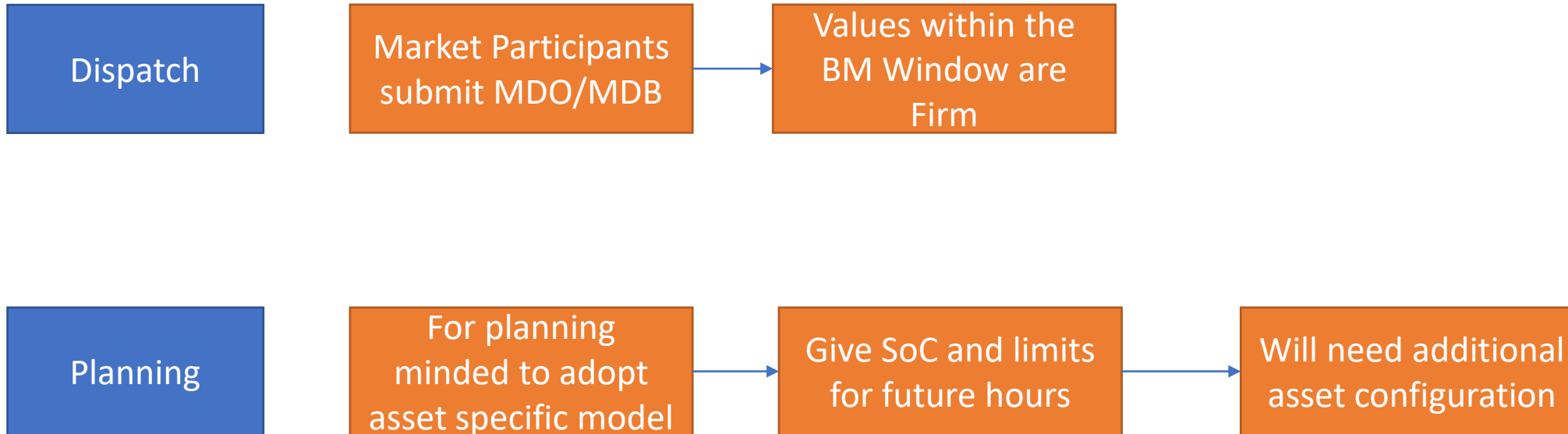




GC0166 Timelines

Recommendation

Following discussions with Work Group members we are looking to have different solutions for Dispatch and Planning



Timelines for MDO/MDB

- For new BMUs a value will be provided by the BMU during the registration process
- For existing BMUs a default value can be inserted by the ESO into our IT systems for each BMU (after the mod has been approved by the Regulator)
- The new parameters will follow the usual defaulting rules. BMUs will submit indicative values for the next Settlement Day before 11:00 at Day Ahead. If a BMU has not submitted these values the previous days values will be copied and defaulted at 11:00 Day Ahead (the details of how this works now are in the Data Validation, Consistency and [Defaulting Rules](#))
- As we approach each Gate Closure BMUs will update MDO/MDB as they trade their positions
- After Gate Closure the values of MDO/MDB within the BM Window can only updated in response to one of three events
 - A technical fault with the BMU
 - Following an instruction from the ESO
 - A frequency event which means a BMU has used all the charge it was reserving to provide an ancillary service

A simple battery model

Model should be simple enough to include in large scale problems, e.g.:

$$SOC_t = SOC_{t-1} + P_t^{IM} \cdot \eta - \frac{P_t^{EX}}{\eta}$$

With some additional constraints:

