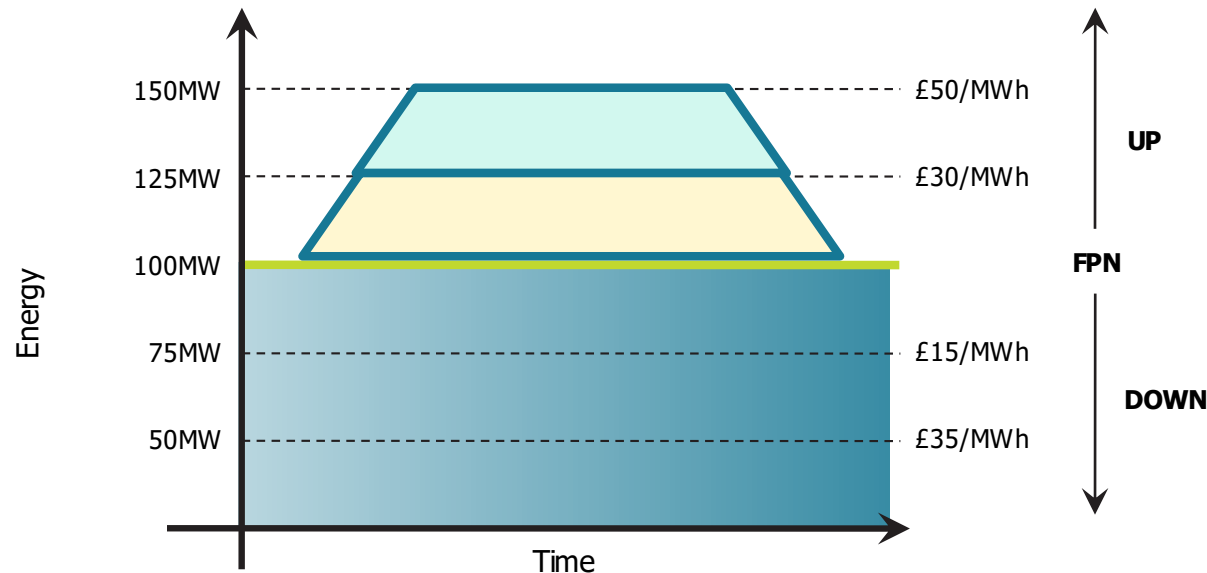


Diagram shows the scaling costs of deviating from FPN.

Knowing their costs the BSP bids into RR
@ £40 per MW for deviating 25 MW

If activated BSP would make £10 per MW profit

2. BSP after Auction Results



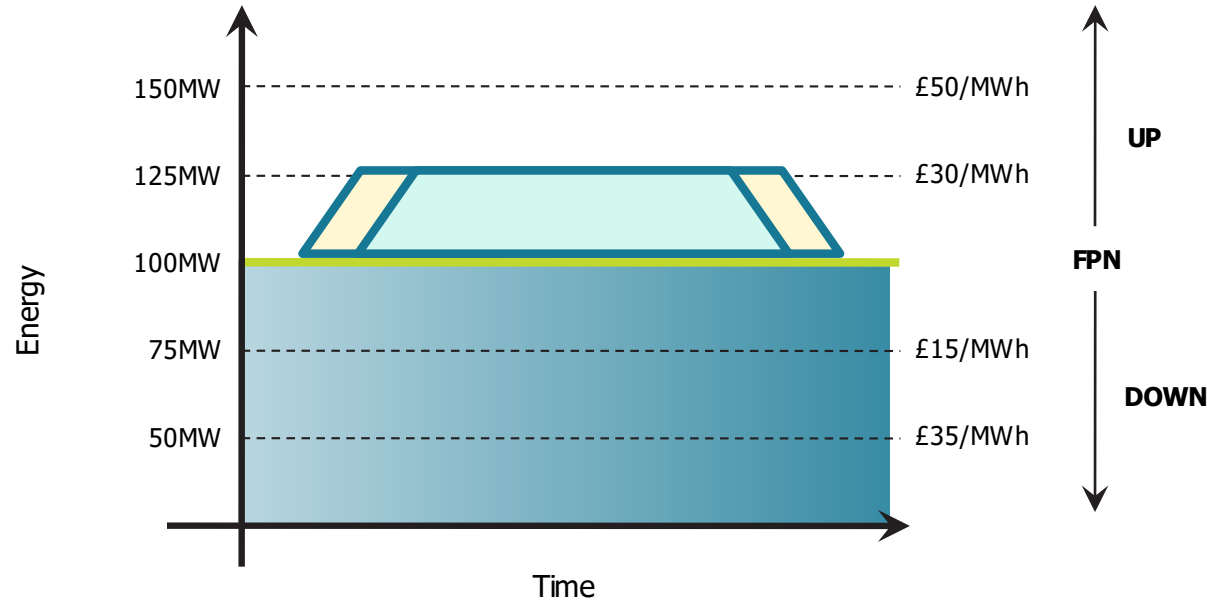
However a BOA is issued after BEGCT but before the RR Auction Results are known (and therefore instruction issued).

