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| Workgroup Consultation | | | |
| **GC0166: Introducing new Balancing Mechanism Parameters for Limited Duration Assets**  **Overview:** Introduction of new parameters for limited duration assets (including Battery Energy Storage Systems (*BESS*)) to optimise dispatch and planning. This will address the challenges around how such assets are dispatched efficiently and how to best plan for use of such units. | | **Modification process & timetable**    **Workgroup Consultation**  **Proposal Form**  29 November 2023  **Workgroup Report**  **Code Administrator Consultation**  **Draft Modification Report**  **Final Modification Report**  **Implementation**  **1**  **2**  **3**  **4**  **5**  **6**  **7** | |
| **Have 5 minutes?** Read our [Executive summary](#_Executive_summary_1)  **Have 20 minutes?** Read the full [Workgroup Consultation](#_Why_change?)  **Have 90 minutes?** Read the full Workgroup Consultation and Annexes. | | | |
| **Status summary:** The Workgroup are seeking your views on the work completed to date to form the final solution(s) to the issue raised. | | | |
| **This modification is expected to have a: Medium impact** - Generators, Aggregators, Storage Users | | | |
| **Modification drivers:** Efficiency, New Technologies, System Operability, System Planning, System Security, Transparency | | | |
| **Governance route** | Standard Governance with assessment by a Workgroup | | |
| **Who can I talk to about the change?** | **Proposer:**  Stephen Baker, ESO  [stephen.baker@nationalgrideso.com](mailto:stephen.baker@nationalgrideso.com)  Phone: 07929 724347 | | **Code Administrator** **Chair**:  Milly Lewis  [milly.lewis@nationalgrideso.com](mailto:milly.lewis@nationalgrideso.com)  Phone: 07811 036380 |
| **How do I respond?** | Send your response proforma to[grid.code@nationalgrideso.com](mailto:grid.code@nationalgrideso.com) **by 5pm on 14 August 2024** | | |

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# Executive summary

This modification seeks introduce new parameters that will allow the better use of Electricity Storage devices within the balancing mechanism.

What is the issue?

A large number of Electricity Storage Devices are currently operating in the balancing mechanism. These devices can only import or export until their limited storage capacity is either full or fully depleted. Although there are two parameters already defined in the Grid Code and BSC (Max Delivery Period and Max Delivery Volume) these do not cater for bi-directional units. Although the current issues have been brought into focus by batteries, this modification is intended to include all Electricity Storage devices.

What is the solution and when will it come into effect?

**Proposer’s solution:**

The introduction of new parameters, Maximum Delivery Offer (MDO) and Maximum Delivery Bid (MDB), that will be defined in the Balancing Code section of

the Grid Code.

As well as introducing two additional defined terms into the Glossary and Definitions to enable the new parameters, Future State of Energy (FSoE) and Data Validation, Consistency and Defaulting Rules

**Implementation date:** Q4 2024

**Summary of potential alternative solution(s) and implementation date(s):**

Currently no alternative solutions have been proposed.

What is the impact if this change is made?

**Medium impact** - Generators, Aggregators, Storage Users as the solution is intended to optimise the use of diverse assets by the ESO in the interest of the consumer

Interactions

The ESO will be proposing a modification to the BSC to enable the publication of these Data items on BMRS (Balancing Mechanism Reporting Service).

As the modification seeks to alter BC1 there are EBR Article 18 T&Cs implications, which will be consulted against.

What is the issue?

A large number of Electricity Storage Devices are currently operating in the balancing mechanism. These devices can only import or export until their limited storage capacity is either full or fully depleted. Although there are two parameters already defined in the Grid Code and BSC (Max Delivery Period and Max Delivery Volume) these do not cater for bi-directional units. To get around this the ESO use Maximum Import Limits and Maximum Export Limits and the “15-minute rule” which limits how the ESO uses these assets and does not allow the ESO to plan in longer timescales. After extensive discussion with industry, the ESO is proposing, via this modification to introduce new parameters that will allow the better use of Electricity Storage devices. Please note – although the current issues have been brought into focus by batteries, this modification is intended to include all Electricity Storage devices.