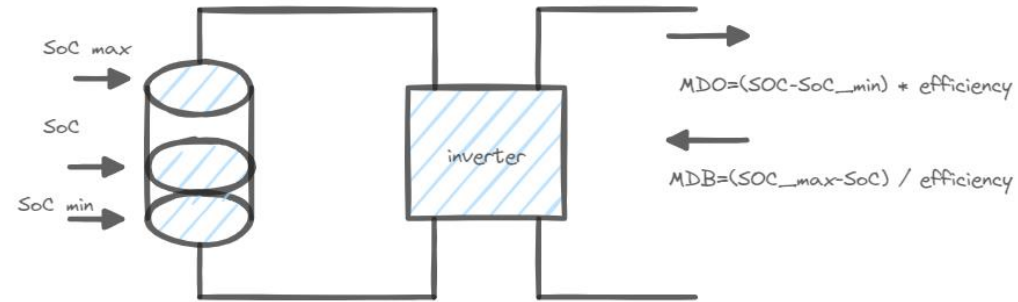
$$SOC_t^{MN} \leq SOC_t \leq SOC_t^{MX}$$

$$0 \leq P_t^{IM} \leq P^{MX}$$

$$0 \leq P_t^{EX} \leq P^{MX}$$

$$P_t^{EX} \cdot P_t^{IM} = 0$$

The time-varying limits in SOC may reflect ancillary service considerations (e.g. limitations due to future provision of a service).



Key points

- Model could be used to form a view of impact of BOAs on future margins.

Timelines for Asset Specific Model

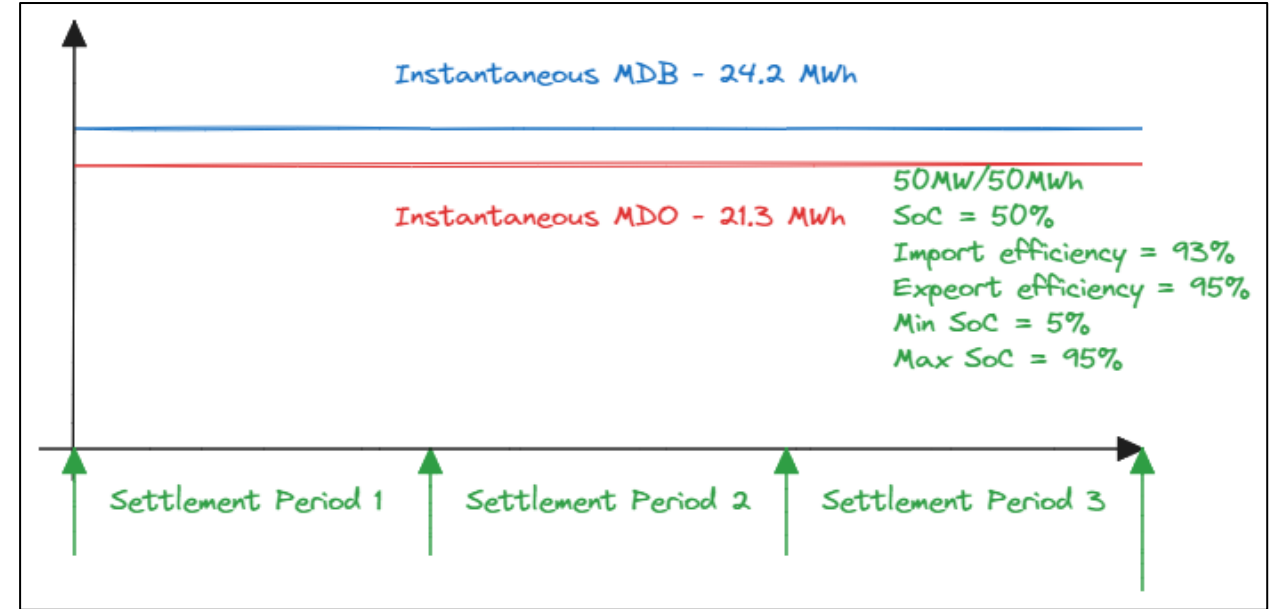
- For each BMU we will agree a model. Different BMUs may have different models depending on what they want to share and the level of accuracy. A very simple model may just have export and import efficiencies. A more complex model may have additional parameters (temperate effects etc). The ESO will take guidance from the BMU owner on what is a fair representation but our assumption is that the model shown below is sufficient in most cases
- For new BMUs the model and its parameters are agreed at registration
- For existing BMUs a model will be agreed after the mod has been approved by the Regulator
- The model parameters are not expected to change at any great frequency – they will only change if there is some change to the asset
- The variables that will change are the limits in quantities such as allowed State of Charge (SoC) as determined after auctions for ancillary services
- We would expect SoC limits (min and max) to be declared after a change due to an auction for an ancillary service. The time span for the SoC limits should include all known future ancillary auctions affect the SoC limits
- The last value in the SoC limits will continue forward time
- If a BMU does not supply ancillary services they would not need to update their SoC limits