If products stack in all instances then
now costs for RR activation are £50 per
MW but bid is only at £40 per MW

If activated BSP would make £10 per MW loss

BOA before Auction Results Solution

3. BSP @ Settlement



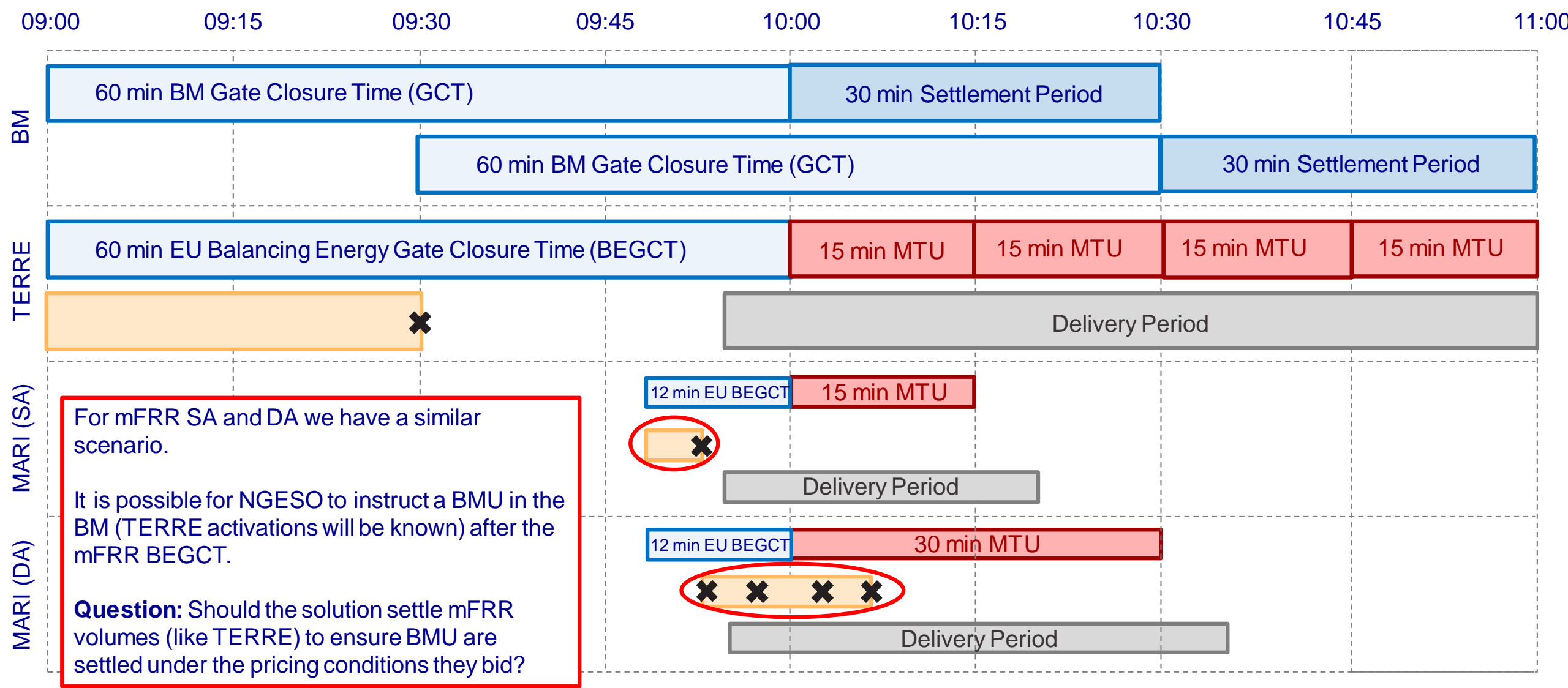
To ensure that BSP is paid RR volumes as they were bid and to ensure system remains balanced:

