Balancing Transformation - Storage Stakeholder Group

20 July 2023

ESO

Agenda

10:00 Aims of Today

- *What we'd like to cover and why*

10:10 Options under review

- *Step through each option and get your feedback*
- *We will be using Menti for feedback and Teams for questions/clarifications*

11:10 Recent issues with MIL/MEL redeclarations

- *Advice on current redeclarations*
- *We will be using Teams for questions/clarifications*

11:20 AOB

11:30 Close

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Aims of Today

Grid Code Development Forum (GCDF)

- Next meeting is scheduled for 2 August

- Paper submission for 26 July

Aims

- Get your feedback on the latest options
    - Formal feedback we have received from Tesla and Shell
    - We have a number of "sub-options" on the ideas presented last time
    - A new option for consideration
- Open discussion on redeclarations
    - Give you an update on recent MIL/MEL redeclaration behaviour and get your feedback on possible changes to advice
- AOB
    - Have we missed anything?

Current situation

The "15 minute rule"

- The ESO cannot be sure of the available energy from a storage unit

- To overcome this we use the "15 minute rule"

- The ESO will not issue an instruction beyond 15 minutes and uses the Maximum Import Limit (MIL) and Maximum Export Limit (MEL) to determine the amount of energy that can be safely dispatched

- After issuing an instruction the ESO waits for a redeclaration of MIL/MEL before issuing another instruction

- This advice is contained in the following document [Stacking with BM (nationalgrideso.com)](nationalgrideso.com)

- This rule has a number of shortcomings and so we have received a number of suggestions from industry to address these concerns

Options map for future changes
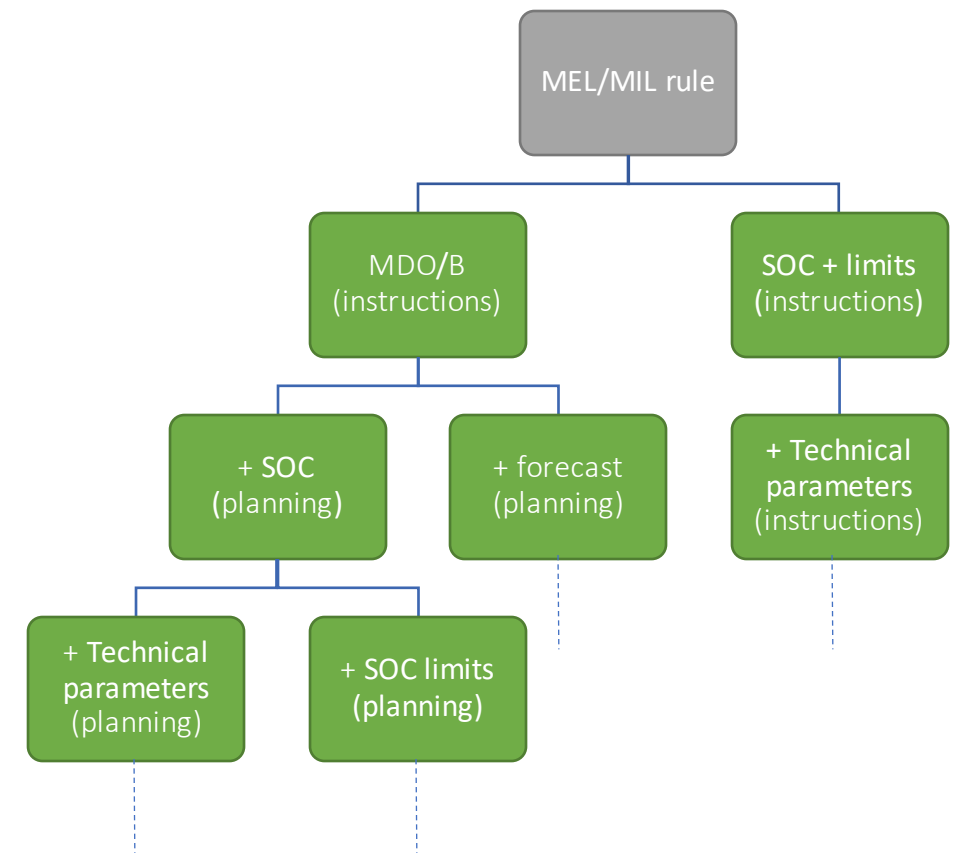
Control room operates on 3 time-frames:
● system planning (48 to 4h ahead or real-time)
● dispatch (4h ahead)
● instructions (a few minutes ahead)

Parameters for instructions
● decoupling from MEL/MIL
● better estimates of asset capability
● more efficient operation

Parameters for system planning
● remove uncertainty in planning

```
                          MEL/MIL rule
                    ┌──────────┴──────────┐
              MDO/B                    SOC + limits
          (instructions)             (instructions)
         ┌─────┴─────┐                    │
    + SOC          + forecast       + Technical
   (planning)      (planning)        parameters
  ┌────┴────┐                       (instructions)
+ Technical  + SOC limits
parameters   (planning)
(planning)
```

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MDO/B – (renamed from MDVE/I)

Maximum Delivery Offer / Bid
- amount of energy available for offers/bids
- time varying parameter?