GC0166 EUK Additional Slides

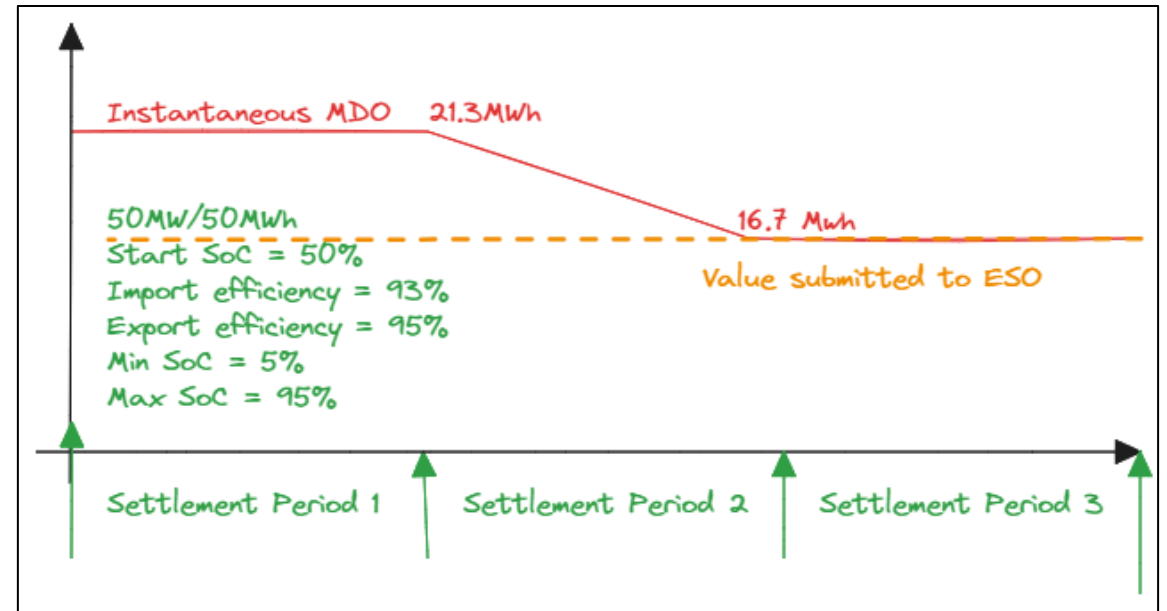
Case 1 - (PN = 0, no DR contracts)

- In this case the MDB and MDO declared to the ESO will be the same as the instantaneous values
- 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
- 1. A bid, -50MW, 29 mins flat top, energy = 24.1MWh



Case 2 - (increasing PN, no DR contracts)