- NGESO developed a TERRE dispatch guide; and
- Settlement was changed

So that (as per the diagram) the BSP

- RR volumes paid @ £40 per MW
- Remaining BOA volumes paid @ £BOD

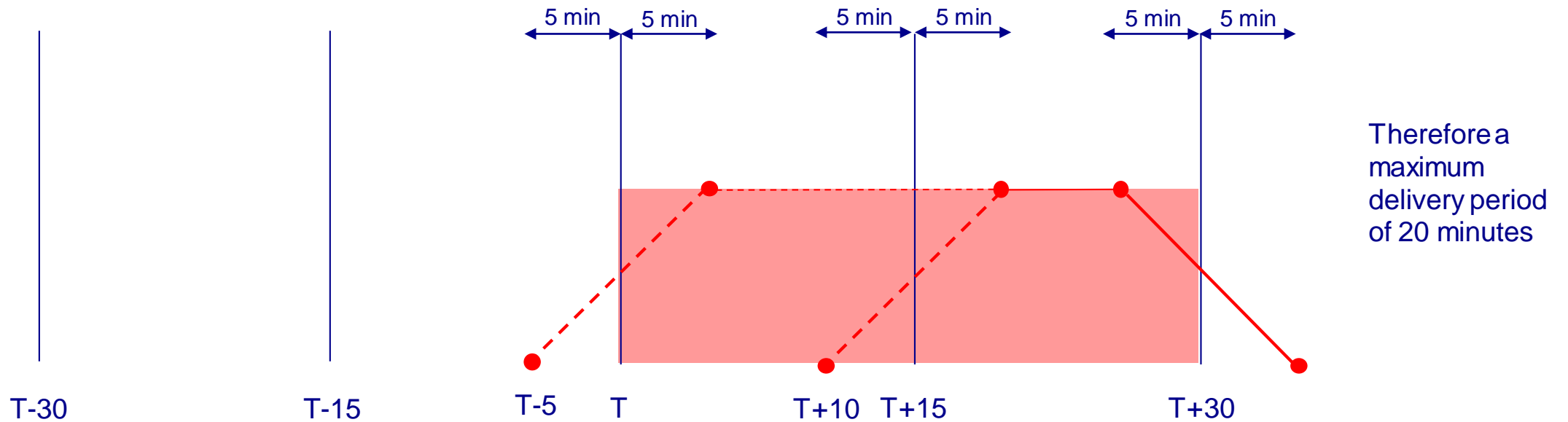
Discussion Point – BM / RR / mFRR Product Interaction



DA STANDARD PRODUCT SHAPE

UPDATE – DA Standard Product Shape

‘Delivery of balancing energy for direct activations, including ramping, may start at any point in time between T-5 and T+10, depending on when the demand(s) arrived on the platform. The delivery will always end at T+35. This is also the time interval during which corresponding signalling will occur.’



SA & DA auction results to be issued by Activation Period:

‘For the mFRR standard product, the activation period starts in the middle of ramp-up and ends in the middle of ramp-down. For scheduled activations the activation period is equal to 15 minutes and coincides with the MTU period that is being optimized by the AOF. For direct activations the activation period may have a duration from 15 minutes up to 30 minutes, starting during the MTU period being optimized by the AOF and ending with the following MTU period.’

Reference Information – MOL File

MOL File Contents

Document Header

period.timeInterval The duration of the activation period: 15 minutes for scheduled activation (and up to 30 minutes for direct activation)

Bid Time Series

bid_Period.timeInterval The activation period: Duration is fixed to 15 minutes for scheduled activation and from 15 up to 30 minutes for direct activation.

Period
timeInterval The activation period. Shall be the same value as in bid_Period.timeInterval

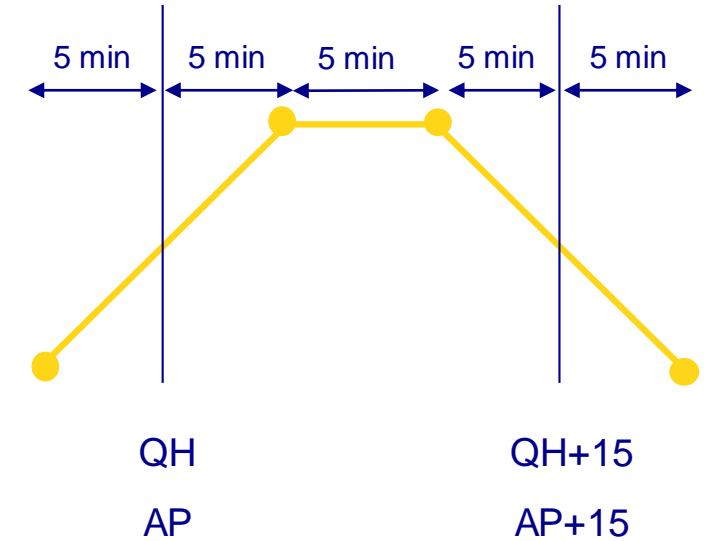
mFRR Standard Product Shape

Schedule Activations

Point variables will be created with a defined logic (i.e. they will create a standard shape) e.g.

For each SA the SAA will deem:

- a point variable at AP-5 to be the start of the trapezoid
- a point variable to equal mFRR Acceptance MW Level at AP+5
- a point variable to equal mFRR Acceptance MW Level at AP+10
- a point variable at AP+20 to be the end of the trapezoid

