MARI Workgroup 7

Updating the Grid Code to include the Manually Activated Reserve Initiative (MARI)

Louise Trodden and Camille Gilsenan

nationalgridESO

Agenda

- WG 6 Outputs
- Types of bids
- Dispatch Document feedback
- DNO TOR
- AOB

Outputs from Workgroup 6

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WG 6 Questions	Answers
Can we choose the BM or do we have to use the standard products	There is a consultation open at the moment - EBGL Article 26: Proposal for Defining and Using Specific Products for Dynamic Containment, STOR and the BM. This outlines how we expect TERRE to interact with specific products. We are expecting similar principles to apply for MARI. Another article 26 consultation may be required to outline the need for a suite of products (standard and specific).
Who sends the instruction to the IC- Libra or the ESO	The common platform informs NGESO of the cross-border flows resulting from scheduled and direct activations, respectively. In some cases, the resulting cross-border flows may be sent to the regional nomination platform or operator of the interconnector. It is entirely configurable and at the discretion of the TSOs to decide what party or parties shall receive the output files. For TERRE, Libra will send the cross-border schedule directly to the ICs. NGESO will adopt the same data exchange approach for MARI. Subject to configuration in the common platform, the resulting cross-border flows may be communicated in an EDI document, a signal, or a combination of both. Question for the interconnectors regarding data exchange – do the interconnectors have use of Electronic Highway (EH)?
Can we have the IC in the dispatch guide?	NGESO sent out a dispatch principles document (version 1) ahead of WG6. We have decided to widen the scope of this document with the aim of making it as useful as possible for industry (including the interconnectors) – it is now referred to as the NGESO MARI Reference Document. A section has been added specifically for interconnectors, which we will update as we receive more information. A framework section has also been added – this section will cover the relevant information required for mFRR go live and where it will be covered (e.g. OP/Grid Code etc).

Outputs from Workgroup 6

WG 6 Outputs	Answers
Action 25- Ramping for more or less than 10 minutes	NB - The TSO-BSP shape will align with the TSO-TSO shape (the ramped schedule). Any volume within this shape will be paid for, anything outside of this won't be paid for. However, this doesn't mean that BSPs can't ramp slower/faster - technically they can but deviation volumes will be paid at the balancing energy deviation price (proposed to be set at 0 - the same principles as TERRE)
Action 35 – what happens if the interconnectors deviate from the cross-border schedule sent by Libra?	Internal meeting confirmed that the way we expect MARI to work with deviations is the same as it is currently, there would be no changes. Therefore, any imbalance will be picked up in the IC imbalance reports and passed to the IC as it is for TERRE and other SO-SO trades. This will also be covered in the System-to-System Flow Methodology, the BASA and the OP. Does this cause any questions or concerns?
Action 38 – Block or profile settlement for IC	What are the interconnectors views on this?

Interconnector questions raised

WG 6 Outputs	Answers
Consequences if interconnectors do not follow the dispatch schedule, it's difficult to discuss this without also understanding the interconnector settlement mechanism and how interconnector operational parameters will be taken into account when those schedules are generated- Is this in the Bi lateral agreement? It is not in the BSC?	If interconnectors do not follow its reference programme they will have to pick up the imbalance cost. This principle also applies to TERRE and other SO-SO trades and is covered in existing agreements (e.g. the system-to-system flow methodology and paragraph 7.5 of Section R of the Balancing and Settlement Code (BSC)).
Although a single scheduled or direct activation for a profiled balancing service product shape may reflect the instruction across the interconnector, once multiple activations are stacked they can lead to a profiled shape for interconnectors that is much more complex to dispatch than if the balancing service products were block activations, which would translate to a simpler shape for interconnector dispatch (This first came up in a discussion we had with Camille last month)	The cross border exchanged shape is fixed (the standard mFRR trapezium shape), so we cannot change this shape from a ramped shape to a block as it has already been fixed within the central project. The main reason this shape was chosen was because it aligns with the EU interconnector delivery shape. As the direct and scheduled activations stack and interact, the standard shape becomes less uniform and more complex to dispatch from an interconnector operational perspective. NGESO and the interconnector operators need to manage the aggregated flows. Provided the ATC submitted by NGESO is feasible, ensuring the interconnectors can ramp at their set ramp rate, the interconnector schedules should also be feasible. Does this cause any questions or concerns?
How does the Algorithm know what IC to choose	As there are multiple interconnectors connected to GB, the AOF will determine the flow on each interconnector. Min/max flow constraints on interconnectors shall be satisfied as far as possible. If NGESO submits a mFRR demand, and there is capacity available on multiple interconnectors connected to GB, the algorithm shall evenly distribute the resulting flow among the interconnectors configured for that given border, while respecting the applicable CBCLs interconnector flow constraints and dead zones (for now, the central project has deemed the requirement on dead-zones out of scope). For example, assuming no interconnector flow constraints and no dead zones, a resulting flow of 20MW and three interconnectors with CBCLs set at 5, 10 and 15 respectively, the following flows will be assigned to the interconnectors: 5, 7.5 and 7.5, respectively. The algorithm can consider weights that may be applied on certain borders. This is entirely optional and to be confirmed.
What would be the expected frequency and rate of new interconnector schedules being received by the interconnectors and how can we ensure that it is operationally feasible?	TBC once the wider impact assessment is completed

