GCDF – New parameters for Storage

02 Aug 2023

ESO

Background

The Balancing Programme

- The ESO has initiated a programme to update the tools and capabilities within the control room in readiness for net-zero operation
- Details of the programme can be found at the following location Balancing programme | ESO (nationalgrideso.com)
- The programme holds quarterly face-2-face reviews (all are invited to attend)
- In addition, the programme has been holding a number of forums that meet on a more regular basis to discuss specific topics
- One forum covers Storage – we have held six meetings to date and the forum has 80 signed up members
- From this forum there have been a number of suggestions for new parameters that can be used to optimise the dispatch of Storage units
- Today we would like to take you through the discussions held to date

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)
- 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:

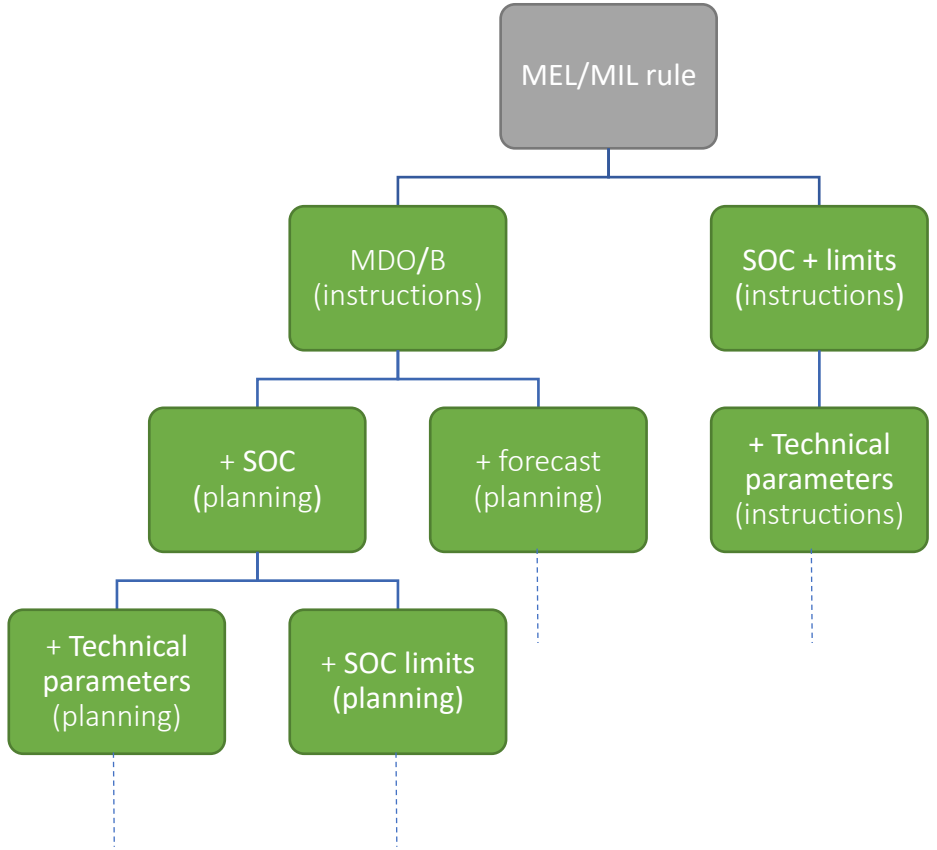
- system planning (48 to 4h ahead or real-time)
- dispatch (4h ahead)
- instructions (a few minutes ahead)

Parameters for instructions

- decoupling from MEL/MIL
- better estimates of asset capability
- more efficient operation

Parameters for system planning

- remove uncertainty in planning



MDO/B – (renamed from MDVE/I)

Maximum Delivery Offer / Bid

- amount of energy available for offers/bids
- time varying parameter?