How it could work:
(1) Asset operator submits MDO/B (e.g. 5/5MWh for import/export from 19:22 to 20:15)
(2) ESO dispatches asset (e.g. 1MWh of export from 19:45 to 19:50)
(3) ESO keeps track of remainder of energy (e.g. 5/4MWh) up to 20:15
(4) Asset operator may update MDO/B to reflect change of SoC (e.g. 6.1/4 MWh from 19:50 to 20:15) or ESO could issue further instructions
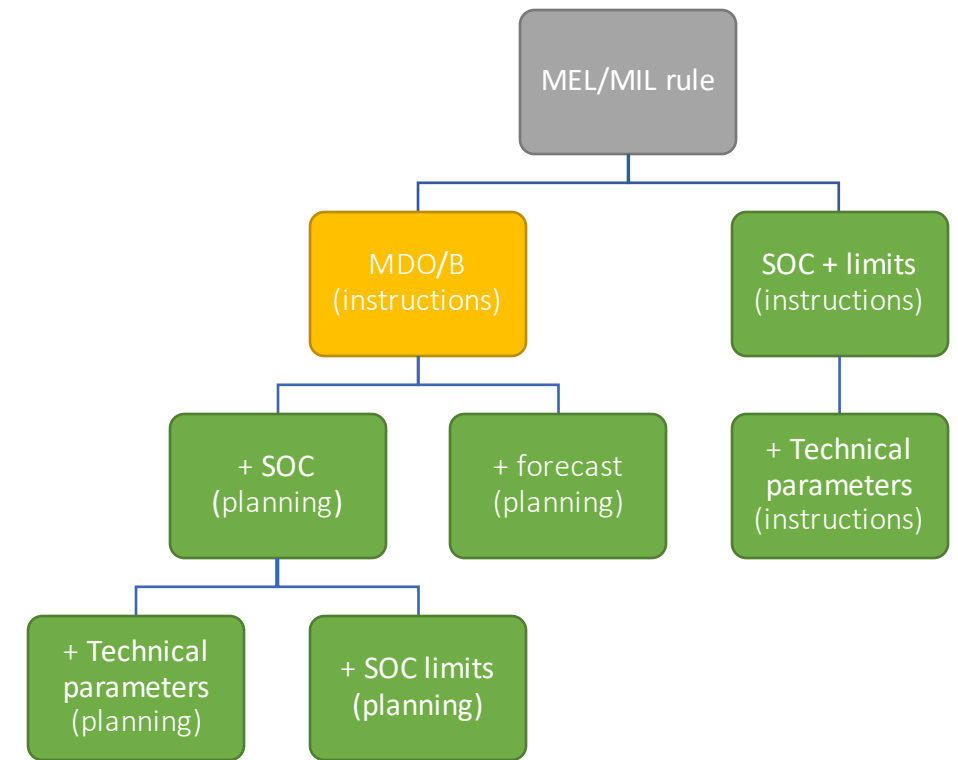
- This approach *decouples energy available from MEL/MIL*
- Allows provider to *indicate available energy for BOAs in the short-term*
- *May accommodate aggregations of storage / non-storage assets*
- *Frequency of data submission on asset charge/discharge dependent on design*

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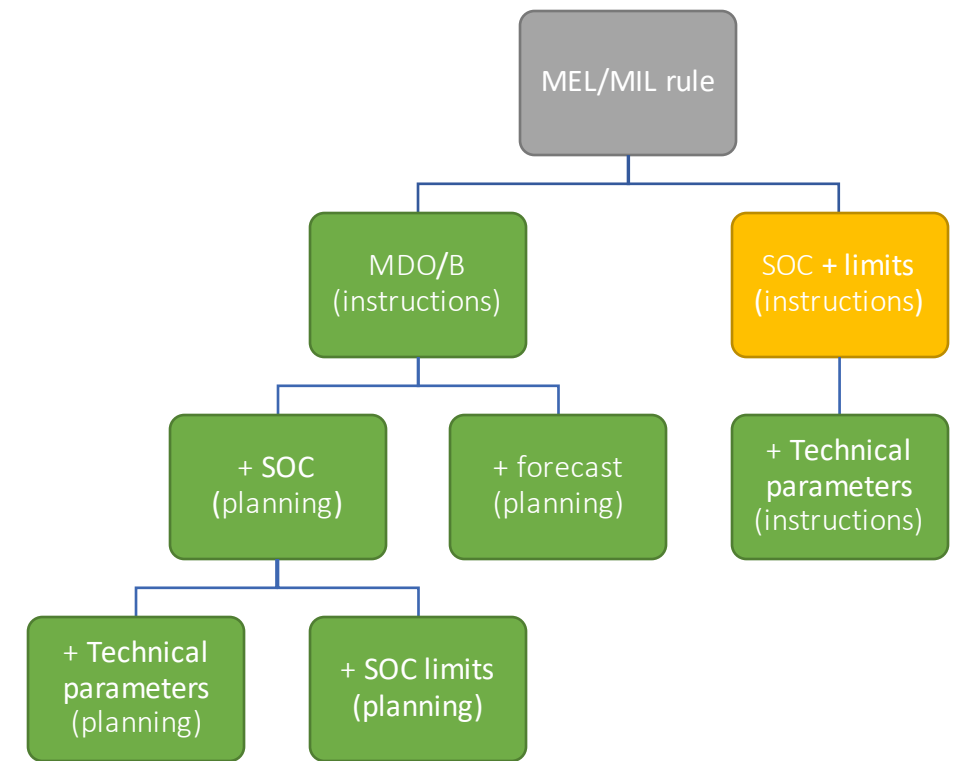# SOC + limits (for instructions)

SOC
- state-of-charge at a given point in time

SOC limits
- bounds within which SoC should remain (similar definitions to MDO/B possible)


How it could work:
- ESO would have a *clear indication of asset capability*
- ESO could infer what is available for bids/offers based on SOC/SOC limits but *requires some assumptions about underlying model that describes a BMU*
- underlying models would have to be agreed with asset operators – *process could get complicated*
- *might not work for aggregated assets*

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Provision of technical parameters

● Parameters may either be used for instructions (would affect BOA volumes) or for planning (rough estimates)

● Possible *confidentiality concerns* – would we need a process for updating outside BM?

