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Workgroup Consultation

GC0166: Introducing new Balancing Mechanism Parameters for Limited Duration Assets

Overview: This modification seeks introduce new parameters that will allow the better use of Electricity Storage Modules within the Balancing Mechanism, with all Balancing Mechanism Units (BMUs) required to submit the new parameters.

Modification process & timetable

1	**Proposal Form** 29 November 2023
2	**Workgroup Consultation** 18 November 2024 – 09 December 2024
3	**Workgroup Report** 24 April 2025
4	**Code Administrator Consultation** 06 May 2025 – 06 June 2025
5	**Draft Modification Report** 18 June 2025
6	**Final Modification Report** 08 July 2025
7	**Implementation** 10 Business Days after Authority Decision

Have 5 minutes? Read our [Executive summary](#)
Have 20 minutes? Read the full [Workgroup Consultation](#)
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 (All Balancing Mechanism Units)

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, NESO stephen.baker@uk.nationalenergyso.com **Phone:** 07929 724347	**Code Administrator Chair:** Milly Lewis milly.lewis@uk.nationalenergyso.com **Phone:** 07811 036380
How do I respond?	Send your response proforma to grid.code@nationalenergyso.com by **5pm** on **09 December 2024**	

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Executive summary

This modification seeks introduce new parameters that will allow the better use of Electricity Storage Modules within the Balancing Mechanism, with all Balancing Mechanism Units (BMUs) required to submit the new parameters.

What is the issue?

A large number of Electricity Storage Modules are currently operating in the Balancing Mechanism. These devices can only import or export until their limited storage capacity is either fully charged 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 modules. Although the current issues have been brought into focus by batteries, this modification is intended to include all Electricity Storage Modules.

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 additional defined terms into the Glossary and Definitions to enable the new parameters, MDO, MDB and Future State of Energy (FSoE). There will also be changes required to the Data Validation, Consistency and Defaulting Rules.

Implementation date: Q2 2025 (July – September 2025)

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 – All Balancing

Mechanism Units must provide new information. The solution is intended to optimise the use of diverse assets by NESO. Electricity Storage Modules will be required to provide more information to facilitate this.

Interactions

NESO will be proposing a modification to the BSC to enable the publication of these Data items via Balancing Mechanism Reporting Agent, i.e. Elexon's Insights Solution[1]. As the modification seeks to alter BC1 there are EBR Article 18 T&Cs implications, which will be consulted against.

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[1] Formally BMRS (Balancing Mechanism Reporting Service).

What is the issue?

A large number of Electricity Storage Modules are currently operating in the Balancing Mechanism. These devices can only import or export until their limited storage capacity is either fully charged 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 modules. Although the current issues have been brought into focus by batteries, this modification is intended to include all Electricity Storage Modules in the BM and the data submission requirements will apply to all generators active in the BM.

To get around this NESO use Maximum Import Limits and Maximum Export Limits (MIL and MEL) and the "30 minute" rule (previously "15-minute rule") which limits how NESO uses these assets and does not allow NESO to plan in longer timescales. The proposed solution works to supersede this.

To use stored energy in an optimal way to balance the NETS it requires an increased economic dispatch of Electricity Storage Modules, and to allow for improved operational planning allowing NESO to factor in these modules for longer term planning (up to 24 hours ahead)

After extensive discussion with industry, NESO is proposing via this modification to introduce new parameters that will allow the better use of Electricity Storage Modules. Please note – although the current issues have been brought into focus by batteries, this modification is intended to include all Electricity Storage Modules.
GC0166 seeks to address the growing problem presented increasingly as the energy mix becomes ever more diverse.

Why change?

Increased economic dispatch of Electricity Storage Modules. Improved operational planning allowing NESO to factor in these modules for longer term planning (up to 24 hours ahead).

What is the solution?

Proposer's solution

The Proposer intends this modification to cover any Electricity Storage Modules (including short duration assets, not just batteries) within the Balancing Mechanism, with all Balancing Mechanism Units (BMUs) required to submit the new parameters (if active in the BM).

There will be an implementation period informed by the Open Balancing Platform (OBP), and NESO will require a period to implement the changes post approval.