Types of Bids

MARI: Standard and variable bid characteristics

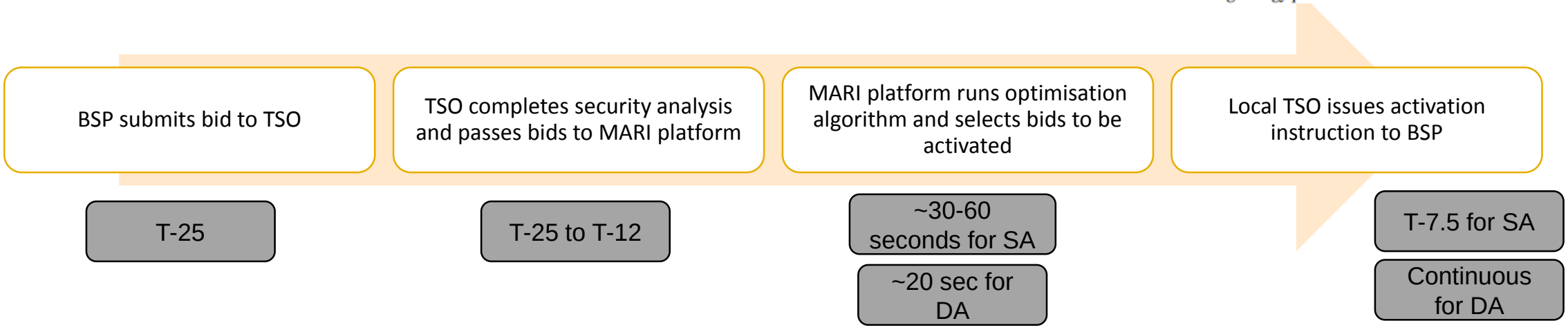
- Reminder: BSPs submit mFRR bids and offers to their local TSO.
- Bids are to be provided to NGESO in GBP, with NG to have responsibility for conversion to/from Euro.
- The standard and variable bid characteristics are defined in the IF document.
- The different types of bids are covered in the following slides

Mode of activation	Manual
Activation type	Direct or scheduled
Full activation time ("FAT")	12.5 minutes
Minimum quantity	1 MW
Bid granularity	1 MW
Maximum quantity	9,999 MW
Minimum duration of delivery period	5 minutes
Price resolution	0.01 €/MWh
Validity Period	A scheduled activation can take place at the point of scheduled activation only. A direct activation can take place at any time during the 15 minutes after the point of scheduled activation.