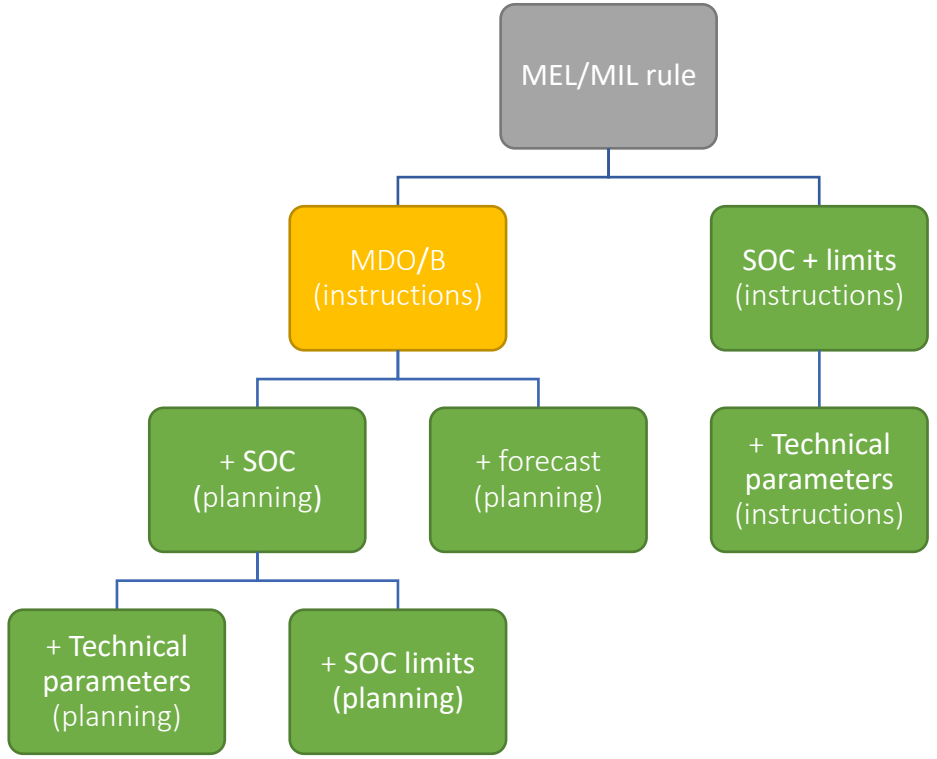
How it could work:

(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



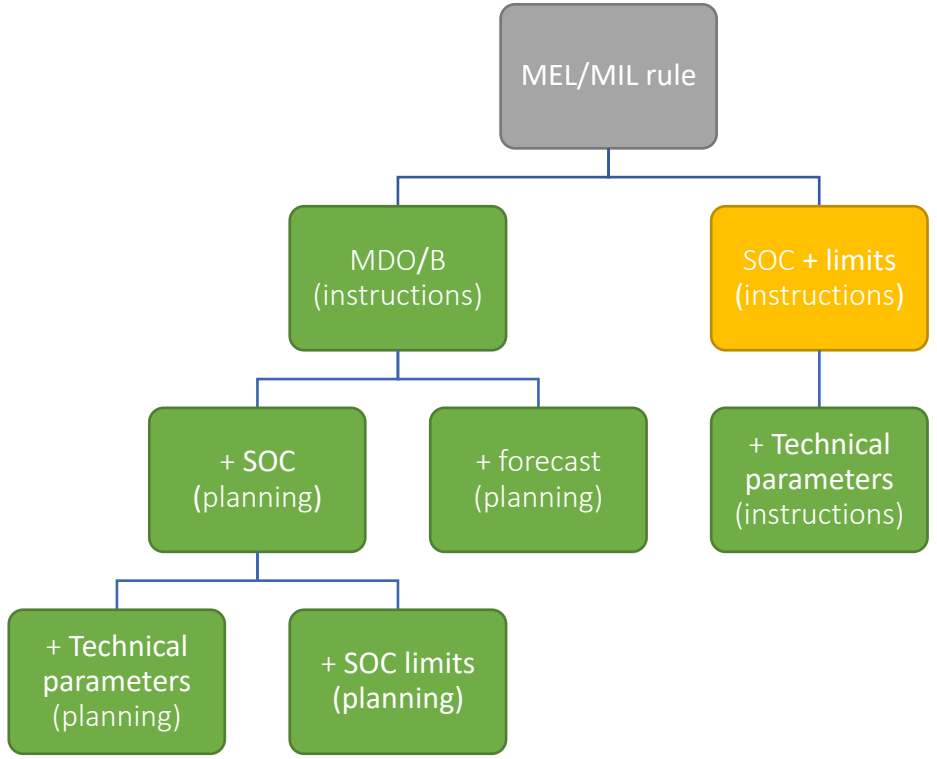
- This approach *decouples energy available from MEL/MIL*
- Allows provider to *indicate available energy for BOAs in the short-term*
- *May accommodate aggregations of storage / non-storage assets*
- *Frequency of data submission on asset charge/discharge dependent on design*

