



GC0166 Work Group – Action 11

Summary of discussion

- The attached examples were shared with the sub-group on 27 April
- Simon kindly provided feedback by a number of emails
- Richard also provided an email response and met with Richard on 2 May
- Met with Simon, Chris, Eli, Giorgio, Manos and Steve on 8 May

Summary of discussion points - 1

MDO/MDV and dynamic parameters

- Discussion centred on the inclusion of details relating to dynamic response in the values of MDO/MDV
- Did including these details mean that MDO/MDV could not be considered as dynamic parameters ?
 - Dynamic parameters should give the physical state of the BMU
 - Did including details of MWh that must be “sterilised” for response go against this principle?
 - Another view was that from a pragmatic point of view sending two streams of data to the ESO and expecting the desk to handle this was impractical
- **ESO View**
 - ESO will seek legal guidance
 - ESO will also check with Ofgem if they have a view
 - If MDO/MDV are not dynamic parameters they will be moved to another part of the Grid Code (likely to be sections that are similar to covering Bid-Offer Data and Physical Notifications)

Summary of discussion points - 2

Redeclaration of MDO/MDV

- The view put forward by the ESO was that MDO/MDV could only be redeclared after Gate Closure after the issuing of a BOA or if the asset has problems
- Discussion centred on whether this possible and, at the same time, for a BMU to guarantee its declared Physical Notifications
- It was pointed out that in Case 2 (see below) the BMU would have to declare its MDO/MDV at SP47 (one hour earlier) for SP1
- **ESO View**
 - In order to act on reliable information inside the BM Window must know PNs and MDO/MDV with certainty

Summary of discussion points – 3

Should MIL/MEL be lowered when BMU is offering dynamic response?

- Discussion centred on Case 4 (please see below)
- One view was that MEL should be reduced to 40MW in the example given (to reflect that 10MW must be held back for the dynamic response)
- **ESO View**
 - The legal definition of MIL/MEL in section BC1.A.1.3.1 states that these parameters are “maximum” values indicating the example is correct and MEL should be 50 MW

Summary of discussion points - 4

Granularity of MDO/MDV points

- If MDO/MDV is allowed to be declared at minute intervals it may add little value and we should consider having a single value for each in each settlement period
- **ESO View**
 - We will check with IT and other teams but minute level granularity does give the best physical representation



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Slides sent for discussion to sub-group

Technical versus Commercial

- Are Maximum Deliverable Offer (MDO)/Maximum Deliverable Bid (MDB) technical or commercial parameters?
- Ofgem gave the following direction in an open letter [Information submitted by generators into the BM \(ofgem.gov.uk\)](https://www.ofgem.gov.uk/information-submitted-by-generators-into-the-bm)

We expect the dynamic parameters that generators submit in the BM to reflect the true operating characteristics of their plant, and the definitions of these parameters, as set out in the Grid Code.

- The ESO believes MDO/MDB to be dynamic parameters so that after gate closure the only reason to redeclare is due to a technical fault or if the ESO issues an instruction that changes the state of charge
- MDO/MDB will replace Maximum Delivery Volume (MDV) and Maximum Delivery Period (MDP) which are defined within the Grid Code as dynamic parameters (please see section BC1.A.1.5)
- The values of MDO/MDB should reflect all available energy but only curtailed by the energy required to provide other services to the ESO for security reasons (such as response or reserve)
- As the “balancer of last resort” the ESO requires all available resources to balance the system

Does MDO/MDB apply to all asset types?

- There has been discussion about which asset types should submit MDO/MDB
- To simplify this our proposal is to say that MDO/MDB will apply to all BMUs (not asset type specific)
- The old parameters Maximum Delivery Volume and Maximum Delivery Period also applied to all BMUs
- A BMU that is not truly limited in energy can submit a single large value and this will then be defaulted every day
- By following this recommendation all BMUs will be treated in the same way
- It means the ESO does not have to register and use additional information to determine if a BMU has MDO/MDB applied to it
- It also future proofs this parameter for new technologies
- It means that aggregators with multiple assettypes can be treated in a consistent way

