

# Unlocking stacking of BOAs in Dynamic Containment

As part of the continued development of the Dynamic Containment (DC) service through the Soft Launch, we are seeking to unlock stacking within the Balancing Mechanism (BM) as per our Wave 1 commitments. This document outlines our plans to introduce this development in to the DC service in a co-ordinated manner.

From market engagement, we recognise the additional value that adding the ability to stack in the BM will offer. We anticipate this additional flexibility and revenue stacking will increase the efficiency of battery assets delivering the service, increase competition which would in turn reduce costs to the consumer.

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3. DC and BM interaction
4. Performance data submissions
5. Operational metering & settlement
6. Additional clarifications of the Service Terms
7. Wider Frequency stacking

## 1. Implementation timelines

### BM stacking launch date

The target go-live for the launch of stacking in Dynamic Containment will be at **10am on Wednesday 27 January**.

On go-live, you need to:

- Ensure EDL and EDT connections (or wider access API) are working;
- Ensure all necessary PN data is submitted in line with BM gate closure timings;
- All Dynamic Data (MEL, MIL, SEL etc.) is submitted showing correct unit availabilities and available volumes. This data can also be submitted in real-time/within the BM gate closure;
- Ensure telephone contact methods are working and available;
- Ensure possibility to receive BOAs manually via telephone if required (this is the backup method if EDL is unavailable);
- Ensure that any data or BOA issues are reported via telephone to the NGENSO Control Engineer as soon as possible. **Please note: that all BOA rejections, including automatic rejections by a control system, must be immediately followed up by a telephone call**

from the operator to the NGENSO Control Engineer explaining the reason for rejection (this is a 24/7 requirement under the Grid Code).

**Expression of interest**

If you would like to participate, please contact your account manager or the team at: [box.futureofbalancingservices@nationalgrideso.com](mailto:box.futureofbalancingservices@nationalgrideso.com) and share the completed table from the appendix.

**Questions**

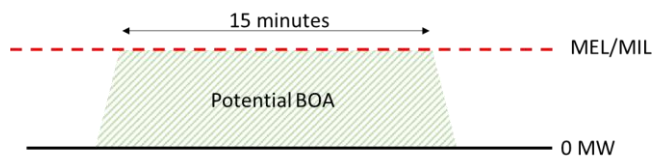
If you have any questions, please contact the team at: [box.futureofbalancingservices@nationalgrideso.com](mailto:box.futureofbalancingservices@nationalgrideso.com)

**2. Existing principles for batteries in the BM**

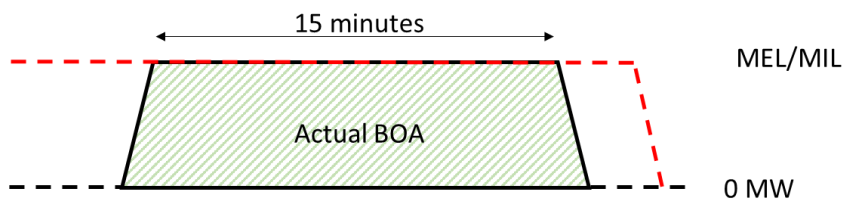
The Balancing Mechanism (BM) system architecture has some limitations in its representation of storage assets. ESO are working towards developing system solutions to factor real time stored energy capacity/capability of energy storage assets within the BM. Until this work is delivered, ESO are operating the below principles for energy limited assets, specifically batteries within the BM. More detail on the future developments can be found in the Enhanced Balancing Capability section (4.2.3.1) of the [R110-2 Business Plan](#).

The examples below illustrate how battery Balancing Mechanism Units (BMUs) are accessed in the BM. The examples operate on the principle that battery BMUs should be able to operate at their Maximum Export Limit (MEL)/Minimum Import Limit (MIL) for at least 15 minutes.

- Battery BMUs should declare their MEL and MIL open-ended such that it reflects the capacity to follow a Bid Offer Acceptance (BOA) which ramps from the current Physical Notification (PN) to the MEL or MIL and remains at the MEL or MIL for a duration of 15 minutes before ramping back to the Physical Notification. Ramping rate to be the Run Up Rate (RUR) or Run-Down Rate (RDR) as applicable.