SOC + limits (for instructions)

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

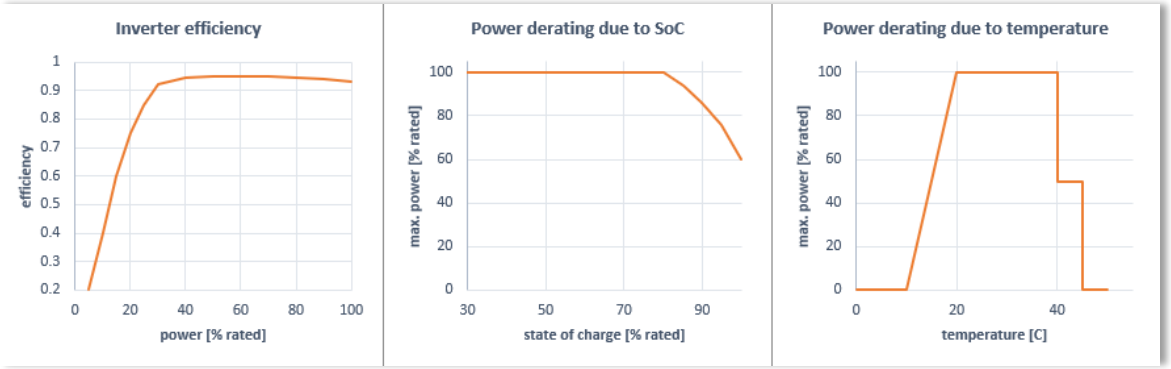
SOC limits
- bounds within which SoC should remain (similar definitions to MDO/B possible)

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*

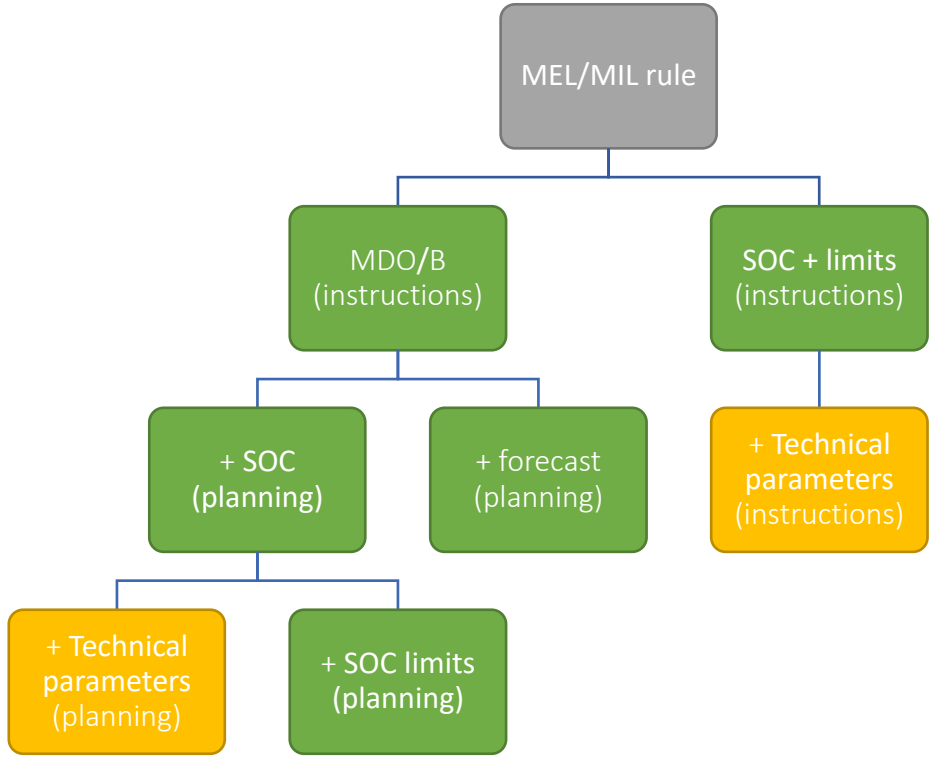


Provision of technical parameters

- 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)