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.

- **Maximum Delivery Offer (MDO)**, being the maximum volume of **Offer Acceptance** by a **BM Unit** which can be instructed by **The Company** through **Bid-Offer Acceptances (BOA)** to the **BM Unit** within a **Balancing Mechanism Window Period**, excluding the volume of energy required to satisfy **System Ancillary Services** and/or **Commercial Ancillary Services.**

- **Maximum Delivery Bid (MDB)**, being the maximum volume of **Bid Acceptance** by a **BM Unit** which can be instructed by **The Company** through **Bid-Offer Acceptances (BOA)** to the **BM Unit** within a **Balancing Mechanism Window Period,** excluding the volume of energy required to satisfy **System Ancillary Services** and/or **Commercial Ancillary Services**.

With the supporting definitions added to the Glossary and Definitions section of the Grid Code:

- **Balancing Mechanism Window Period:** Has the meaning set out in the BSC.
- **Bid Acceptance:** An acceptance by a **BM Unit** of a **Bid-Offer Acceptance** to decrease its export, or increase its import from the **National Electricity Transmission System.**
- **Export:** Has the meaning set out in the **BSC**.

- **Future State of Energy (FSoE)**: For a given point in time, a forecast of the total quantity of energy (measured in **MWh**) which is stored in an **Electricity Storage Module**.
- **Import:** Has the meaning set out in the **BSC**.
- **Offer Acceptance:** An acceptance by a **BM Unit** a **Bid-Offer Acceptance** to increase its export onto, or decrease its import from the **National Electricity Transmission System**.

If a BMU can deliver the full volume of energy in a Bid Offer Acceptance, in the BM Window, as defined by the run up/run down rates, SIL/SEL and MEL/MIL they can declare a default value for MDO or MDB. If they cannot, they must inform NESO of the energy limitation by submitting a value of MDO or MDB that reflects this limitation.

As well as introducing additional defined terms into the Glossary and Definitions to enable the new parameters, MDO, and MDB and Future State of Energy (FSoE) there will also be changes to the Data Validation, Consistency and Defaulting Rules.

There is also a requirement for Energy Storage Modules to provide a planning model which is more asset specific.

See Annex 3 for full draft legal text.

Workgroup considerations

The Workgroup convened 10 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

Assets within Scope

The Proposer confirmed that they intend that the solution for MDO and MDB will be technology neutral. However, there was concern from several Workgroup Members that BMUs should not be subject to MDO and MBD when they can fully deliver in the BM Window. Several Workgroup members had concerns around the application of the modification on pumped storage.

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The Proposer still intends that this is a parameter which should be submitted by all technology types.

Some Workgroup members expressed concern that the use of the defined term "Electricity Storage Module" exempts Pumped Storage from the additional requirement to provide asset specific planning model but would leave in scope similar Long Duration Energy Storage asset classes such as Compressed Air Energy Storage or Long Duration Lithium Ion Battery.

The asset types that are not limited can record a large value at registration so that NESO will know that any BOA is not curtailed by a lack of energy. If this modification is approved, for existing BMUs NESO will insert a default value.

These values will then be defaulted each day so that the BMU does not have to redeclare. The suggested default value for MDO is 9999MWh and for MDB it is -9999MWh.

Several Workgroup members wanted there to be a stronger definition around what falls under limited/ unlimited, whereas the Proposer was comfortable that this was not required due to the other parameters in the Grid Code. The Workgroup members who disagreed with the Proposer have not yet raised an alternative solution.

Workgroup Consultation questions:

- Do you agree with the Proposer that the solution should be technology neutral or with the Workgroup members who thought the solution should be based on asset type?
- Are you clear on what is meant by limited/unlimited?

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 meanwhile NESO 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.

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Commercial Versus Technical Dynamic Parameters Discussion

The Workgroup had extensive discussion without reaching a consensus whether the proposed dynamic parameters; MDO and MDB, should be considered technical (i.e. what a plant is physically capable of delivering) or commercial (what the provider has elected to deliver). This discussion was centred around the [Ofgem Open Letter published in September 2020](#), which explained that Dynamic Parameters should not be used for commercial purposes.