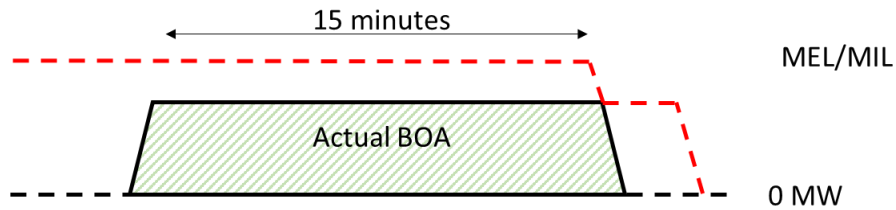


- If a BOA is issued to MEL/MIL, the State of Energy should be recalculated, and the MEL or MIL should be redeclared as soon as possible starting from the point at which the current MEL/MIL level could not be sustained if the BOA were to be extended. This redeclaration will be a minimum of 17 minutes from the first point of instruction (15 minutes duration and 1-minute ramp either side) but may be longer.



- If a BOA is issued which part-loads a unit below MEL/MIL, then the above principle should also be applied for a subsequent MEL/MIL based upon the State of Charge at the end of the

current BOA. The MEL/MIL should remain at the original level for the first 16 minutes of the BOA (reflecting the 1-minute ramp and 15-minute duration), and then drop to the new level no sooner than the end of the BOA.



- On returning to PN, the BMU should resubmit their MEL/MIL as per the first bullet point.

Should any of these principles contradict with the Grid Code at any point, then the Grid Code will take precedence.

### 3. DC and BM interaction

For the ESO, the DC service is crucial to operational security so we will take a cautious staged approach to implementing BM stacking. Providers wishing to participate in the BM should ensure that any BM activity does not erode or compromise the ability to deliver their DC obligations.

#### General principles

1. **Maximum Export Limit (MEL) and Minimum Import Limit (MIL)** - these should reflect the physical capability of the unit.
2. **Bid-Offer Data (BOD)** - pricing data can be used to 'price out' tranches of capability to indicate that the unit committed that quantity to the DC service.
3. **Stable Export Limit (SEL) and Stable Import Limit (SIL)** - these should reflect the physical capability of the unit.
4. **Operational Baseline (OB)** - this should match the Physical Notification.
5. **Notice to Deliver Offers (NTO) and Notice to Deliver Bids (NTB)** - we advise a minimum of 1 minute, but this can remain at the discretion of the providing units.
6. **Run-Up Rate (RUR) and Run-Down Rate (RDR)** - we have updated the service terms to make it clear that the baseline ramp-rate rules will not apply to baselines adjusted by BOAs. So RUR and RDR can remain as commercial/technical parameters.