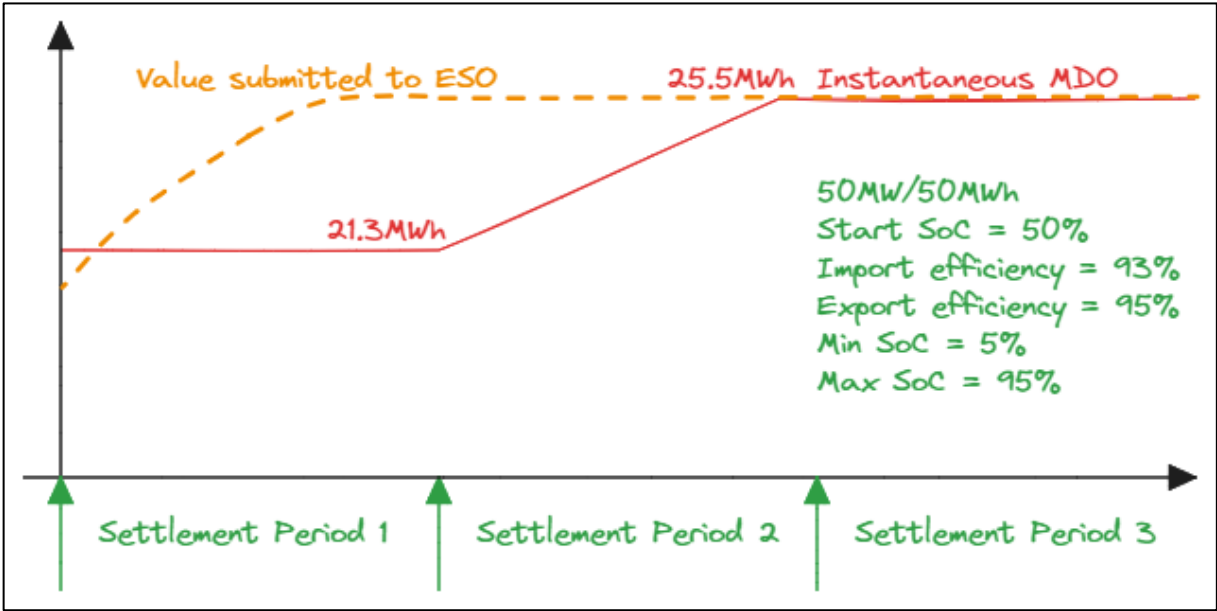
- In this case the MDO declared to the ESO must be the lowest value within the BM Window
- So, for MDO, the BMU would declare 16.7MWh for all three settlement periods (assuming PN ramps at 2MW/min, stops at 20MW for 5 mins, then ramps down at 2MW/min)



Case 3 - (decreasing PN, no DR contracts)

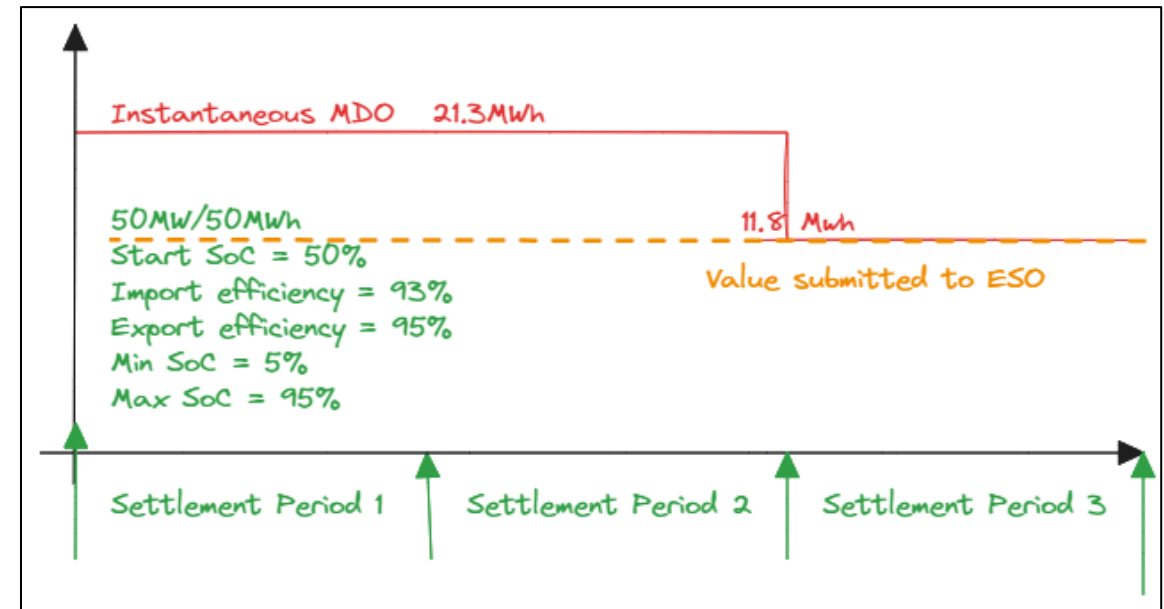
- In this case the MDO declared to the ESO can increase in value within the BM Window
- So, for MDO, the BMU would declare a value that increases from 20.8MWh to 25MWh (assuming PN ramps down at 2MW/min, stops at -20MW for 5 mins, then ramps up at 2MW/min)