Table 1: Standard mFRR balancing energy product bid characteristics

Price	in €/MWh
Location	At least the smallest of LFC area or bidding zone.
Divisibility	BSPs are allowed to submit divisible bids with an activation granularity of 1 MW. BSPs are allowed to submit indivisible bids pursuant to Article 7(4)
Technical linking between bids	BSPs are required to provide information on technical linking between bids submitted in consecutive quarter hours and within the same quarter hour
Economic link	parent-child linking and exclusive group orders will be allowed

Table 2 : Standard mFRR balancing energy product bid variable characteristics



Types of bids

Bid Type	Description	Sub-bid Type	Description
Simple Bids (within one MTU)	Simple bids – one bid, one price	Divisible bid	Bids can be 'divisible' meaning that any portion of the volume of the bid may be activated. A 100MW fully divisible bid may be activated at anywhere between 1MW and 100MW.
		Indivisible bid	'Indivisible bid' means a standard mFRR balancing energy product bid, which cannot be activated partially, i.e. all or nothing
Complex Bids (within one MTU)	Complex bids – combination of simple bids. A complex bid consists of a group of bids within the same MTU period that are associated with each other. The following two types of complex bids will be supported by the platform: Exclusive and multipart bids	Exclusive bids	Exclusive bids are mutually exclusive according to the principle "exactly one or none". They may have different prices, directions and volumes. They must have the same activation type and availability status. Exclusive bids always refer to the same MTU period.
		Multipart bids	If an upward multipart bid is accepted, then all associated bids with lower price must also be accepted. If a downward multipart bid is accepted, then all associated bids with a higher price must also be accepted. This is referred to as parent-child linking in the mFRR IF. Multipart bids must cover the same MTU period and have the same direction. Each bid must have a different price. They must have the same activation type and availability status
Linked bids (between MTUs)	There may be links between bids in different MTU periods. The links will apply retrospectively, i.e. the availability of a bid is determined by the outcome for the linked bids in earlier, already optimised MTU periods. Two different types of links are supported; technical and conditional.	Technically linked bids	Technical linkage is the linkage of two bids (simple or complex) in two subsequent quarter hours.
		Conditional bids	Conditional linking is a link between two or three adjacent quarter hours and is only applicable to simple bids (for day 1 of go live).

MARI: Simple Bids

- Simple bids are those bids, which are not linked together in any form.
- Every simple bid is characterised by a unique price. The offered volume determines the size of the bid.

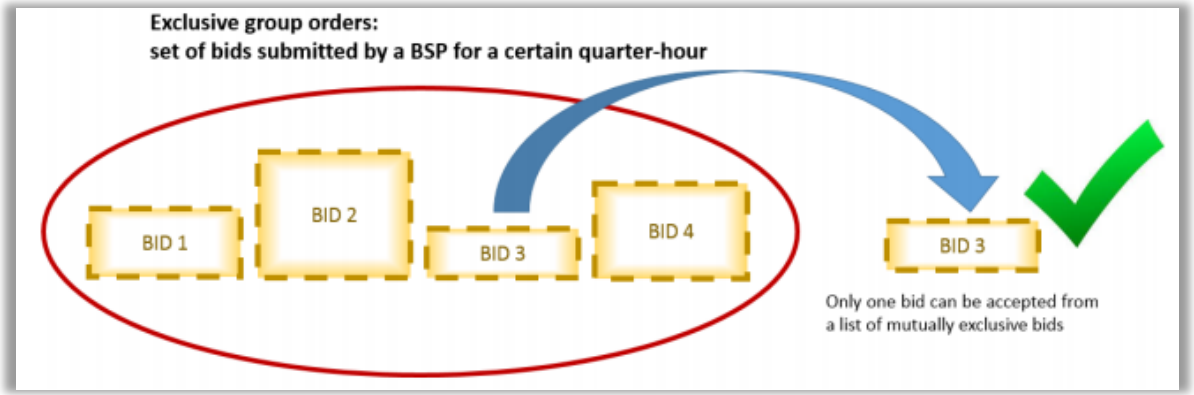
Bid	
Price	**y** €/MWh
Offered Volume	**x** MW
Min offered volume	**z** MW

Depending of the size of the minimum offered Volume (parameter z); the following types of bid can be modelled.