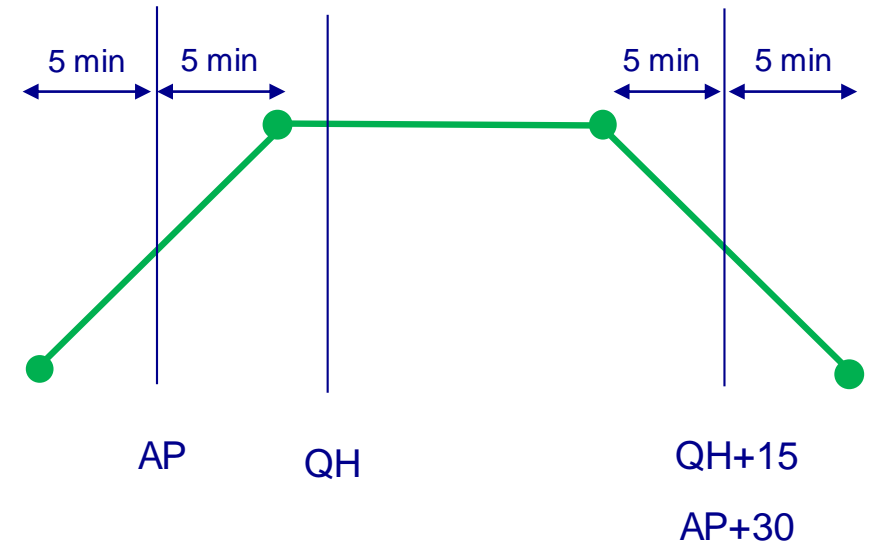


Direct Activations

Point variables will be created with a defined logic (i.e. they will create a standard shape) e.g.

For each DA the SAA will deem:

- a point variable at AP-5 to be the start of the trapezoid
- a point variable to equal mFRR Acceptance MW Level at AP+5
- a point variable to equal mFRR Acceptance MW Level at AP+25
- a point variable at AP+35 to be the end of the trapezoid



*** Where AP = Activation Period ***

Discussion Point – DA Standard Product Shape Solution Impacts

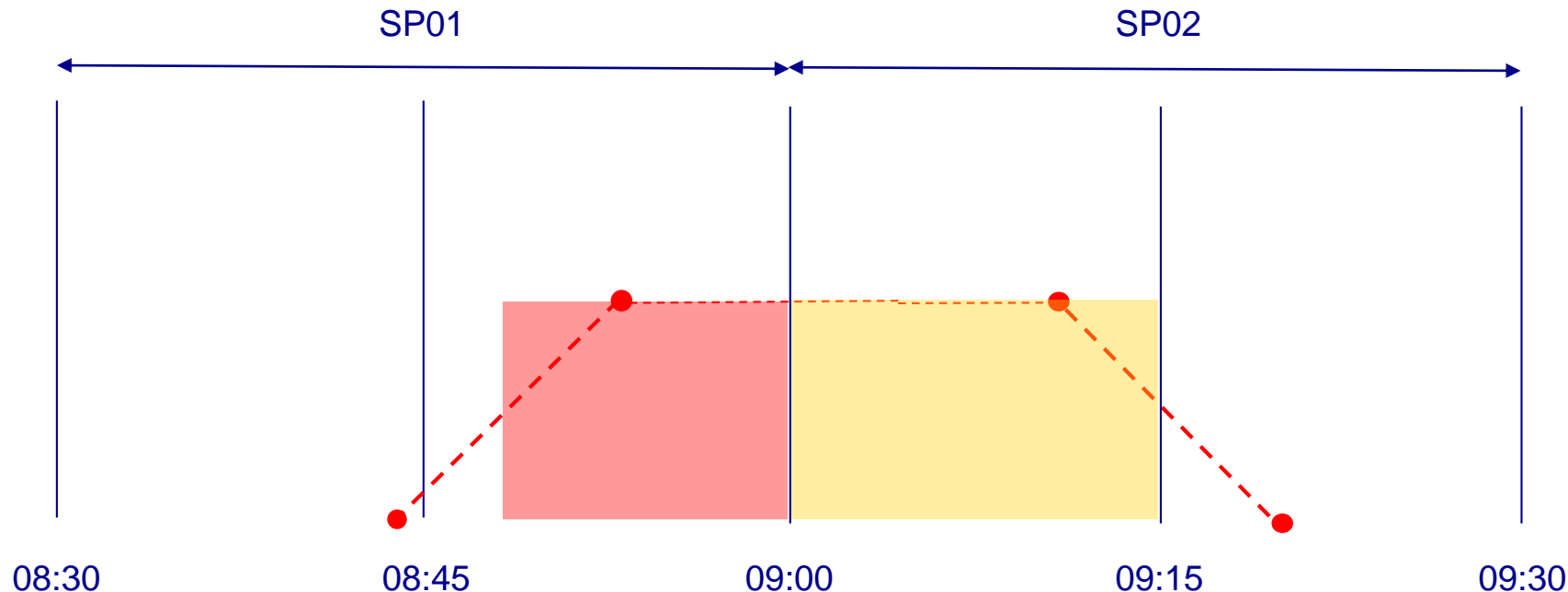
Does this impact DA mFRR Cashflow?

Yes and No.

No as we can still settle the Cashflow on a 'block' basis using the Activation Period as the 'block' volume still equals the DA Standard Product Shape volume.

Yes as it is now possible for the DA mFRR Cashflow to span settlement periods. **Propose** to pay the cashflow by 'block' by Settlement Period.