## Why change?

Increased economic dispatch of Electricity Storage devices. Improved operational

planning allowing the ESO to factor in these units for longer term planning (up to 24

hours ahead).

What is the solution?

## Proposer’s solution

The introduction of new parameters, Maximum Delivery Offer (MDO) and Maximum Delivery Bid (MDB), that will be defined in the Balancing Code section of

the Grid Code.

[insert end definitions]

As well as introducing two additional defined terms into the Glossary and Definitions to enable the new parameters, Future State of Energy (FSoE) and Data Validation, Consistency and Defaulting Rules

Assets Model

See Annex X

Workgroup considerations

The Workgroup convened 7 times to discuss the perceived issue, detail the scope of the proposed defect, devise potential solutions and assess the proposal in terms of the Applicable Code Objectives.

**Consideration of the proposer’s solution**

**Background info on why this is a problem**

**Assets within Scope**

The Proposer confirmed that they intended the solution to be technology neutral. However there was concern from several Workgroup Members that this is not the case due to battery and pump storage assets are required, via other commercial contracts, to maintain a level of reserve and therefore would require declaring post gate closure. This concern was addressed through the demonstration of impact of data flows (Annex X)

**Commercial implications and BSC Interaction**

For the solution to work there is a requirement to move the short term asset data onto the Elexon Insight platform.  The Workgroup agreed with the approach suggested by the Proposer that the BSC change won't be developed until the Final Modification Report is submitted to the Authority, but until then the ESO have engaged with Elexon Business & IT representatives to discuss the changes and establish the best way forward given the desire from the industry to progress this capability.

**Commercial Versus Technical Dynamic Parameters Discussion**

The Workgroup had extensive discussion without reaching a consensus whether the proposed dynamic parameters; Maximum Delivery Offer (MDO) and Maximum Delivery Bid (MDB), should be a technical (what plant is physically capable of delivering) or a commercial (what the provider has elected to deliver) parameter ahead of questioning whether they in line with the [Ofgem Open Letter published in September 2020](https://urldefense.com/v3/__https:/www.ofgem.gov.uk/publications/open-letter-dynamic-parameters-and-other-information-submitted-generators-balancing-mechanism__;!!B3hxM_NYsQ!wCLfVTCsKIBUbLyBgCE5Es789wdEOIFZxQpZkDLSbN6n24WuC2x6d9_TzPT4WfHD9qN2YI0A4AIRqfb_nL1t_Mir02lwWHdng9oN1OI$), they would be even considered as Dynamic Parameters.

An Authority Representative confirmed that there were no immediate concerns with classing MDO/MDB as dynamic parameters from an enforcement/compliance perspective. And that the definition still reads as the amount of energy that can technically be delivered subject to any other ancillary service commitments, rather than the amount that the party would like to deliver. Therefore, this is broadly consistent with other dynamic data in terms of the focus on technical rather than commercial data.

As the definition explicitly states out that the information should be submitted net any energy required for ancillary service contracts, it would mean that it would be difficult for a party to argue that that similar contractual considerations should be accounted for when submitting other dynamic data.

**Overarching Battery Model**

The Workgroup discussed the proposed approach that battery assets model. With the Proposer acknowledging that there will be some asset specific variation.

Market Participants submit MDO/MDB

Values within the BM Window are Firm

Give SoC and limits for future hours

May need additional asset configuration

For planning minded to adopt asset specific model

Dispatch

Planning

**Dispatch: Flow for Maximum Delivery Offer (MDO) and Maximum Delivery Bid (MDB)**

The Proposer explained how for new BMUs a value will be provided by the BMU during the registration process, where for existing BMUs a default value can be inserted by the ESO into our IT systems for each BMU.