Proposals for planning timescales

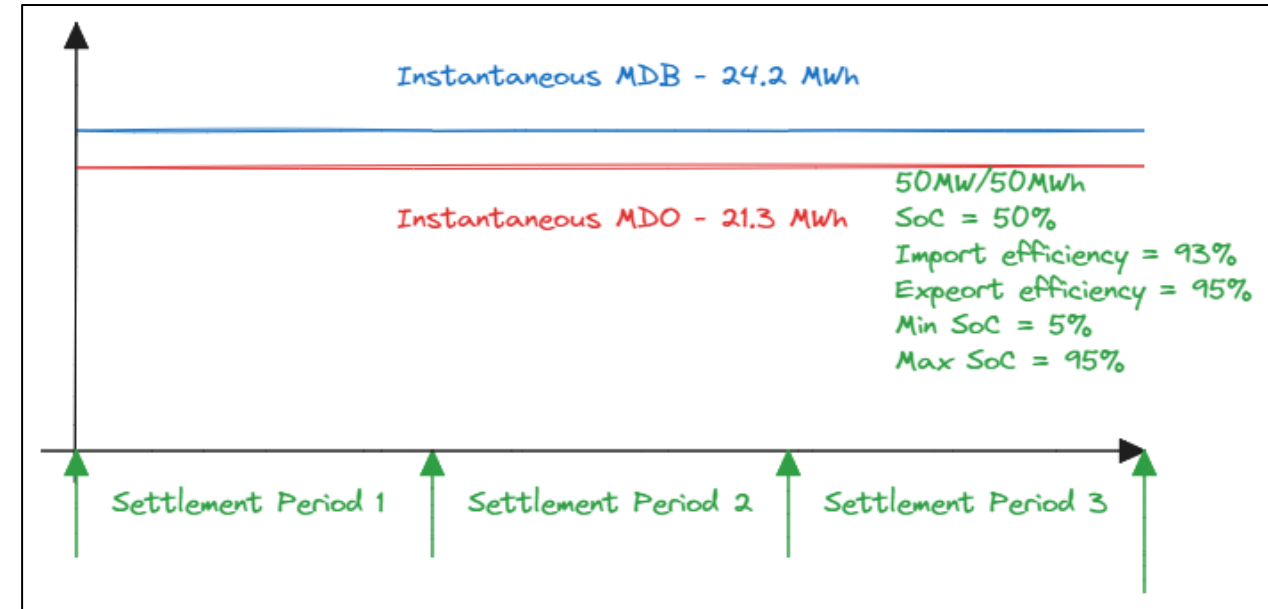
- Outside of the BM window we are proposing a simple asset specific model
- If the ESO issues an instruction to a LDA it changes the available energy
- Inside the BM Window a BMU should tell the ESO how much energy is available – the ESO should not try to derive this
- Outside the BM Window the ESO would want to model different scenarios for planning purposes and so a simple model of the asset should suffice
- The ESO can accept that such modelling is not exact because at this time we are estimating future reserves etc and there are always multiple sources of ambiguity

Detailed considerations with MDO/MDB within the BM Window (after Gate Closure)

- Maximum Deliverable Offer (MDO)/Maximum Deliverable Bid (MDB) will be time varying to account for the need to indicate a change in these values as we come up to periods when less energy is available for Bids or Offers due to the need to provide other system services (for example, if the unit was expected to provide dynamic response, Dx)
- It will be assumed by the ESO that a Limited Duration Asset (LDA) can deliver a Bid Offer Acceptance (BOA), obeying the declared ramp rates and the declared Maximum Export Limit (MEL) or Maximum Import Limit (MIL), such that the energy under the BOA matches the declared MDO/MDB from where the BOA starts
- It will further be assumed that if a BOA is issued for a MW less than MIL or MEL then the length of the BOA can be increased so that the energy under the BOA is within MDO or MDB
- So, if the BOA starts to ramp from its Physical Notification (PN) at the time t1 and returns the Balancing Mechanism Unit (BMU) to its PN at t2 the energy under this BOA will be equal or less than the MDO or MDB (depending on whether it is an offer or bid) at the time t1
- After the acceptance of a BOA the BMU will redeclare its MDO/MDB