Where **DA £ mFRR Cashflow** = volume * 'Settlement Price'



The **red** volume will be paid in SP01 at the correct DA Settlement price; and

the **yellow** volume in SP02 at the correct DA Settlement price

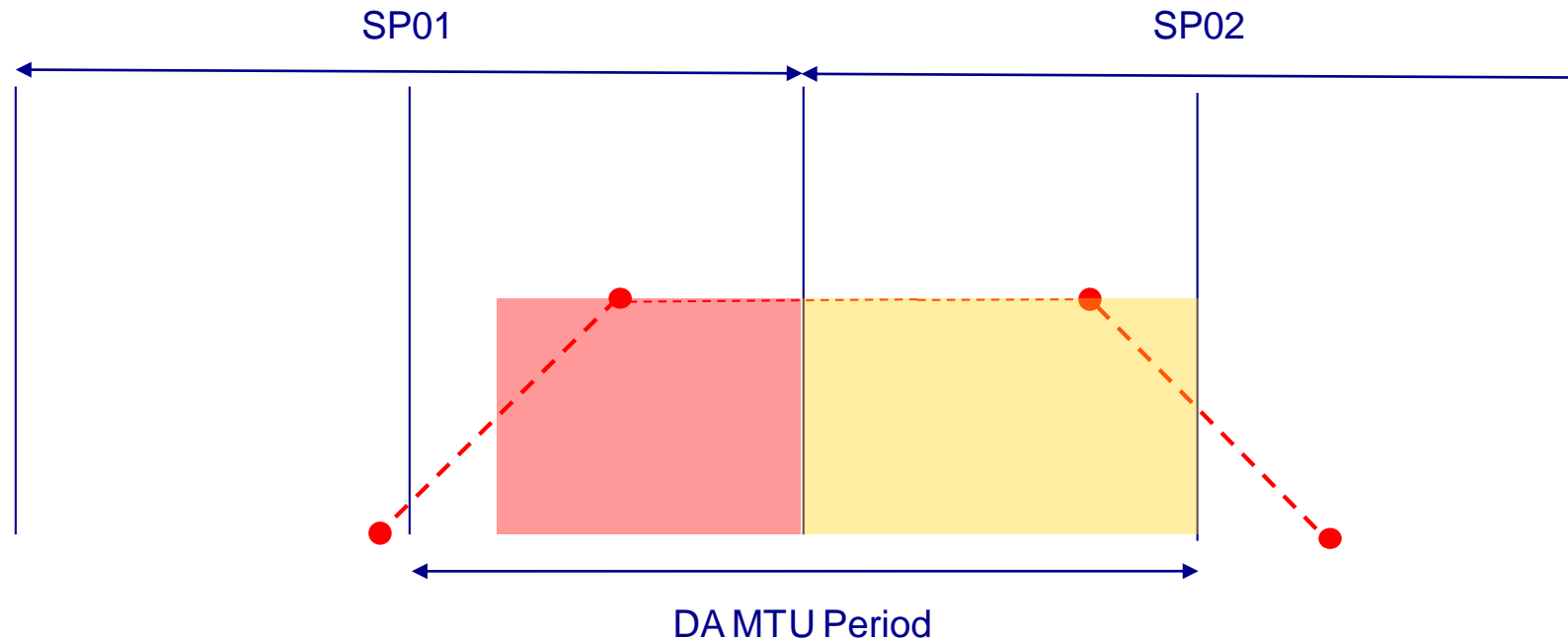
Question: Does the WG agree that the proposed solution change?

Discussion Point – DA Settlement Price

The central platform will produce the following:

- the SA clearing price per SA MTU (QH / 15 min)
- the DA settlement price per DA MTU (30 min)

As expected
Not as expected



NOTE

At this point it is unclear whether the 'Settlement Price' takes into account any Scheduled Activation clearing prices or not.

E.g. $\text{£ DA} = \max(\text{DA}, \text{SA})$

The documentation suggests so but does not explicitly state it.

My expectation is that both a positive and negative Settlement Price will be provided for each QH within the DA MTU period (30 min). I.e. a price will be provided per QH to apply to the 'block' volume within that QH for the appropriate Auction.

Action: Clarity is needed before further work on the solution can be done.

Discussion Point – DA Standard Product Shape Solution Impacts

Does this impact DA Instruction Deviation Cashflow?