● Underlying *models may still not be good enough* (e.g. battery storage has varying efficiency, may have power derated as function of SoC and temperature)
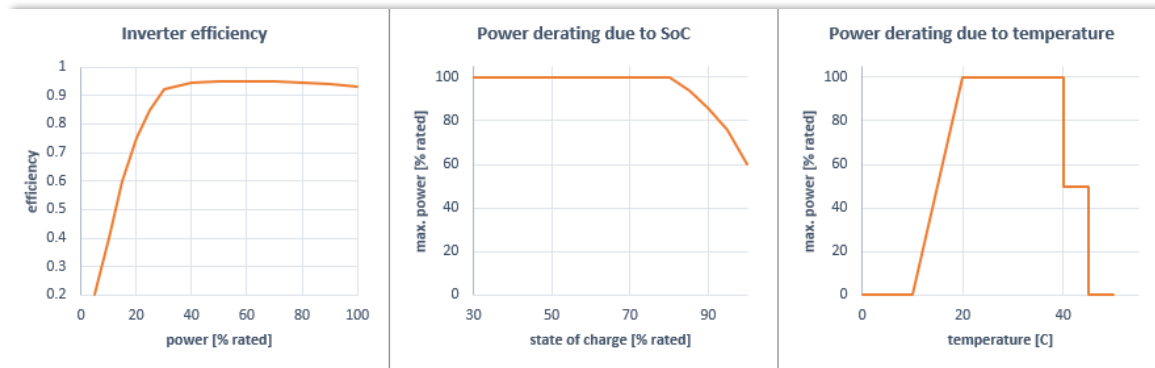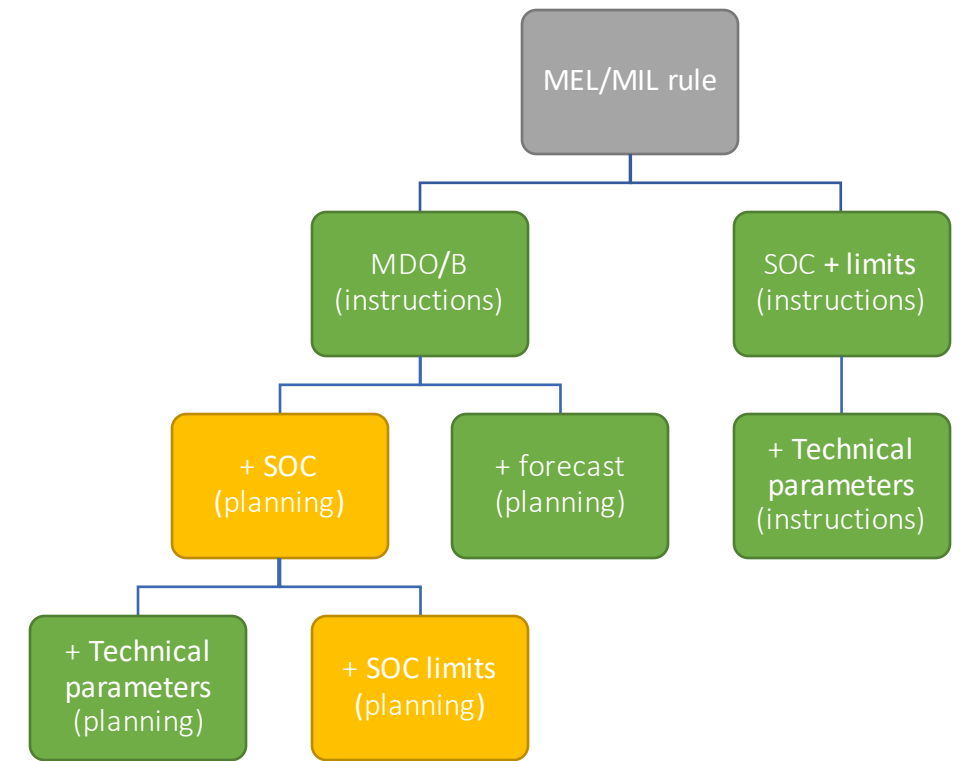

● Different parameters may be relevant for different assets and additional metering data (e.g. storage co-located with renewables or demand response) might be needed to use a model – *ESO handling such complexity might not be possible or appropriate*