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](https://www.nationalgrideso.com/document/34066/download) )

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 and
* a frequency event which means a BMU has used all the charge it was reserving to provide an ancillary service.

The Workgroup queried whether there is a difference between the treatment of duration limited versus energy limited and if this would lead to needing a threshold to be established. The Proposer confirmed that as BOAs that are longer than 89 minutes (the length of the BM Window) any BMU that can sustain a BOA for longer than the length of the BM Window, at their MIL or MEL, is not considered limited for the ESO purposes.

**Planning: Future State of Energy (FSoE) and Flow for Asset Specific Models**

The Workgroup queried whether the definition should be ‘Charge’ or ‘Energy’, the Proposer confirmed that as the reference is to energy, and the definition relates to units (MWh) then “Future State of Energy (FSoE)” is the better term.

The Proposer explained how for each BMU, to avoid differentiating between current and future technologies, the ESO 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 their 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 modification 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
* The ESO 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

**Time resolution for parameters**

The ESO SME clarified the desire for the parameter to be a time resolution parameter which considers commercial contracts, and the ESO SME shared that the ESO treat Physical Notifications (PNs) as sacrosanct and therefore should not be changed.

A Workgroup Member raised concerns around using time resolution parameters and suggested one variation per settlement period seemed to be the correct trade off.

The Workgroup discussed the complexity of picking out behaviours of parties alongside considering different scenarios and suggested the Workgroup understand how limiting these situations would work in reality.

**Interactions with Stacking**

A Subgroup was formed to review the likely real time outputs of the new dynamic parameters. They settled upon 4 scenarios which should be accepted as legitimate reasons for modifying/netting from a purely technical SoE parameter, distinguishing at all times between NGESO Dispatch Timescales, & Scheduling Timescales:

* Technical fault or outage impacting available energy
* Physical Notification as best view of intended dispatch profile [particularly on becoming ‘Final’ at Gate Closure if deliverability is to be maintained]
* Contracted ESO or DNO ancillary service energy which must be reserved under Service Terms (e.g. DFR)
* Response energy as part of ancillary service provision\*

\* This is not to conflate the Reserved Energy Volume (REV) required under the relevant contract with the updating of MDO/B headroom and footroom over and above the REV which is made available for BOAs

[Stacking with BM (nationalgrideso.com)](https://www.nationalgrideso.com/document/184466/download)

The Workgroup voiced concerns that unless the parameters are truly Technical that there is a risk that the system could be gamed. The Proposer reiterated their position that MDO and MDB are Technical parameters and should be declared taking into consideration ancillary services offered by BMU. Therefore, take price in BM which is on offer, but that the ESO Compliance Teams are able to monitor contracts and investigate behaviours should suspicions be raised that gaming has taken place and would be identifiable.

**Impact on Bid Offer Acceptances (BOAs)**

The Workgroup debated at length the impact of the new parameters on BOAs, particularly on when the exemption scenarios above are involved.



Figure 1. Moving timelines

**ESO management of Data**

The Workgroup queried whether the ESO would be able to manage the volume of data they would receive from Industry if they are able to re-declare every minute until Gate Closure, as the current system is due to be replaced in early 2025.

The Proposer confirmed that depending on when the modification was approved the data would either go directly into OBP which will be able to handle up to 40,000 BMUs. But if this wasn’t in place they would take data and legacy systems will pass to new system for OBP to complete the data crunching so were confident in their solution.

The Proposer confirmed that MDO and MDB would neither improve or worsen the situation with the Automated Network Management Systems (ANM) which was being picked up more widely by the Whole System Management Team.

**Capacity Team conversations**

**Default Registration Value**

[Explain registration process and when joining BM]

**Electricity Balancing Regulation (EBR) Implications**

Article 18 sets out the rules for creating markets and how balancing products should be set up across the GB market. It states that Transmission System Operators (TSOs) (ESO) should have terms and conditions developed for balancing services, which are submitted to and approved by Ofgem. The terms and conditions related to balancing should be developed by the ESO, the ESO is responsible for managing change and maintaining the T&Cs relating to balancing for balancing service providers (BSPs) and balance responsible parties (BRPs).