	Fully divisible bid	Indivisible bid	Divisible bid
Price	**y** €/MWh	**y** €/MWh	**y** €/MWh
Offered Volume	**x** MW	**x** MW	**x** MW
Min offered volume	**z** MW Where z = 0 MW	**z** MW Where z = x MW	**z** MW Where: 0 MW < z < x MW

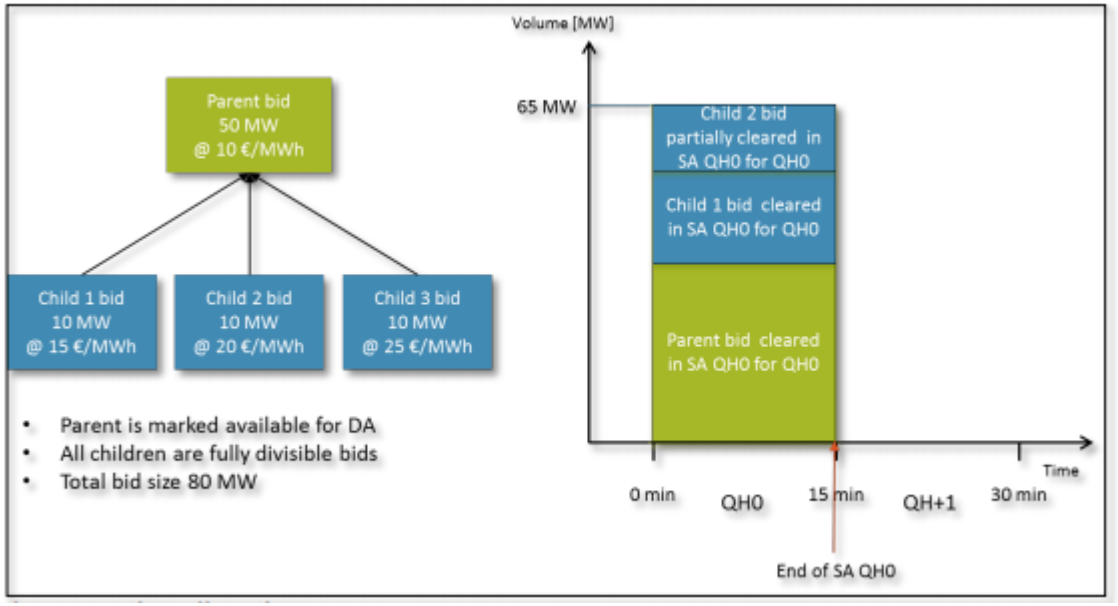
MARI: Complex Bids – Exclusive bid example

- Mutually exclusive according to the principle „exactly one or none”
- All bids can be divisible, indivisible, and fully divisible
- May have different prices, volumes and directions
- Always refer to the same MTU (15 min)
- If the group was not activated in SA, it can be cleared in DA
- All the bids in an exclusive group should have the same activation type



MARI: Complex Bids – Multipart bid/Parent – Child Bid Example

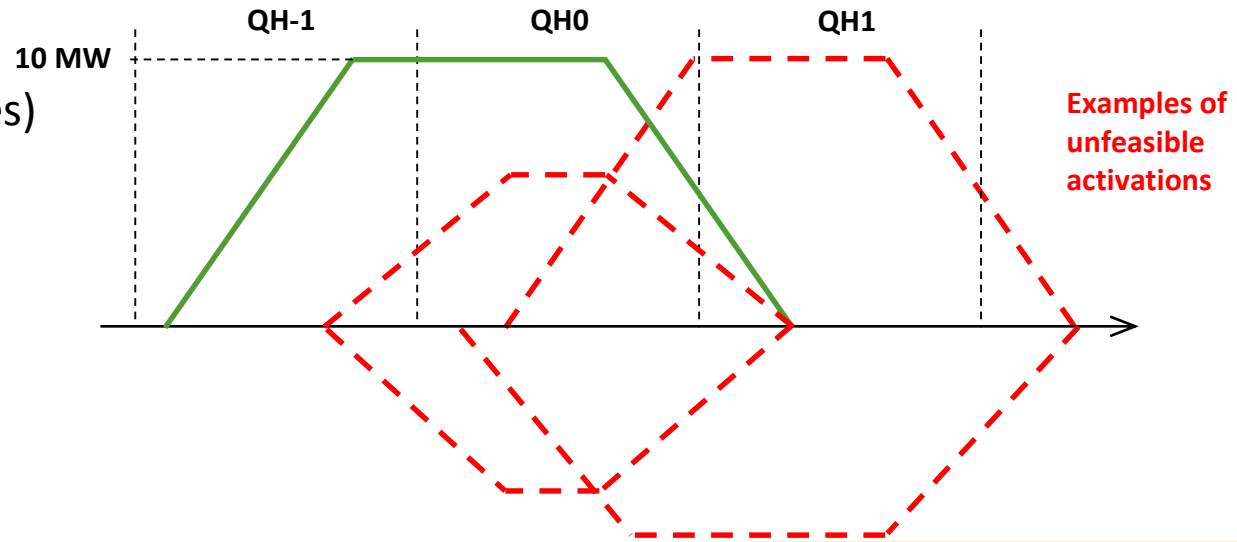
- Bids can be (fully) divisible or indivisible
- Must cover the same MTU period and have the same direction
- The activation type should be the same for all bids of the multi-part bid.
- All bids in the multi-part bid should have different prices. The parent bid will be the cheapest one for the positive direction and the most expensive for the negative direction.