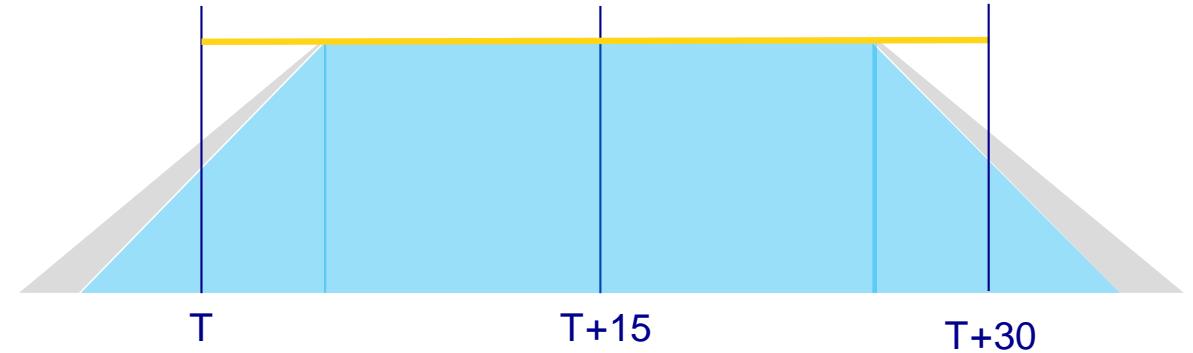
No – propose to use the ‘new’ DA Standard Product Shape and Settlement Price

Does this impact Non Delivery?

No – propose to use the ‘new’ DA Standard Product Shape and Settlement Price

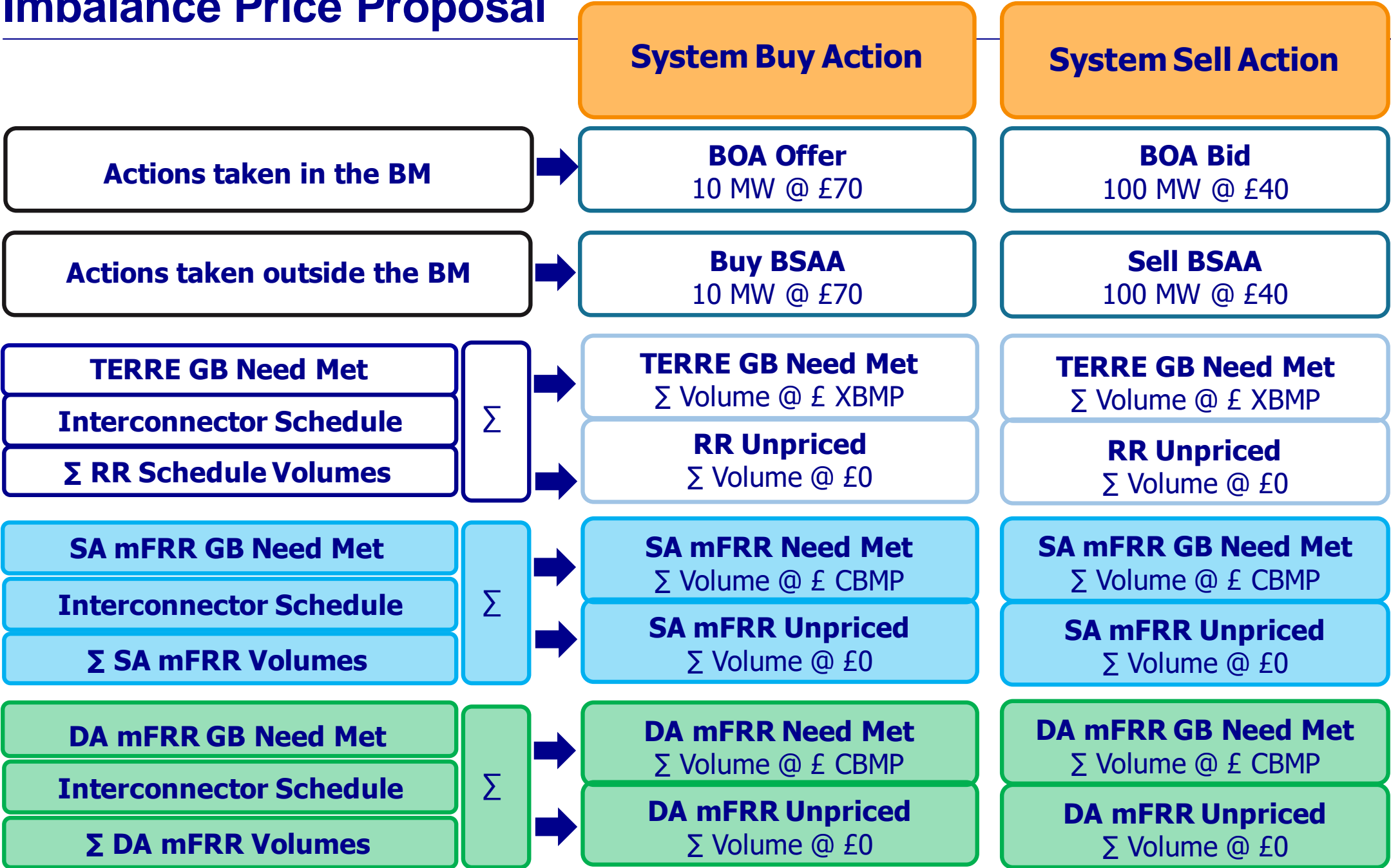
Does this impact Imbalance Price Calculation?