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 <u>can technically</u> be delivered excluding the volume of energy required to satisfy to any other Ancillary Service commitments, rather than the amount that the party <u>would like</u> 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. However, there is some contention around the fact that these parameters can be redeclared inside the BM Window based on proposed changes to the Physical Notification after the BM Window.

It was recognised in the Workgroup that stopping a redeclaration inside the BM Window meant an LDA could not trade as normal and at the same time obey its Final Physical Notifications (FPN) (Annex 4). For NESO having an accurate FPN is vital.
Allowing MDO and MDB to be redeclared inside the BM Window means that NESO will not have certainty during this period.

Workgroup Consultation questions:
- Do you agree that MDO/MDB are technical dynamic parameters?

MDO/MDB versus an asset-based model

During the initial Workgroup meetings Workgroup Member discussed whether NESO should use an asset-based model to predict the energy left in a BMU before and after NESO issues a BOA.

In this context an "asset-based model" means a representation of the components making up the BMU and a model of the behaviour of these components as energy is taken from, and inserted into, the BMU.

Annex 5 was provided by a Workgroup member and shows a BMU consisting of a single battery a model.

Most of the Workgroup and NESO agreed that inside the BM Window the owners of BMUs should provide NESO with an explicit statement of the available energy for an offer or a bid. NESO should not try to derive these, or NESO is effectively making decisions that could affect the BMUs commercial position.

However, NESO also must make constant forecasts of future margins and provide this information to the market so that the market can respond.

NESO agreed that an asset-based model was the best approach for this.

This model can be used by NESO to forecast the availability of BMUs in the future and to perform "what-if" analysis if NESO was to issue a BOA to these assets. In these timescales NESO is not making any commercial decisions and so using an approximate model is considered sufficient.

NESO also gets another important piece of information about Electricity Storage Modules – the State of Energy is a metered value returned to NESO via SCADA measurements. This is a measurement of the current situation, but it does not forecast future behaviour.

Overarching Battery Model

The Workgroup discussed the proposed approach that the battery assets model would follow, with the Proposer acknowledging that there will be some asset-specific variation.

Dispatch	Market Participants submit MDO/MDB	→	Values within the BM Window are Firm		

| Planning | For planning minded to adopt asset specific model | → | Give FSoE and limits for future hours | → | May need additional asset configuration |
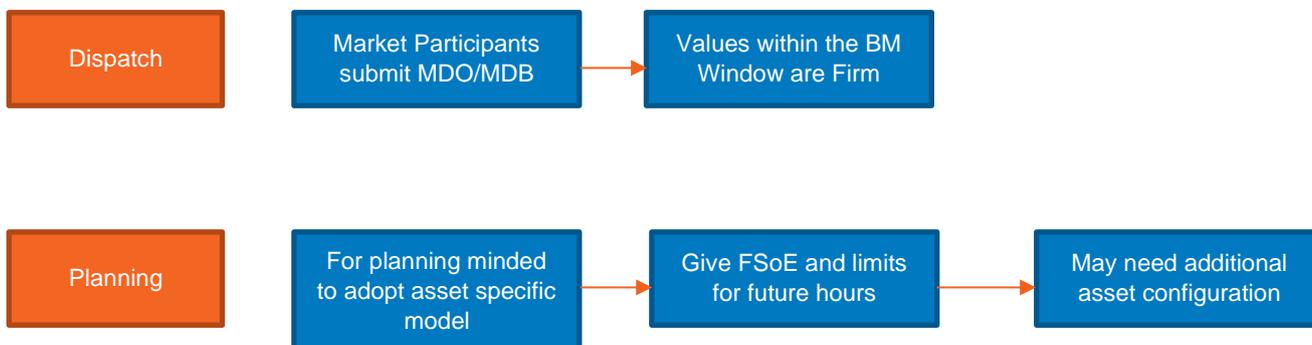
Dispatch: Flow for Maximum Delivery Offer (MDO) and Maximum Delivery Bid (MDB)

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 (+9999/ -9999) by NESO into their 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 day's 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 the following circumstances:

- A technical fault;
- If NESO issues a BOA;
- If a frequency event occurs so that the BMU depletes all energy it had reserved for an Ancillary Service; and/or
- If it has a non-zero PN after the BM Window changes.