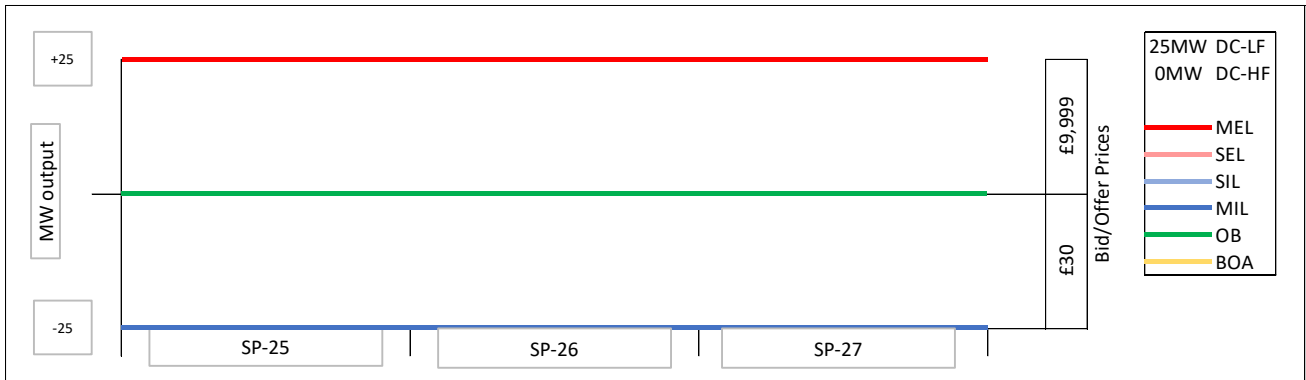
#### Worked examples to support

##### Scenario: DC-LF only contract, BM bids (to charge) only

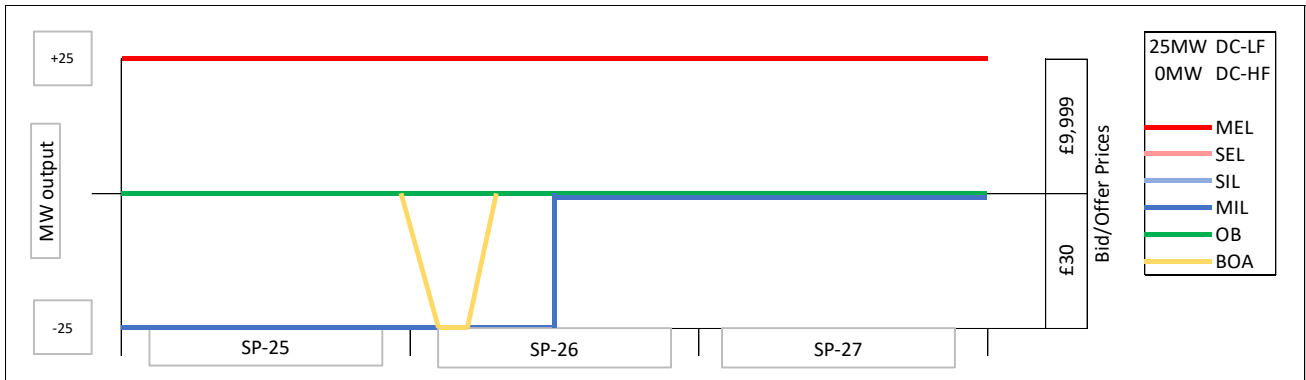
The opportunity here is for the provider to offer and the ESO to access downwards BM actions (bids). These bids may be competitively priced as they allow the DC providing unit to re-charge following depletion when providing DC-LF.

1. The MEL and MIL reflect the physical capability of the unit and comply with the existing BM principles for battery storage in the BM (specifically, output at the MEL or MIL could be sustained for at least 15+2 minutes).
2. BOD pricing is used to indicate that the unit should not receive offers (£9999 offer price) as the output quantity has been reserved for provision of DC. The bid price is competitive to indicate that the unit may receive bids.

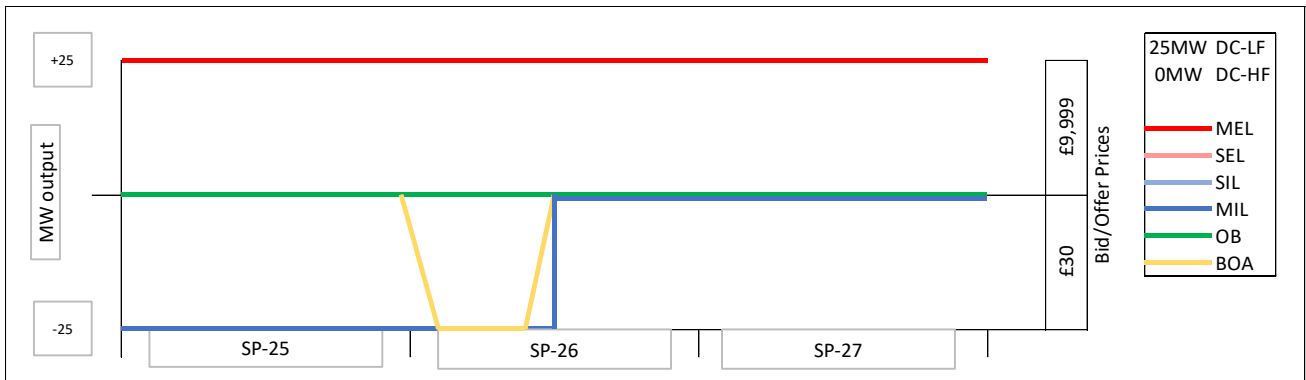
3. SEL and SIL reflect the physical capability of the unit and will be expected to be at 0MW.
4. The OB follows its normal course and can be expected to be at or around zero in most cases.



The ESO issues a short (<15 min) BOA bid from (PN to MIL) to the unit which is accepted. Following BOA acceptance, the BMU re-declares its MIL in-line with the principles described in the section above. The MIL is re-declared at a point at least 15+2 minutes after the point of instruction.



If the BOA was issued at maximum length for a battery BMU, the unit may re-declare its MIL at the point where the BOA ends as shown below for a 15+2min BOA.



## 4. Performance data submissions

Performance data is submitted through an API service as CSV files. The operational baseline needs to be adjusted to reflect the BOA. Providers should add/subtract the delivered BOA quantity from their original operational baseline.

In the future, we intend to add an additional column to the performance reporting file specifically to record delivered BOA quantities. Any changes such as this will follow the normal consultation approach before being implemented.