Yes – lets run through it



IMBALANCE PRICE CALCULATION

Imbalance Price Proposal

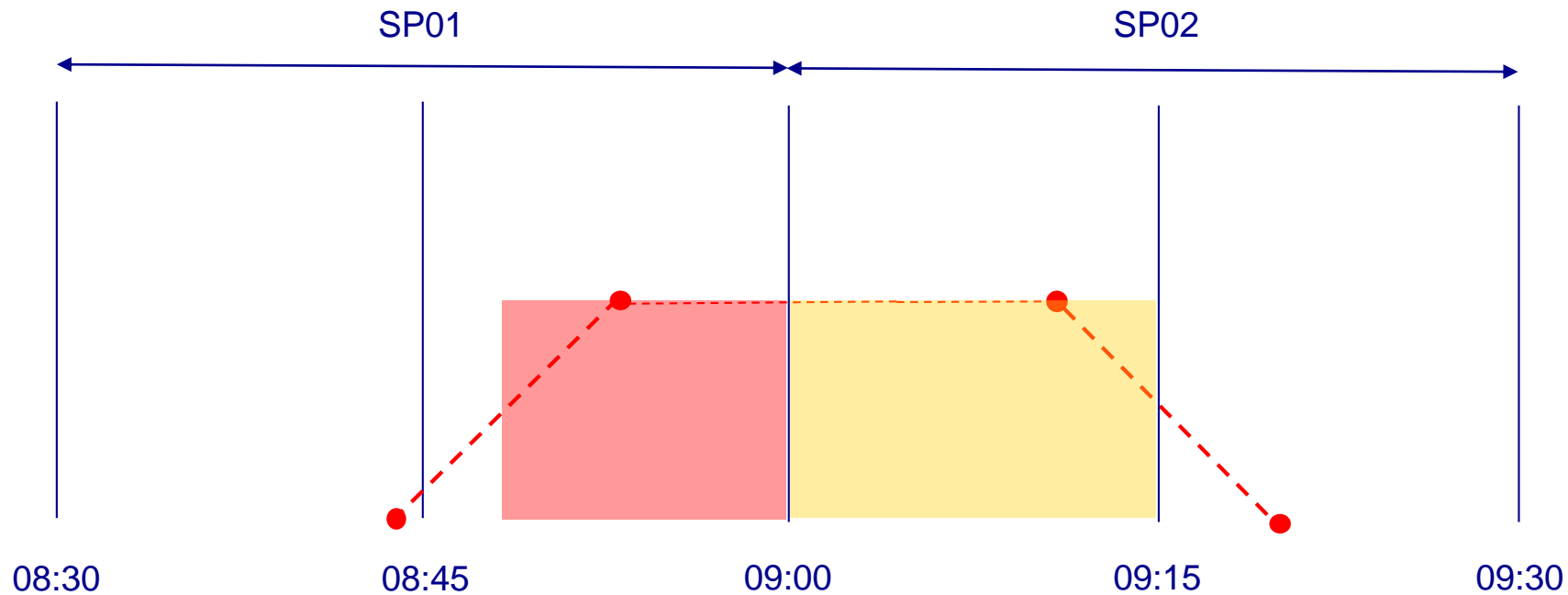


Discussion Point – GB Need Met

Does the ‘block’ settlement of direct activation proposed represent the true cost of balancing for each settlement period?

What we will know for each Auction (SA & DA):

- the MW GB Need Met per Auction
- the Activation Period of the GB Need Met
- that we can calculate blocks to allocate volume per Settlement Period (just like the RR Cashflow)
- the SA clearing price per SA MTU (15 min)
- the DA settlement price per DAMTU (30 min) [assumed £ per direction per 15 min]



Reference Information - Imbalance Price MARI Input

As soon as the AOF has finished processing a set of demands for direct activations the cross-border flows, remaining capacity and net positions are sent to TSOs together with the selected bids and satisfied demands. It should be noted that the activation period for direct activations stretches until T+30, i.e. until end of following quarter hour.

What we will know for each Auction (SA & DA):

- the MW GB Need Met per Auction
- the Activation Period of the GB Need Met
- that we can calculate blocks to allocate volume per Settlement Period (just like the RR Cashflow)
- the interconnector Schedule will be sent both with a 'net position' and 'auction specific XB flows'
- the XB flows / Net Position for direct activation in MTU1 will be aggregated on top of the resulting flows from the schedule activations during MTU1 and any earlier direct activations in MTU1 or MTU0
- the SA clearing price per SA MTU (15 min)
- the DA settlement price per DA MTU (30 min) [assumed per 15 min]
- the mFRR volumes of GB BMU from mFRR activations

What we don't know (yet):

- whether the Interconnector Schedule will be 'profile' or 'block' (both options available to NGESO but likely to be 'profile from previous WG discussion)

Reference information – Interconnector schedule

For a given MTU period, the XB flows and net positions resulting from scheduled and direct activations, respectively, shall be sent in separate documents.

The resulting XB flows from the optimization for scheduled activation in MTU1 will be aggregated on top of the resulting flows from the direct activations during MTU0.