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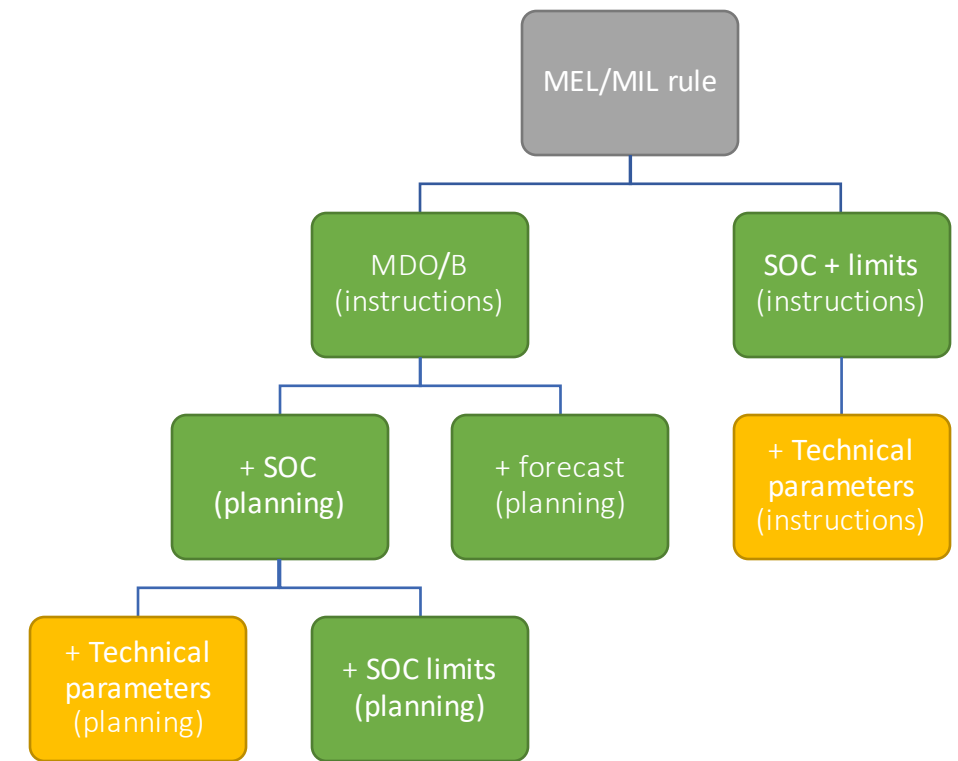
SOC + limits (for planning)

● SOC (to determine current asset state) + SOC limits (within the asset is allowed to move) > ESO assumes asset availability

● Should give the ESO as good as view of possible for asset contractual commitments (e.g. DSO contracts in the future) and restrictions in asset operation arising due to those such commitments

● *Current ESO contracts are already known*

● Even if the limits are accurate the *ESO would have to make assumptions about asset availability in BM*

● Should the ESO be able to schedule assets?

MEL/MIL rule

MDO/B (instructions)

SOC + limits (instructions)

+ SOC (planning)

+ forecast (planning)

+ Technical parameters (instructions)

+ Technical parameters (planning)

+ SOC limits (planning)

Asset unavailable to ensure sufficient energy level for service

Asset doing DC (both ways)

What if asset was utilised?

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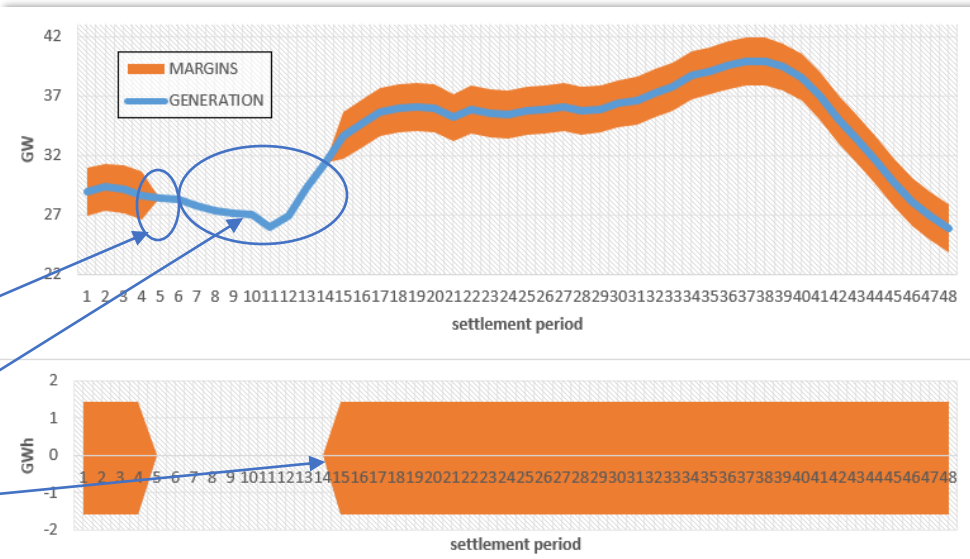
Asset operator forecasts

● In this case asset availability is set based on a best-view forecast from the asset-operator.

● It is reasonable to assume asset operators plan based on price forecasts and estimates on utilisation – *would the forecasts be usable?*
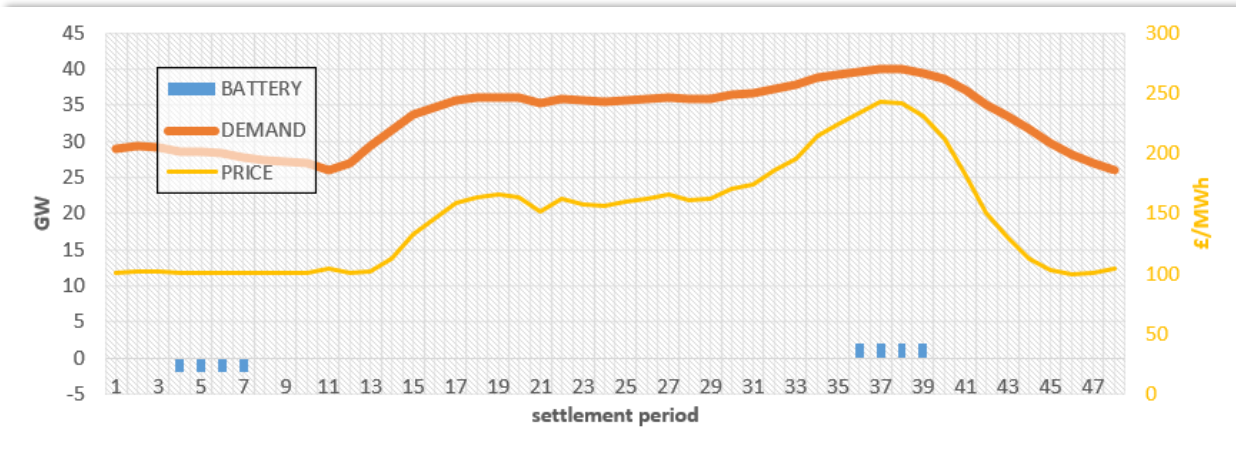
● Challenging to ensure a common derivation methodology (understand underlying assumptions) or check validity of data