The interaction has been identified between GC0166 and the mapped Article 18 sections within the Regulated Sections of the Grid Code.

**Pros and Cons of Certainty versus Flexibility**

**Guidance Note versus Grid Code content**

**REMIT Interaction**

**Timeline for Application**

**Consideration of other options**

**Changing redeclaration periods**

**Tranche MDO and MDB**

**Varied**

**Workgroup consultation question: Xxxxx?**

## Draft legal text

The draft legal text for this change can be found in Annex xx.

What is the impact of this change?

## Proposer’s assessment against Code Objectives

|  |  |
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| Proposer’s assessment against Grid Code Objectives | |
| **Relevant Objective** | **Identified impact** |
| (a) To permit the development, maintenance and operation of an efficient, coordinated and economical system for the transmission of electricity | Positive  The new parameters will allow Electricity Storage devices to inform the ESO of energy available over time, instead of the ESO having to derive this from existing parameters that were not intended for this purpose. |
| (b) Facilitating effective competition in the generation and supply of electricity (and without limiting the foregoing, to facilitate the national electricity transmission system being made available to persons authorised to supply or generate electricity on terms which neither prevent nor restrict competition in the supply or generation of electricity); | Positive  The dispatch of these assets will not be limited by the use of heuristic rules but will be based on the declared capability of the assets. |
| (c) Subject to sub-paragraphs (i) and (ii), to promote the security and efficiency of the electricity generation, transmission and distribution systems in the national electricity transmission system operator area taken as a whole; | Positive  Allowing Duration Assets to declare their available energy allows for better operational planning by the ESO and better managing of margins and constraints. |
| (d) To efficiently discharge the obligations imposed upon the licensee by this license and to comply with the Electricity Regulation and any relevant legally binding decisions of the European Commission and/or the Agency; and | Neutral  Does not affect ESO obligations. |
| (e) To promote efficiency in the implementation and administration of the Grid Code arrangements | Neutral  The change is not related to administration of the codes. |

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| Proposer’s assessment of the impact of the modification on the stakeholder / consumer benefit categories | |
| **Stakeholder / consumer benefit categories** | **Identified impact** |
| Improved safety and reliability of the system | Positive  Currently the ESO uses what is called the “15 minute rule” to estimate the energy available and the charging opportunities from Electricity Storage devices. The ESO uses the units declared Maximum Import Limit and Maximum Export Limit and then limits the length of instructions to 15 minutes.  This reduces the ability to issue instructions for longer than 15 minutes and gives us no information on the expected future state of these units to allow planning.  Improving the quality of data we get from these units will mean we can manage margins and constraints more accurately and efficiently, so improving safety and reliability of the system. |
| Lower bills than would otherwise be the case | Positive  More quality information allows for greater efficiency in markets so aiding overall consumer benefit. |
| Benefits for society as a whole | Positive  Renewable energy resources contribute directly to the reduction of green-house gases. However, they are intermittent in nature and the ability to store energy is a vital part of the overall energy mix if we are to operate in a safe and efficient manner.  This modification allows better management of Electricity Storage devices and so has an overall benefit for society. |
| Reduced environmental damage | Positive  Supports new providers and technologies.  Current processes limit the use of limited duration assets. |
| Improved quality of service | **Positive**  The use of Electricity Storage devices supports greater use of renewable energy resources and therefore, our net-zero ambitions for the future. |

**Standard Workgroup consultation question:** Do you believe that GC0166 Original proposal better facilitates the Applicable Objectives?

When will this change take place?