The table below illustrates how an operational baseline of 0MW may be updated to reflect a BOA acceptance. The unadjusted baseline would normally be flat at 0MW.

unit	t	f_hz	baseline_mw	p_mw	soe_import_mwh	soe_export_mwh	availability
ABCDE	2020-08-04T12:29:00.850Z	50.0	0	0	25.0000	25.0000	1
ABCDE	2020-08-04T12:29:00.900Z	50.0	0	0	25.0000	25.0000	1
ABCDE	2020-08-04T12:29:00.950Z	50.0	0	0	25.0000	25.0000	1
ABCDE	2020-08-04T12:30:00.000Z	50.0	0	0	25.0000	25.0000	1
ABCDE	2020-08-04T12:30:00.050Z	50.0	-0.0208	-0.0208	25.0000	25.0000	1
ABCDE	2020-08-04T12:30:00.100Z	50.0	-0.0416	-0.0416	25.0000	25.0000	1
ABCDE	2020-08-04T12:30:00.150Z	50.0	-0.0624	-0.0624	25.0000	25.0000	1
ABCDE	2020-08-04T12:30:00.200Z	50.0	-0.0832	-0.0832	25.0000	25.0000	1
ABCDE	2020-08-04T12:30:00.250Z	50.0	-0.1040	-0.1040	25.0000	25.0000	1

### Point of instruction

BM BOA instructions are timestamped with a granularity of minutes. However, we acknowledge that units with 0 or 1-minute NDZ can receive a BOA after its point of instruction. E.g. a BOA with an instruction to start at 12:01:00 may be received anywhere up to 12:01:59. For this reason, and to encourage the use of 0 and 1-minute NDZs which provides value to ESO, we propose that providers use their discretion when incorporating the BOA into their baseline (reported at 20Hz). The guiding principle should be that the reported baseline is an accurate representation of what the asset was doing without any response provision.

In the case where a BOA stamped to start at 14:02:00 was received at 14:02:37 (for example), we would accept an operational baseline that included this BOA change at any point between 14:02:00 and 14:03:00 - not constrained only to the minute boundary. The BOA will be submitted by NGENSO in-line with the unit's run-up and run-down rate parameters, the adjusted baseline should reflect this. Imbalance arising from not following a BOA will be treated in the normal way - providers may wish to consider this when following a BOA instruction and representing this in their operational baseline. As it stands with regards to DC performance monitoring, we will not penalise any small differences between the operational baseline (for DC) and the BOA-adjusted FPN.

## 5. Operational metering & settlement

### Operational metering

No change required. ENCC will be able to follow the delivery of the BOA and any DC response using existing tools.

## **Settlement**

The response energy computation for Dynamic Containment is unaffected by this change and will continue to be based on accepted MW and system frequency deviation from the target frequency. Consequently, any BOA will not impact the determination of response energy volume data which is provided to Elexon under the Applicable Balancing Services Volume Data (ABSVD) submission, and an imbalance will arise if the service provider does not supply the tendered level of response.

## **6. Additional clarifications of the Service Terms**

Providers should always seek to ensure they are following the latest version of the Service Terms. Links to the documents can be found on the Dynamic Containment webpage [here](#).

Further clarifications of the Service Terms can be found below.

### **Submission of baseline, MEL, MIL, SEL & SIL**

We would like to clarify that a baseline does not have to be at the same level throughout a settlement period.

#### **Baseline ramp-rates**

Clause 6.8 states that baselines (for energy limited providers) must comply with a maximum ramp rate. Clause 6.9.i describes, with reference to the guidance document, how the maximum ramp rate is to be calculated. Clause 6.9.iii confirms that and baseline adjusted by a BOA is considered compliant with the ramp rate limitation.

Therefore, there is no need to change the RUR or RDR for DC participating units to comply with the baseline ramp rate limitation.

## **7. Wider Frequency stacking**

We are excited to add the capability of BM stacking to the new Dynamic Containment service as part of frequency reform. We plan to include this capability for all new services that are introduced to the market as we recognise the additional value that adding the ability to stack in the BM will offer.

## Appendix

### Expression of Interest

Please complete the following table to express your interest in participating. Please copy the completed table into an email and send it to the team at:

[box.futureofbalancingservices@nationalgrideso.com](mailto:box.futureofbalancingservices@nationalgrideso.com)

<b>DC BOA stacking - Expression of Interest</b>	
<b>Company Name</b>	
<b>Unit ID</b>	
<b>Fuel type</b>	
<b>Capacity (MW)</b>	
<b>Anticipated capacity for BOAs (outside of DC commitment) (MW)</b>	
<b>Anticipated hours of participation (morning, day, evening, overnight)</b>	
<b>Is the unit already active in DC? If so, what is the typical DC contract quantity (MW)?</b>	
<b>Targeted date for BOA stacking</b>	