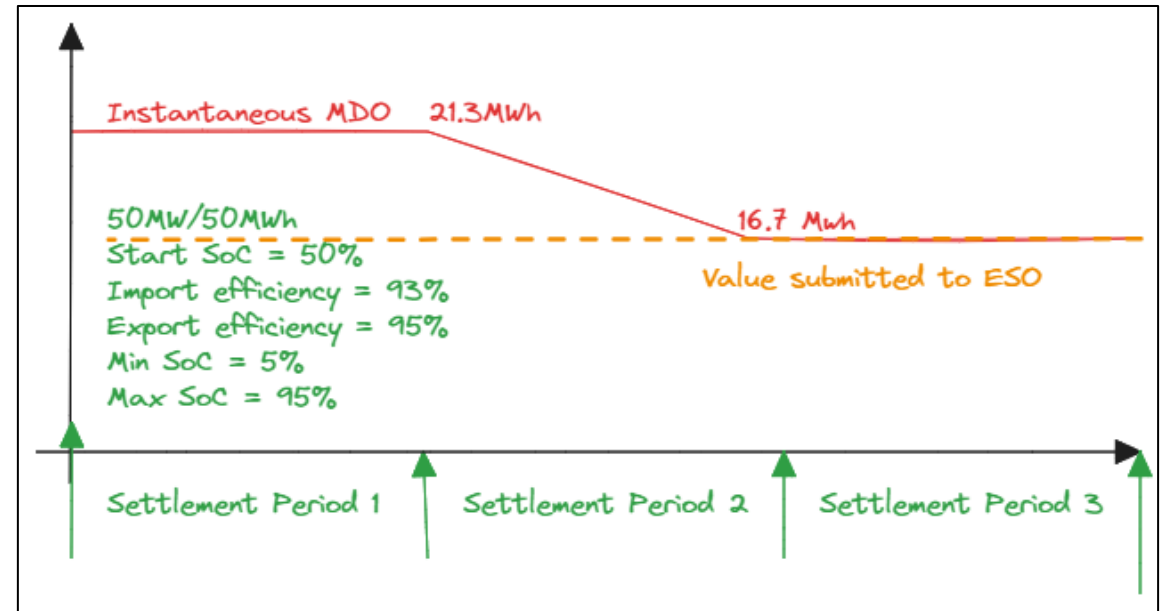
Case 1 - (PN = 0, no DR contracts)

- The instantaneous values of MDB and MDO are expected to be modelled by the BMU and would be derived from State of Charge at given instance
- In this case the MDB and MDO declared to the ESO will be the same as the instantaneous values
- (Note we are showing MDB as positive but it may be better to be a negative number)
- Assuming high ramp rates the ESO could issue a BOA at any time in these three settlement periods with the following
 - An offer, 50MW, 25 mins flat top, energy = 20.8MWh
 - An offer, 25MW, 51 mins flat top, energy = 21.2MWh
 - A bid, -50MW, 29 mins flat top, energy = 24.1MWh



Case 2 - (positive PN, no Dx contracts)

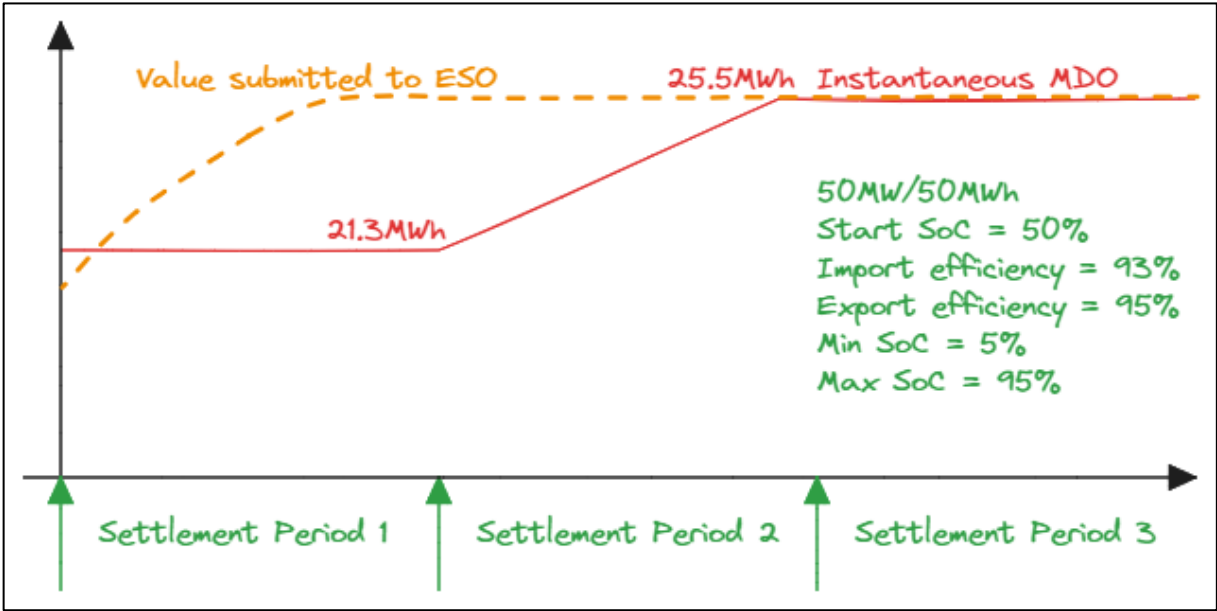
- In this case the MDO declared to the ESO must be the lowest value within the BM Window
- So, for MDO, the BMU would declare 16.7MWh for all three settlement periods (assuming PN ramps at 2MW/min, stops at 20MW for 5 mins, then ramps down at 2MW/min)