### Implementation date

10 Business Days following a decision by Ofgem

### Date decision required by

Q4 2024

### Implementation approach

Control Room Systems, Auction Systems, Market Services

**Standard Workgroup consultation question:** Do you support the implementation approach?

Interactions

|  |  |  |  |
| --- | --- | --- | --- |
| CUSC | BSC | STC | SQSS |
| European Network Codes | EBR Article 18 T&Cs[[1]](#footnote-2) | Other modifications | Other |

The ESO will be proposing a modification to the BSC to enable the publication of these Data items on BMRS (Balancing Mechanism Reporting Service).

How to respond

## Standard Workgroup consultation questions

1. Do you believe that the Original Proposal and/or any potential alternatives better facilitate the Applicable Objectives?
2. Do you support the proposed implementation approach?
3. Do you have any other comments?
4. Do you wish to raise a Workgroup Consultation Alternative request for the Workgroup to consider?
5. Do you agree with the Workgroup’s assessment that GC0166 does impact the European Electricity Balancing Regulation (EBR) Article 18 terms and conditions held within the Grid Code?
6. Do you have any comments on the impact of GC0166 on the EBR Objectives?

## Specific Workgroup consultation questions

1. Do you agree that MDO/MDB are technical requirements?

The Workgroup is seeking the views of Grid Code Users and other interested parties in relation to the issues noted in this document and specifically in response to the questions above.

Please send your response to [grid.code@nationalgrideso.com](mailto:grid.code@nationalgrideso.com) using the response pro-forma which can be found on the [GC0166](https://www.nationalgrideso.com/industry-information/codes/gc/modifications/gc0166-introducing-new-balancing-programme-parameters-limited-duration-assets) modification page.

In accordance with Governance Rules if you wish to raise a Workgroup Consultation Alternative Request please fill in the form which you can find at the above link.

*If you wish to submit a confidential response, mark the relevant box on your consultation proforma. Confidential responses will be disclosed to the Authority in full but, unless agreed otherwise, will not be shared with the Panel, Workgroup or the industry and may therefore not influence the debate to the same extent as a non-confidential response.*

Acronyms, key terms and reference material

|  |  |
| --- | --- |
| **Acronym / key term** | **Meaning** |
| BSC | Balancing and Settlement Code |
| BESS | Battery Energy Storage Systems |
| BMRS | Balancing Mechanism Reporting Service |
| CUSC | Connection and Use of System Code |
| EBR | Electricity Balancing Regulation |
| GC | Grid Code |
| Limited Duration Asset | Assets used to store electricity which can only import or export until their limited storage capacity is either full or fully depleted |
| STC | System Operator Transmission Owner Code |
| SQSS | Security and Quality of Supply Standards |
| T&Cs | Terms and Conditions |
| BMRS | Balancing Mechanism Reporting Service |
| MDO | Maximum Delivery Offer |
| MDB | Maximum Delivery Bid |
| FSoE | Future State of Energy |

### Reference material

* [Balancing programme | ESO](https://www.nationalgrideso.com/what-we-do/electricity-national-control-centre/balancing-programme#Strategic-capability-review)
* [GCDF- new parameters for Storage (Summary Presentation 02.08.23)](https://www.nationalgrideso.com/document/285381/download)
* [STC - Panel Meeting - 29.11.2023](https://www.nationalgrideso.com/calendar/stc-panel-meeting-29112023)

Annexes

|  |  |
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| **Annex** | **Information** |
| Annex 1 | Proposal form |
| Annex 2 | Terms of reference |
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| Annex X |  |
| Annex X |  |
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1. If your modification amends any of the clauses mapped out in Annex GR.B of the Governance Rules section of the Grid Code, it will change the Terms & Conditions relating to Balancing Service Providers. The modification will need to follow the process set out in Article 18 of the Electricity Balancing Regulation (EBR – EU Regulation 2017/2195). All Grid Code modifications must be consulted on for 1 month in the Code Administrator Consultation phase, unless they are Urgent modifications which have no impact on EBR Article 18 T&Cs. N.B. This will also satisfy the requirements of the NCER process. [↑](#footnote-ref-2)