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, DR contract starting in SP3)

- In this case the BMU was successful in winning a DR audit
- DR is sold in EFA blocks so this graph shows the case where we are coming up to the start of the contract
- 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)
- In cases where the three SPs are covered by the contract, or where we are coming to the end of an EFA block, there may be instances where the LDA uses all capacity to satisfy its DR contract. In this case the BMU will redeclare its PNs and MDO in later SPs (as governed by gate closure)



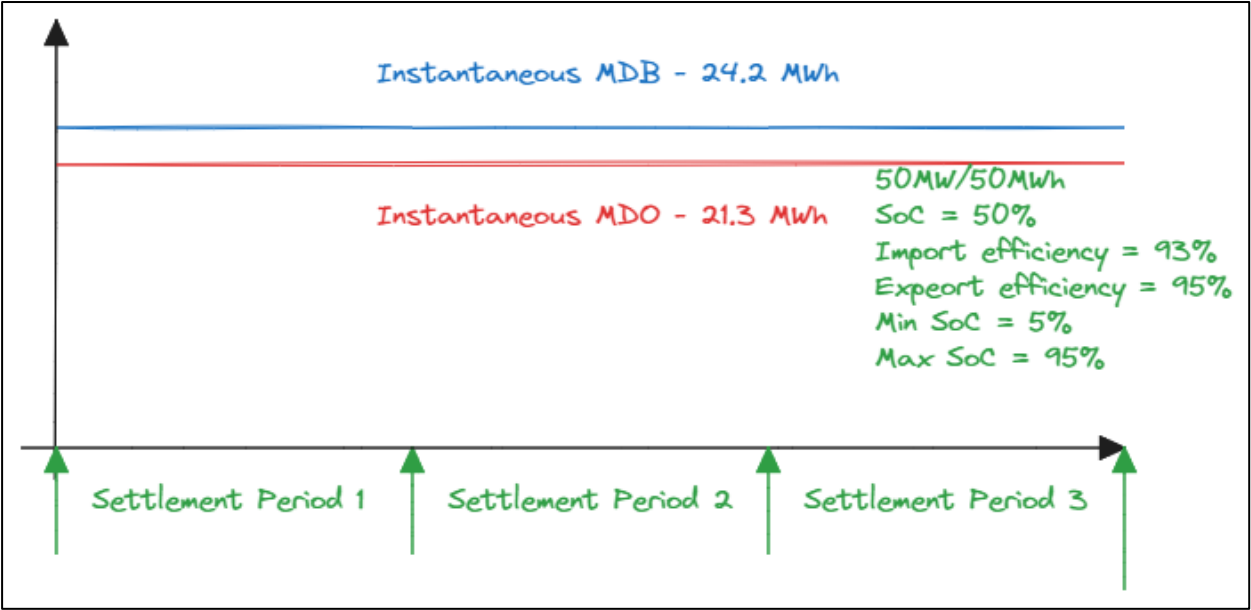
Moving timeline (3 hours)