● *ESO would still have to make assumptions about whether the asset is available in the BM*

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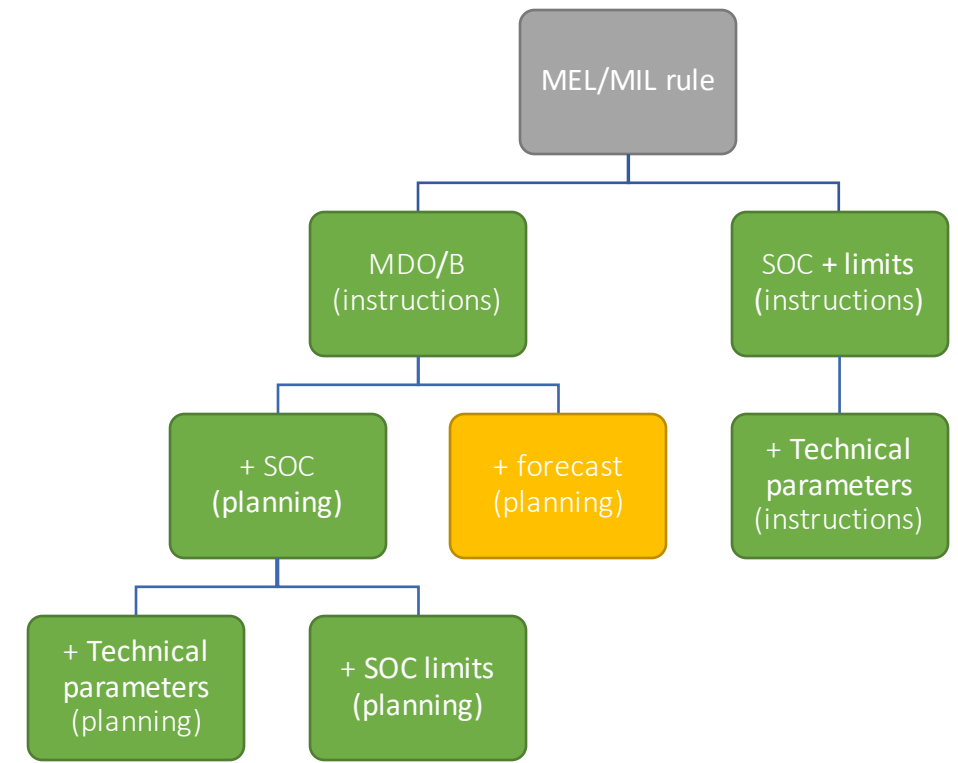
Operational metering (non-EDL) approach

MDO/B or SOC-based data

● receive via SCADA

● data should be sufficient to indicate available energy for BOAs

● duration of time over which energy is available should also be defined (either assumed or via additional data)

● *no concerns over existing comms usage* (EDL)

● possible *concerns over quality of data*

MEL/MIL rule

MDO/B (instructions)

SOC + limits (instructions)

+ SOC (planning)

+ forecast (planning)

+ Technical parameters (instructions)

+ Technical parameters (planning)

+ SOC limits (planning)

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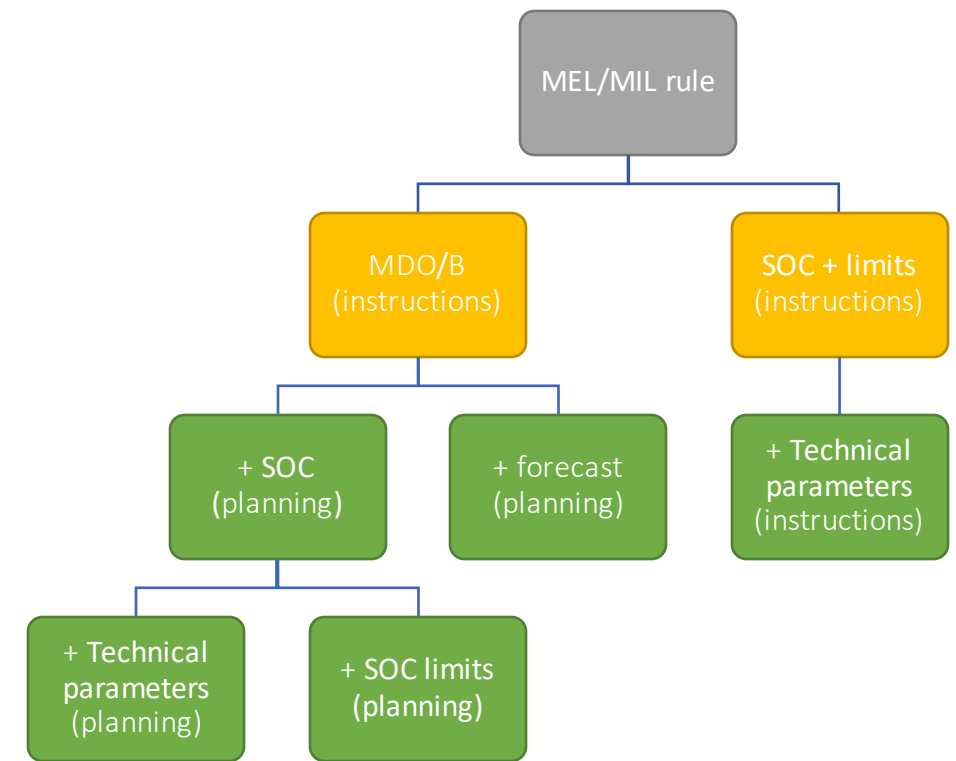
Redeclarations