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 NESO purposes.

Workgroup Consultation question

- Do you see there being an interaction between MIL/MEL between MDO and MDB?

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 modules (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, NESO 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 (temperature effects etc). NESO 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;

Post Workgroup meeting 10 discussion the where Workgroup members requested further clarification on the asset-based model the Proposer confirmed the intent of the solution for the following four areas:

How should model parameters be sent to NESO and covering what time horizon? The aim of an asset-based model is to allow NESO to plan in future timescales.

- The period covered is the time for which NESO has interim data.

- At 11:00, Market Participants are expected to submit this interim data for the following schedule day. If they do not do this, then data is defaulted.

- So, at 11:00, NESO has interim data to end of the next schedule day.

- NESO will use this data to plan ahead for 33 hours.

- To make it easier for BMU owner NESO will derive limits for Ancillary Services from auction data available to NESO. NESO will get this data after each auction and calculate the level of charge needed for the Ancillary Service from the awarded contract.

- This means the model parameters will change infrequently and will be derived at the time of BMU registration.

How would co-located assets be treated (that is, assets with different technology types making up a single BMU)? To perform the required "what-if" analysis NESO requires a model that allows it to simulate the effect of issuing Bid-Offer Acceptances while staying within the FSoE of the BMU. This model must also show how the FSoE changes after the BMU follows a PN.

There are many ways to collate assets to form a BMU. The required model will be agreed after bilateral discussion.

The main characteristic of this model is accuracy – it is expected that the model will be able to predict FSoE at an accuracy of less than 10% up to four hours into the future and an accuracy of less than 20% between 4 to 33 hours.

The model will be reset (due to any drift in calculating the state of energy) by comparing data to the measured FSoE that NESO receives via SCADA measurement.

What MIL/MEL should be declared by these co-located assets? The Proposer explained that MIL/MEL is outside the scope of this Grid Code modification but suggested this query would be passed onto the relevant task force.

Was NESO interested in the internal energy of the asset or at a Connection Point? The model should allow NESO to model BOAs and PNs at the point where these are measured as defined in the BSC (normally settlement metering).

Workgroup Consultation questions:

- Is it clear from the definition of FSoE that this should be calculated at the point where it can be imported/exported to the Total System?
- Is it credible for the proposed level of FSoE accuracy to be achieved over the proposed time horizon (up to 33hrs)?
- How do you think NESO can/should use FSoE and Asset Specific models in their system planning, considering market activity also continues within day, and commercial interactivity with operational "limits"?
- Is it clear whether FSoE is proposed or considered as either a 'technical' or 'commercial' parameter?

Time resolution for MDO/ MDB parameters and number of submissions

NESO SME clarified the desire for the MDO/MDB parameter to be a time varying parameter which considers Ancillary Service contracts, and NESO SME shared that NESO 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.

It was agreed that minute resolution was preferred, however there were queries on the maximum number of submissions that NESO IT systems could handle.

At the time of writing NESO is transitioning its IT services to a new platform. The new MDO and MDB parameters may be implemented in either the older or new platform depending on the time when approval is given.

If we consider MEL submission from batteries the current system experiences a peak in submissions immediately before Gate Closure.

On average this peak is 1100 submissions in the five-minute period before Gate Closure from a total of 135 batteries. So, the maximum number of submissions NESO would expect per BMU in the five-minute period for MDO is 8. With a similar number for MDB.

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The new IT platform can handle more than this however the Proposer believed 8 to be a reasonable limit overall.