Scenarios	Pre-Gate Closure	Gate Closure	Gate Closure	Gate Closed	Post-Gate Closure +1	Post-Gate Closure +2	Post-Gate Closure +3	Post-Gate Closure +4	Post-Gate Closure +5	Post-Gate Closure +6	<div><div></div> = Gate</div> <div><div></div> = HH Settlement Period</div> <div><div></div> = Exception</div> <div><div></div> = Closure window</div>	
BAU	Commercial Agreement/ Default value	MDO/ MDB sent or BOA issued by ESO	MDO/ MDB sent or BOA issued by ESO	Declaration is fixed	ESO issue BOA							
Technical exception or Frequency Event		MDO/ MDB sent or BOA issued by ESO	MDO/ MDB sent or BOA issued by ESO	Declaration is fixed	MDO/ MDB redeclared or BOA issued by ESO							
Scenarios		Pre-Gate Closure	Gate Closure	Gate Closure	Gate Closed	Gate Closure +1	Gate Closure +2	Gate Closure +3	Gate Closure +4	Gate Closure +5	Gate Closure +6	
BAU		Commercial Agreement/ Default value	MDO/ MDB sent or BOA issued by ESO	MDO/ MDB sent or BOA issued by ESO	Declaration is fixed	ESO issue BOA						
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Scenarios			Pre-Gate Closure	Gate Closure	Gate Closure	Gate Closed	Gate Closure +1	Gate Closure +2	Gate Closure +3	Gate Closure +4	Gate Closure +5	Gate Closure +6
BAU			Commercial Agreement/ Default value	MDO/ MDB sent or BOA issued by ESO	MDO/ MDB sent or BOA issued by ESO	Declaration is fixed	ESO issue BOA					
Technical exception or Frequency Event				MDO/ MDB sent or BOA issued by ESO	MDO/ MDB sent or BOA issued by ESO	Declaration is fixed	MDO/ MDB redeclared or BOA issued by ESO					

NB/ Day ahead indicative values submitted day ahead before 11am

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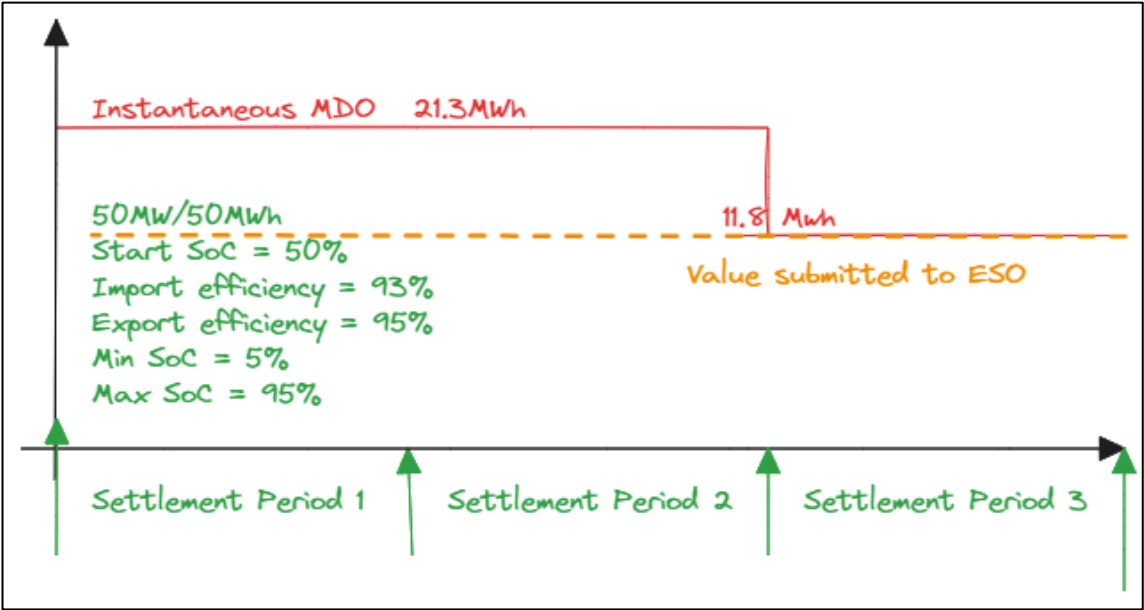


DAY IN THE LIFE REPRESENTATION

Scenarios	Gate Closure -3	Gate Closure -2	Gate Closure -1	Gate Closure	Gate Closure +1	Gate Closure +2	Gate Closure +3
BAU	Commercial Agreement	MDO/ MDB sent	MDO/ MDB sent	Declaration is fixed	ESO issue BOA		

Case 4 - (0 PN, DR contract starting in SP3)

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Scenarios	Gate Closure -3	Gate Closure -2	Gate Closure -1	Gate Closure	Gate Closure +1	Gate Closure +2	Gate Closure +3
Technical exception		MDO/ MDB sent	MDO/ MDB sent	Declaration is fixed	MDO/ MDB redeclared		