Case 3 - (negative PN, no Dx contracts)

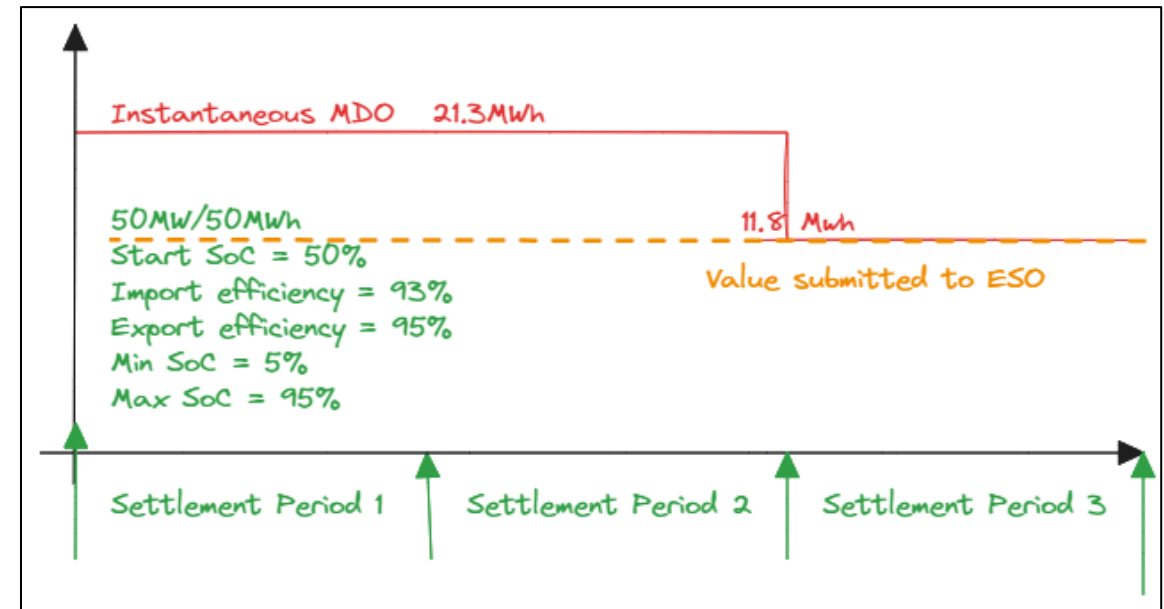
- In this case the MDO declared to the ESO can increase in value within the BM Window
- So, for MDO, the BMU would declare a value that increases from 20.8MWh to 25MWh (assuming PN ramps down at 2MW/min, stops at -20MW for 5 mins, then ramps up at 2MW/min)

Time	Declared MDO	Instantaneous MDO
23:00	20.8	21.3
23:10	21.6	21.3
23:15	24.1	21.3
23:30	25.0	21.3
23:45	25.0	24.4
24:00	25.5	25.5



Case 4 - (0 PN, Dx service starting in SP3)

- In this case the BMU is expected to provide a Dx service
- DR is given in EFA blocks so this graph shows the case where we are coming up to the start of the Dx period
- The BMU declares how much capacity it must hold back for, in this case, a 10MW DC low contract
- We expect the MEL for the unit to stay as 50MW but the ESO should be aware that the max BOA that can be issued during SP3 is MEL – Contract Quantity (in this case 50MW – 10MW = 40MW)
- There may be instances where the LDA uses all capacity to satisfy its Dx contract. In this case the BMU will redeclare its PNs and MDO in later SPs (as governed by gate closure)



Physical form of MDO/MDB

- This will be a time varying parameter
- MDO and MDB can vary independently
- The value can be defaulted (as per other parameters at 11:00 every day)
- The suggested form for each of MDO or MDB is (at a logical level)
 - From time, From Volume (MWh), To Time, To Volume (MWh)
 - (23:30, 20, 23:40, 30)