With one minute granularity a BMU could submit a different MDO or MDB for every minute. Instead, NESO expects BMUs to use the "to" and "from" fields to reduce this.
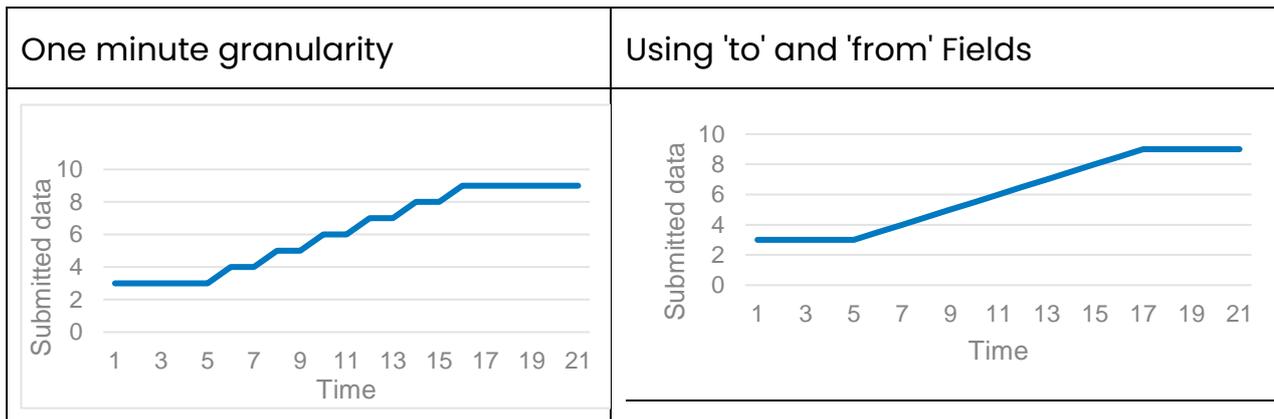
One minute granularity	Using 'to' and 'from' Fields

Workgroup Consultation questions:

- Is it clear from the definition of MDO and MDB that NESO can send multiple instructions up to the volume declared?
- Is it clear that the services referenced within the definitions of MDO and MDB are only during the BM Window?

Example scenarios considered as part of the Workgroup

To support the development of the solution Annex 6 shows several different scenarios when calculating MDO/MDB.

Impact on Bid Offer Acceptances (BOAs)

The Proposer confirmed that BOAs must be deliverable, and the Workgroup debated at length the impact of the new parameters on BOAs, particularly on when the exemption scenarios above are involved.

Diagrammatic model below used to help the Workgroup to visualize a 'day in the life' and what is expected from BMUs in terms of declaring MDO/MDB. Inclusive of what would happen if in SP4, a BMU would be able to redeclare SP1 and SP2 non- zero.

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
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					
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					
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					

Figure 1. Moving timelines

Legend:
- = Gate
- = HH Settlement Period
- = Exception
- = Closure window
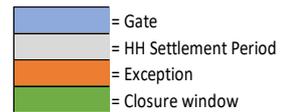
NESO management of Data

The Workgroup queried whether NESO would be able to manage the volume of data they would receive from Industry if they were 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. However, 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 nor worsen the situation with the Automated Network Management Systems (ANM) which was being picked up more widely by the Whole System Management Team.

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) (NESO) 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 NESO, NESO 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

Workgroup Consultation questions:

- 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?

- Do you have any comments on the impact of GC0166 on the EBR Objectives?

Regulation on Wholesale Energy Market Integrity and Transparency (REMIT) Interaction

During the discussion around whether MDO/MDB are technical or commercial dynamic parameters, a Workgroup Member commented that if the parameters relate to trading, then there would be an interaction with REMIT.

A Workgroup Member stated that there should be a clear distinction drawn between factors that can feed into the MDO/MDB calculation when it's submitted and what are valid reasons to redeclare MDO/MDB after gate closure are, therefore, REMIT is out of scope, especially for 1-hour batteries BMUs need to declare 1 hour ahead.

The Proposer re-iterated that NESO is seeking certainty from the solution, including that BMUs only redeclare parameters for technical not commercial reasons.

Capacity Team Alignment

The Proposer confirmed with NESO Electricity Market Reform (EMR) team that the Proposed solution for GC0166 is aligned with the current EMR thinking.

Pros and Cons of Certainty versus Flexibility

The Proposer confirmed that the aim of this modification is to facilitate increased economic dispatch of Electricity Storage Module assets and to enable improved operational planning allowing NESO to factor in these modules for longer term planning (up to 24 hours ahead), which is directly linked to providing certainty and that the exemptions introduced for BMUs to redeclare MDO/MDB provided additional flexibility.