- If a downward multipart bid is accepted – all associated bids with higher price must also be accepted
- If an upward multipart bid is accepted – all associated bids with lower price must also be accepted
- If any component / any bid in the multi-part bid is accepted in SA, none of the other components would be available in DA.

MARI: Linked Bids – Technical Linkage Example

- TSOs are still investigating the interaction between technical and conditional linking, the content presented is subject to change and may be adapted
- At gate closing for QH0, the BSP does not know the result of the clearing for DA for QH-1. Therefore, if the bids submitted for QH-1 and QH0 represent the same asset or the same pool the dependencies between those bids must be communicated to the mFRR platform in order to prevent overlapping or unfeasible activations.
- Technical linking ensures that a bid in QH0 is not available for clearing if the bid in the previous quarter hour was activated in DA. This is important in order not to activate the same balancing resource twice.
- Technical linkage is the linkage of two bids (simple or complex) in **two subsequent quarter hours**.
- Any bid in QH0 may have a technical link to DA bid in QH-1.
- It remains the responsibility of BSPs to correctly identify their bids, in order to avoid unfeasible activations (e.g. double activation of the same resources)

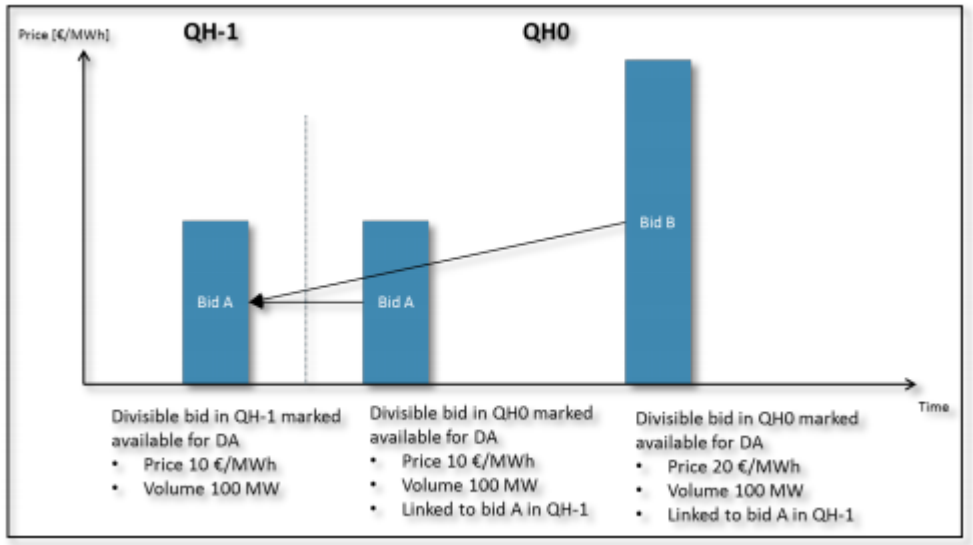


<u>The following rule will be supported:</u>

A bid that underwent direct activation in QH-1 (i.e. for the preceding quarter hour) is not available in QH0, neither for scheduled nor for direct activation. This rule shall always be enforced by the AOF.