Battery Post-Instruction Re-Declarations
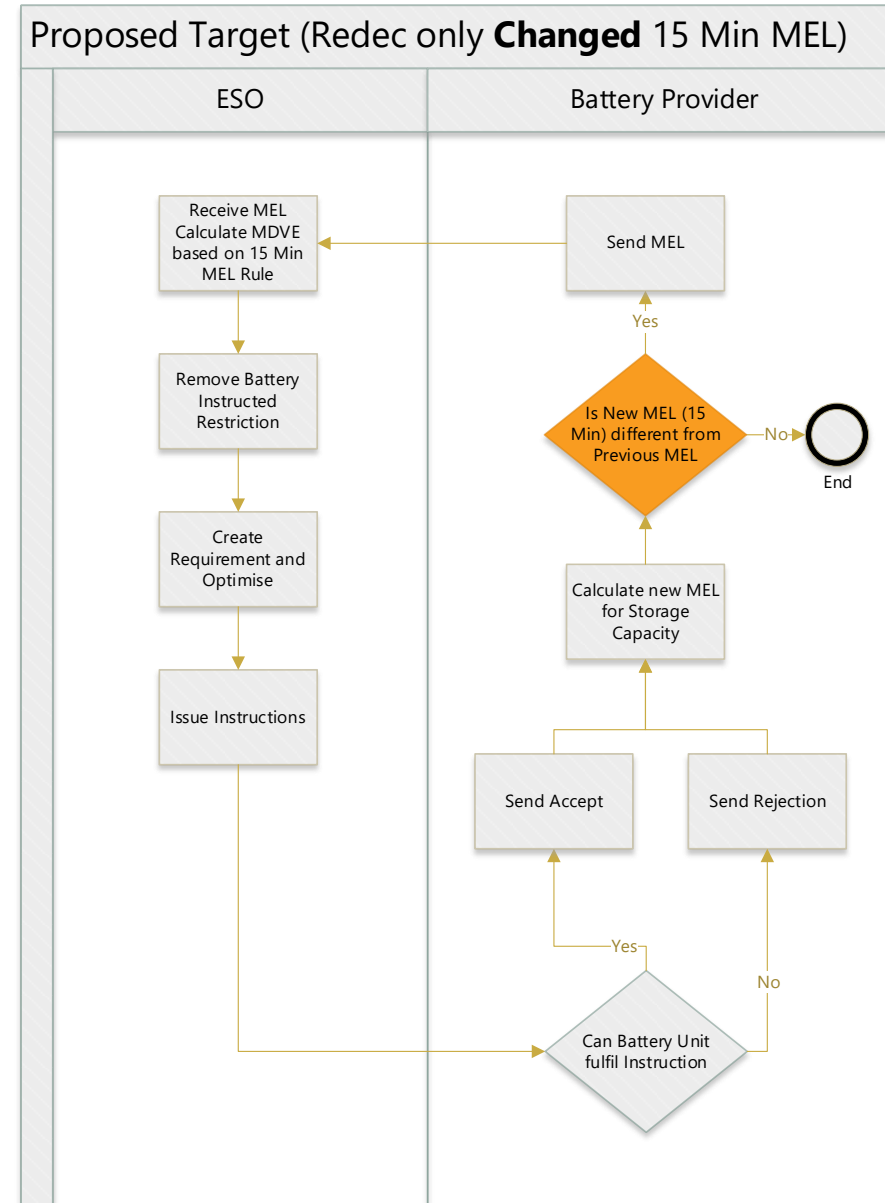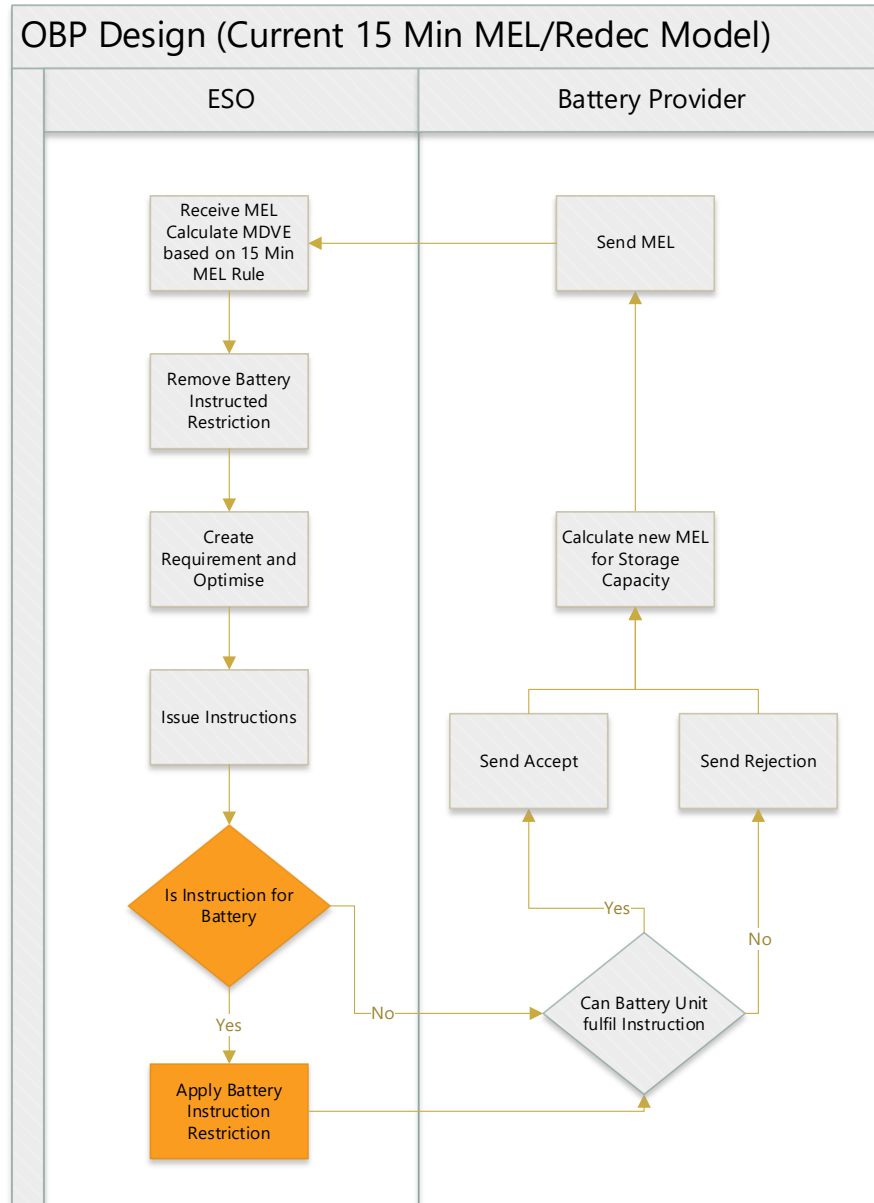
- The current industry and ESO Control Room model to manage battery storage capacity is the "15 min MEL" logic where MEL is specified at a level that can be dispatch for 15 minutes and is used to calculate Max Del Volume/State of Charge