NESO noted that they had considered the balance between certainty vs flexibility, the Workgroup requested further clarity on this. The Proposer confirmed that by fixing MDO/ MDB inside the BM Window it would limit the ability of an LDA to trade. This is a consequence of existing market arrangements.

The Proposer also considered only allowing MDO/MDB to increase in the BM Window but to achieve this the BMU would need to hold back a large amount of energy which they felt did not strike the right balance of certainty versus flexibility.

Currently limited duration assets use the "MIL/MEL 30-minute" rule to inform NESO of the available energy for a bid or offer. This limits the length of possible BOAs.

Having a declared value of MDO/MDB covering all of the BM Window allows NESO to have a longer-term view of a BMUs availability during this vital period. However, as MDO/MDB can be redeclared at any time during the BM Window reduces NESO's certainty.

NESO buys some reserve at Day Ahead but usually still expects the market to provide some reserve closer to real-time. LDA in the calculation of reserve will still be probabilistic based on history (as it is now). And so, the new parameters mean no change to the level of LDAs that we can rely on inside the BM Window for reserve.

At the start of the BM Window, after Gate Closure, NESO will have a view of the imbalance caused by market participants not balancing overall.

However, there is still a great deal of uncertainty caused by errors in demand forecasts, errors in forecasting renewables, interconnector swings etc.

To avoid unwinding costs NESO will not close the imbalance immediately, instead it will take some actions to reduce the imbalance but also wait until closer to real-time to take final actions when forecasts get better.

MDO/MDB provide the Control Room with a longer period of certainty but, given that MDO/MDB can be redeclared with no notice this volume can be withdrawn when NESO may have been relying on it.

The alternative situation of fixing MDO/MDB but allowing FPNs to vary is also undesirable. NESO may have a fixed MDO/MDB but now it cannot rely on the scheduled position of the BMUs.

This is worse than the current situation where renewables struggle to follow their FPNs because in this case NESO can use forecasts of weather to give a measure of what will happen but trading by LDAs is something they cannot predict.

On balance NESO believes the modification improves the situation, but it does not reduce the uncertainty that leads to less reserve.

It does mean that at the point of decision NESO can take more economic actions over longer timescales provided they take the BOA before the BMU adjusts its PN after the BM Window and redeclares its MDO/MDB.

Workgroup Consultation questions:

- Do the restrictions in BC2.5.3.4 strike the right balance between flexibility and operability?

Guidance Note versus Grid Code Content

The Workgroup discussed the possibility of introducing a guidance note to support compliance to the proposed arrangements. Whilst there was some support for this, it was noted by several Workgroup Members and the Proposer that the intention was that the solution would be articulated well enough in the Grid Code to not require any additional guidance notes.

Consideration of other options

Redeclaration criteria

The Proposer stated that NESO needs to have a view of the energy available after Ancillary Services commitments have been considered. Ancillary Service contracts interactions affect the volume of energy available, and this feeds into the ongoing discussion about ability to redeclare MDO/MDB past gate closure.

MDO and MDB are designed not be a default parameter for short duration assets and they will need to be redeclared when the State of Energy of the BMU changes.

The Workgroup has had extensive discussion around whether the parameters are technical or commercial, with several Workgroup members considering that the distinction between technical and commercial considerations is often blurred, and that NESO intention for them to be entirely technical parameters is too restrictive.

NESO holds the position that Battery representatives will not be able to redeclare in the window/ past gate closure in all but very specific and pre-defined circumstances.

BM Owners submitting FSoE limit data

Up until the last Workgroup meeting, ahead of the Workgroup Consultation, the proposed solution was that BMU Owners submitted the FSoE limits (min and max) to NESO after a change due to an auction for an Ancillary Service. With the time span for the FSoE limits including all known future ancillary auctions. However, as detailed in the Planning: Future State of Energy (FSoE) and Flow for Asset Specific Models section above, the solution is now for NESO to calculate the data values thus removing the need for BMUs to submit this data.