MARI: Linked Bids – Conditional Linkage Example

- TSOs are still investigating the interaction between technical and conditional linking, the content presented is subject to change and may be adapted
- At gate closing for QH0, the BSPs do not have the knowledge, if their bid in QH-2 was activated in DA or if their bid in QH-1 was activated in SA or DA. A bid in QH0 may for example be available / unavailable for clearing if bid in QH-2 was activated in DA or bid in QH-1 was activated in SA.
- Conditional linking is similar to technical linking and aims to change the availability of a bid in QH0 under certain conditions.
- Conditional linking is a link between two or three adjacent quarter hours and is only applicable to simple bids (for day 1 of go live).
- Responsibility of the BSPs to ensure that the conditional linking rules reflect the actual technical availabilities of the underlying assets for activation.



The following types of conditionality shall be supported:

- *Bid in QH0 not available if bid in QH-1 or QH-2 is activated/activated in SA/activated in DA*
- *Bid in QH0 not available if bid in QH-1 or QH-2 is rejected*
- *Bid in QH0 not available for DA if bid in QH-1 or QH-2 is activated in SA*
- *Bid in QH0 not available for DA if bid in QH-2 is activated in DA*

MARI: Linked Bids – Conditional Linkage Example

Modelling:

- All bids subject to conditional linking have an initial availability status: they may be either available or unavailable. The conditional linking will turn the initial availability status of bids to the opposite availability status if the condition materializes.
- Types of conditional link:

Nr.	Rule of conditional link	Identification	Code
1	If linked bid is activated, the bid in QH0 is unavailable	u_a	Abb
2	If linked bid is activated, the bid in QH0 is available	a_a	Acc
3	If linked bid is activated in SA, the bid in QH0 is unavailable	u_aSA	Add
4	If linked bid is activated in SA, the bid in QH0 is available	a_aSA	Aee
5	If linked bid is activated in SA, the bid in QH0 is unavailable for DA	uDA_aSA	Aff
6	If linked bid is activated in SA, the bid in QH0 is available for DA	aDA_aSA	Agg
7	If linked bid is activated in DA, the bid in QH0 is unavailable	u_aDA	Ahh
8	If linked bid is activated in DA, the bid in QH0 is available	a_aDA	Aii
9	If linked bid is activated in DA, the bid in QH0 is unavailable for DA	uDA_aDA	Ajj
10	If linked bid is activated in DA, the bid in QH0 is available for DA	aDA_aDA	Akk
11	If linked bid is not activated, the linked bid in QH0 is unavailable.	u_na	All
12	If linked bid is not activated, the linked bid in QH0 is available.	a_na	Amm

- Maximum number of conditional links is 6 (3 between QH0 & QH-1; 3 between QH0 & QH-2)

Local implementation survey response

Survey Question	NGESO Response
Do you intend to implement option for BSP to send you SA-only bids in your local balancing system?	Yes
Do you intend to implement option for BSP to send you SA and DA bids in your local balancing system?	Yes
Do you intend to implement option for BSP to send you fully divisible bids in your local balancing system?	Yes
Do you intend to implement option for BSP to send you partially divisible bids in your local balancing system?	Yes
Do you intend to implement option for BSP to send you indivisible bids in your local balancing system?	Yes
Do you intend to implement option for BSP to send you linked bids (technical linking) in your local balancing system?	Yes
Do you intend to implement option for BSP to send you linked bids (conditional linking) in your local balancing system?	Yes
Do you intend to implement option for BSP to send you exclusive bids in your local balancing system?	Yes
Do you intend to implement option for BSP to send you multipart bids in your local balancing system?	Yes
Do you intend to implement option for BSP to send you all possible combinations of previously defined bid options?	Yes - but we need some more clarity on this and do validation checks to understand what combinations are possible

Dispatch Guidelines

Dispatch Guidelines and MARI

- Version 2 sent out to the workgroup
- Key updates:
  - Widened scope of document to make it applicable to wider industry (based on internal and external feedback).
  - Now referred to as the 'NGESO MARI Reference Document'.
  - Section on types of bids has been added
  - Interconnector specific section added
  - Frameworks section added
- Feedback required from workgroup – is there anything else NGESO should include or expand on in this document?

DNO Workgroup Discussion

DNO Workgroup discussion

TOR (L)

Consider if there are any implications, for example specific connection requirements, information / data exchange, for DNOs where the assets providing a MARI service are connected to a distribution network

AOB

- The Implementation Guide has been approved at ENTSO-E and published on the public facing EDI library. Available here

Thank you