- As part of this model, battery providers are expected to re-declare after each instruction to confirm capacity, even if their capacity may (continue to) exceed the MEL/15 min value

- Until the re-declaration is received, Control Room would not be sure that battery units would be able to fulfil a future BOA and should not be utilised, and OBP has implemented logic to mimic this action i.e., OBP would not consider instructed battery units until the re-declaration has been received (even if MEL may subsequently not change)

- Therefore, in the **OBP design, a battery unit that has received a BOA must re-declare its MEL before OBP will include it another Optimisation run** (even if the MEL does not change)

- Given OBP will likely deliver increased number of smaller instructions, there will be an increase in re-declarations, even though the calculated capacity will be unchanged in many cases. This will cause unnecessary load on providers, EDL integration and ESO systems

- Working proposal is to change the industry model such that Battery providers only send a MEL redeclaration if the capacity has changed such that the "15 min rule" MEL value needs to be updated. Control Room and OBP will operate to the existing MEL until a new MEL is received. Advantage is that batteries are continually available for Control Room

- If a reduced MEL redeclaration has not been received, and a BOA is issued for the original MEL calculated capacity, then provider would be expected to reject the BOA

- **Note – this is a tactical option and seeks to address a current issue with the "15 minute rule"**

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Battery Post-Instruction Re-Declarations (Current v Proposed)

OBP Design (Current 15 Min MEL/Redec Model)

ESO	Battery Provider

ESO:
- Receive MEL Calculate MDVE based on 15 Min MEL Rule
- Remove Battery Instructed Restriction
- Create Requirement and Optimise
- Issue Instructions
- Is Instruction for Battery (decision)
  - Yes → Apply Battery Instruction Restriction
  - No →

Battery Provider:
- Send MEL
- Calculate new MEL for Storage Capacity
- Send Accept / Send Rejection
- Can Battery Unit fulfil Instruction (decision)
  - Yes → Send Accept
  - No → Send Rejection

Proposed Target (Redec only Changed 15 Min MEL)

ESO	Battery Provider

ESO:
- Receive MEL Calculate MDVE based on 15 Min MEL Rule
- Remove Battery Instructed Restriction
- Create Requirement and Optimise
- Issue Instructions

Battery Provider:
- Send MEL
- Is New MEL (15 Min) different from Previous MEL (decision)
  - Yes → Send MEL
  - No → End
- Calculate new MEL for Storage Capacity
- Send Accept / Send Rejection
- Can Battery Unit fulfil Instruction (decision)
  - Yes → Send Accept
  - No → Send Rejection

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Q&A

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Q&A and feedback from meeting attendees

Q: Could we have a reminder of the current "15 minute rule"?
A: The rule is expressed in section 2 of this document.

Q: How often would MDO/B and/or SOC + limits need to be updated? Several variations of this question, looking at different combinations of service provision and other changes.
A: Up to the provider – ESO would assume that they are eroded by instructions/response provision, but (at least under the default option) would wait for the provider submission to see how much energy was made available in the opposite direction.

Q: Would MDO/B and/or SOC + limits be changeable post-gate closure?
A: This is our working assumption.

Feedback: having these parameters (MDO/B or SOC/limits) time-varying is likely to cause headaches during periods of charging/discharging.

Q: Who would take responsibility for any submission errors?
A: Responsibility for submitting accurate data would sit with the provider.