Tranche MDO and MDB

It was discussed whether it would be useful for BMUs to submit committed capacity and committed reserved capacity as separate quantities. This was rejected on the basis that it was out of scope as NESO then would need to use the 2 numbers to derive the values they would need to use, and this was discussed early on as not being the intended outcome.

1. Capacity and
2. Committed / Reserved.

Draft legal text

The draft legal text for this change can be found in Annex 3.

What is the impact of this change?

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 Modules to inform NESO of energy available over time, instead of NESO 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 using 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 NESO 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 NESO 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.

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 NESO uses what is called the "30-**minute** rule" to estimate the energy available and the charging opportunities from Electricity Storage Modules. NESO uses the modules declared Maximum Import Limit and Maximum Export Limit and then limits the length of instructions to 30 minutes. This reduces the ability to issue instructions for longer than 30 minutes and gives us no information on the expected future state of these modules to allow planning. Improving the quality of data, we get from these modules 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 Modules 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 Modules 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

Q2 2025

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[2]	☐Other modifications	☐Other

NESO 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

- Do you believe that the Original Proposal and/or any potential alternatives better facilitate the Applicable Objectives?
- Do you support the proposed implementation approach?
- Do you have any other comments?
- Do you wish to raise a Workgroup Consultation Alternative request for the Workgroup to consider?
- Does the draft legal text satisfy the intent of the modification?
- 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?

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[2] 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.

- Do you have any comments on the impact of GC0166 on the EBR Objectives?

Specific Workgroup consultation questions

- Do you agree with the Proposer that the solution should be technology neutral or with several Workgroup members who thought the solution should be based on asset type?
- Are you clear on what is meant by limited/unlimited?
- Do you agree that MDO/MDB are technical dynamic parameters?
- Do you see there being an interaction between MIL/MEL between MDO and MDB?
- Is it clear from the definition of FSoE that this should be calculated at the point where it can be imported/exported to the Total System?
- Is it credible for the proposed level of FSoE accuracy to be achieved over the proposed time horizon (up to 33hrs)?
- How do you think NESO can/should use FSoE and Asset Specific models in their system planning, considering market activity also continues within day, and commercial interactivity with operational "limits"?
- Is it clear whether FSoE is proposed or considered as either a 'technical' or 'commercial' parameter?
- Is it clear from the definition of MDO and MDB that NESO can send multiple instructions up to the volume declared?
- Is it clear that the services referenced within the definitions of MDO and MDB are only during the BM Window?
- Do the restrictions in BC2.5.3.4 strike the right balance between flexibility and operability?

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 using the response pro-forma which can be found on the [GC0166](GC0166) 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
BESS	Battery Energy Storage Systems
ANM	Automated Network Manager Systems
BMRS	Balancing Mechanism Reporting Service
BMU	Balancing Mechanism Unit
BOA	Bid Offer Acceptance
BSC	Balancing and Settlement Code
CUSC	Connection and Use of System Code
EBR	Electricity Balancing Regulation
FPN	Final Physical Notification
FSoE	Future State of Energy
GC	Grid Code
LDA	Limited Duration Asset
MDB	Maximum Delivery Bid
MDO	Maximum Delivery Offer
MEL	Maximum Export Limit
MIL	Maximum Import Limit
NESO	National Energy System Operator
OBP	Open Balancing Platform
PN	Physical Notification
REMIT	Regulation on Wholesale Energy Market Integrity and Transparency).
SCADA	Supervisory Control and Data Acquisition
SP1, SP2...	Settlement Period 1, 2 ....
SQSS	Security and Quality of Supply Standards
STC	System Operator Transmission Owner Code
T&Cs	Terms and Conditions

Reference material

- Balancing programme | NESO
- GCDF- new parameters for Storage (Summary Presentation 02.08.23)
- STC - Panel Meeting - 29.11.2023

Annexes

Annex	Information
Annex 1	Proposal form
Annex 2	Terms of reference
Annex 3	Legal Text
Annex 4	Redeclaration inside BM Window
Annex 5	Habitat Dispatch Planning Tool
Annex 6	Calculating MDO and MDB, Worked Examples