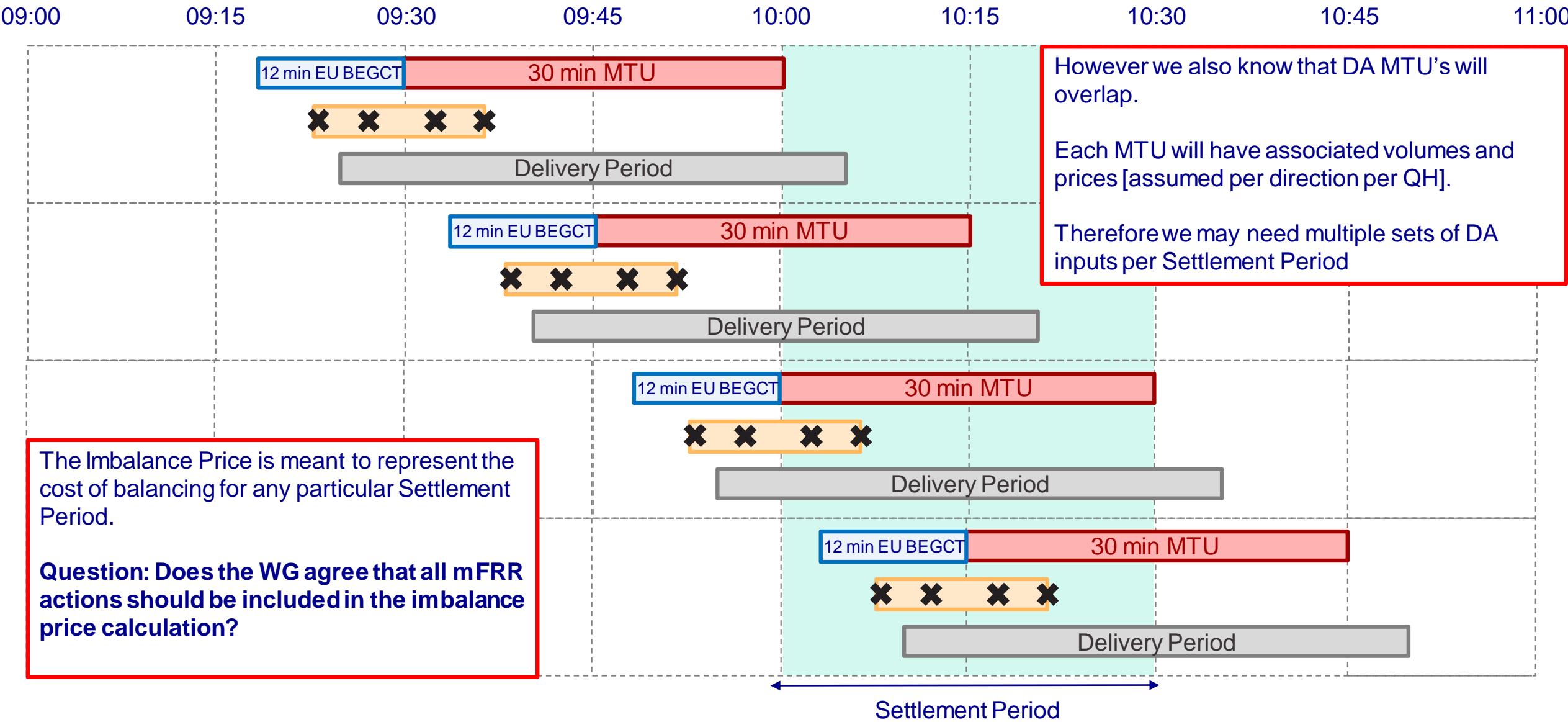
The resulting net positions from the optimization for scheduled activation in MTU1 will be aggregated on top of the net positions from the direct activations during MTU0.

The resulting XB flows from an optimization for direct activation in MTU0 will be aggregated on top of the resulting flows from the scheduled activation for MTU0 and any earlier optimizations for direct activations in MTU0 or MTU-1. The resulting flows from subsequent direct activations for the same MTU period will be sent as higher versions of the same document.

The resulting net positions from an optimization for direct activation in MTU0 will be aggregated on top of the resulting net positions from the scheduled activation for MTU0 and any earlier optimizations for direct activations in MTU0 or MTU-1. The resulting net positions from subsequent direct activations for the same MTU period will be sent as higher versions of the same document.

Data consumer has a choice between receiving the resulting cross-border flows and net positions with or without ramping. When the documents with the resulting cross-border flows and net positions sent to TSOs describe the ramping, they may partially cover up to three MTU periods for scheduled activations and for direct activations partially up to four MTU periods. When the documents do not describe ramping, they will cover exactly one MTU period for scheduled activation and up to two MTU periods for direct activations

Discussion Point – Direct Activations Inputs



ELEXON

THANK YOU

Matt Roper – Design Authority

Matthew.roper@elxon.co.uk

??? Date