Q: Will EDL be upgraded to support increased quantity of submissions?
A: Yes, these upgrades to EDL are currently planned for Q4 2024. EDL is currently the primary option for submitting this data.

Q: Would BDO logic be enhanced to include MDO/B?
A: Yes (this already exists with a proxy value estimated from MEL/MIL).

Q: Could we have price banding by SOC instead of/as well as by power?
A: This is currently outside of our scope.

Feedback: having these parameters (MDO/B or SOC/limits) time-varying will be essential in order to provide accurate data.

Feedback: either approach will help with scalability of storage provision.

Q: What sort of granularity would be expected for new data?
A: ESO expectation is that up to 1 minute granularity would be made possible, but not mandatory.

Q: What is ESO's intended approach to capturing the variability in deliverable energy with eg power output?
A: Multiple options were talked through in this presentation, ESO is still seeking feedback and considering this question.

Feedback: If BOD can't be updated at the same frequency as MDO/B/SOC, commercially this will restrict the volume that can be made available.

Q: Will increasing charge and decreasing discharge (or vice-versa) be considered equivalent by ESO?
A: Yes.

Feedback: (from several sources) any modelling assumptions ESO makes must be transparent and public.

Q: Will ESO still make adjustments to availability declarations based on internal assumptions about technology/asset type etc?
A: Where necessary we will fall back on this, but our end goal is to reach a point where this is never necessary.

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Q&A and feedback from meeting attendees

Q: Could the MDO/B/SOC limits parameters be used to effectively withdraw/reserve capacity for other purposes?
A: In the meeting we replied "yes" but post the meeting we have been informed there have been recent policy discussions in BSC Issue Group 98 that we need to take into account. We will look into this before the next Forum.

Q: This seems to contradict a statement by OFGEM in a previous open letter that dynamic parameters must be technical.
A: As per the above answer we will investigate how this impacts this option ahead of the next Forum.

Feedback: regardless of answers to the above, energy reserved for a service (eg response) would need to be able to be held back from BM.

Q: Would ESO dispatch use multiple batteries in sequence to fill a longer requirement, if economic?
A: Yes
Q: Would this still be in simple price order or would ESO prioritise fuller assets in order to retain reserves?
A: Where margin levels are tight, ESO will factor reserve management into dispatch-making in order to maintain system security.

Feedback: ESO proposals focus very heavily on batteries rather than considering the full range of storage technology.
A: We are trying to develop proposals that are technology-agnostic, however, accept the feedback that today's presentation had a strong emphasis on batteries, and will try to be more neutral going forward.

Q: Would there be a penalty for submitting incorrect information?

A: We don't plan to request one at this time but we expect parties to follow best industry practice.

Q: Is ESO happy with providers raising SOC limits eg in the event of very high prices?
A: Need to check this internally.

Q: How many true aggregated assets are there?
A: The definition of true aggregated assets is vague, depending on the definition, it's between 50 – 80.

Feedback: (from several sources) ESO modelling storage units directly seems like a much more complicated option. Onus should be on providers to deliver a clear signal.

Feedback: Surprised that ESO modelling units directly is considered a "clear indication" – SOC predictions are highly variable.

Feedback: Dispatch rationale transparency is essential to enable providers to correctly gauge how their submissions will be used.

Feedback: Energy availability in planning timescales would be greatly improved if there were proper compensation for availability.

Q: Are there plans to procure Quick Reserve within-day/on a more granular basis?
A: This is outside the scope of this programme. Please consult the Markets Roadmap.

Feedback: (from several sources) Storage technical parameters can change even in the short term.

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Q&A and feedback from meeting attendees

Feedback: Voluntarily submitted available energy forecast seems much more doable and more valuable than forecasted SOC.

Q: On what platform would available energy forecasts be published?
A: ESO intend to publish forecasts but the platform has yet to be determined.

Feedback: ESO should not be able to schedule storage assets, this is up to the asset operators – if ESO wants to lock in margin, this should be paid for via an appropriate service.

Q: Without any ability to plan in advance, would ESO continue to not rely on storage assets to provide margin?
A: Our long-term intent is for the Reserve markets to be the primary route for margin procurement.

Feedback: If MDO/B are not meant for planning, do they really need to be time-varying?

Feedback: Predicted SOC is too divorced from reality to be useful in planning timescales.

Feedback: Using Operational Metering to submit SOC/MDO/B would limit us to a real-time value only which would be less useful.

Feedback: If parameters were submitted via Operational Metering, it could limit the transparency of the data.

Q: Are providers entitled to reject a BOA on grounds of deliverability? BC 2.7.3 seems to indicate that it's safety or consistency grounds only.
A: Please refer to the definition as stated in BC 2.7.3.

Q: For the proposed new MEL/MIL rule: Say MELS were 100MW. You dispatch a 50MW BOA for 10 minutes. What is your assumption for the next 15 mins? What is your assumption after that?
A: As per current published process, we would not utilise the storage unit until a new MEL redeclaration is received. The proposed new MEL/MIL rule is for a redeclaration only if the MEL value changes, otherwise, ESO would "re-use" the 100MW MEL calculated 25MWh value on a subsequent run.

Q: For the proposed new MEL/MIL rule: What assumption will ESO make about energy available between MEL/MIL submissions?
A: The proposed MEL/MIL rule would "re-use" the same MEL/MIL calculated value for max usable capacity on each run, unless a new MEL/MIL is provided.

Q: Can you confirm whether the new "battery zone" will be in OBP release 1 this December?
A: The battery zone has been included in our December 2023 release.

Q: What email address should we send further questions/feedback to?
A: box.balancingprogramme@nationalgrideso.com

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