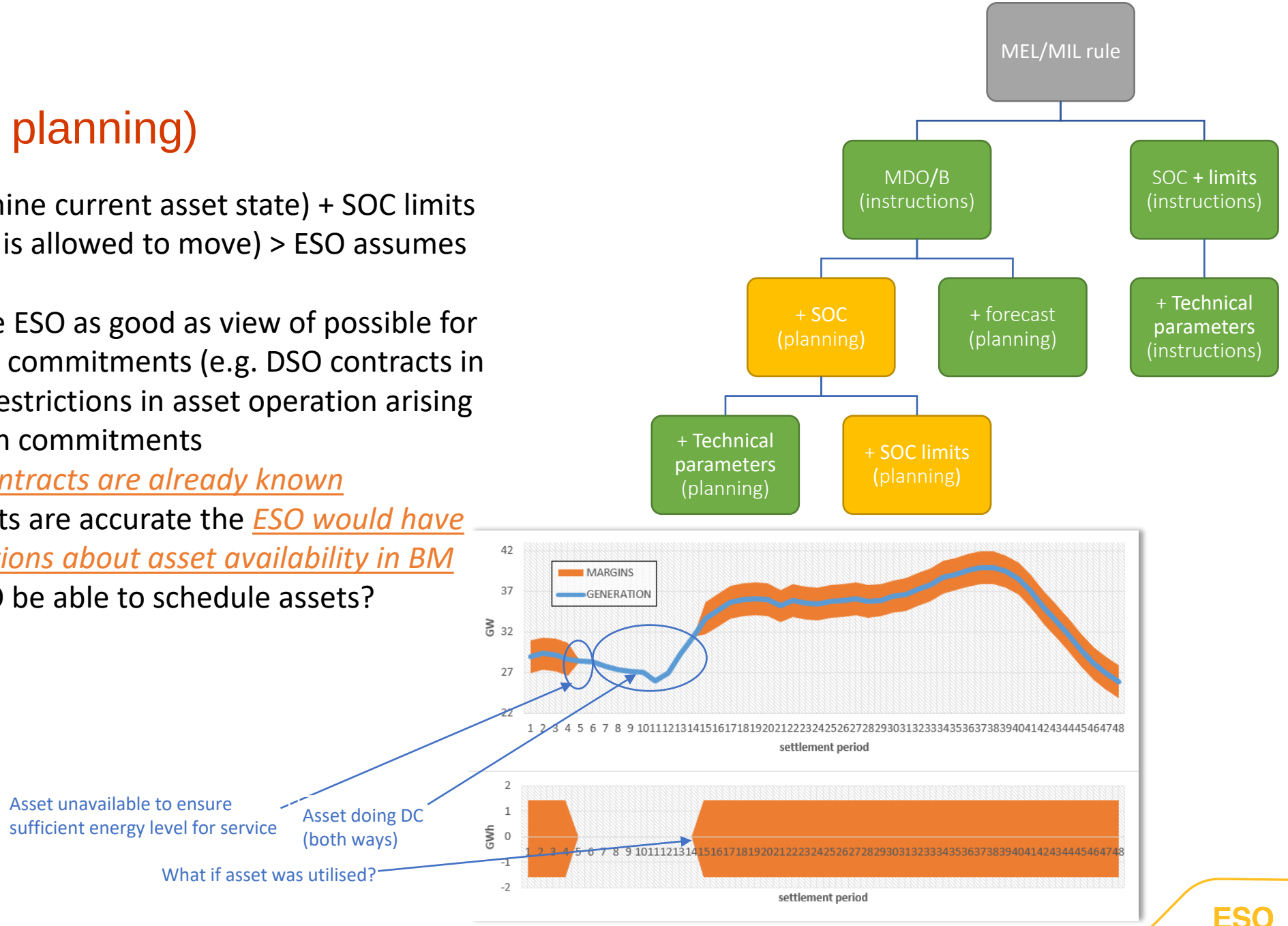


- Different parameters may be relevant for different assets and additional metering data (e.g. storage co-located with renewables or demand response) might be needed to use a model – *ESO handling such complexity might not be possible or appropriate*



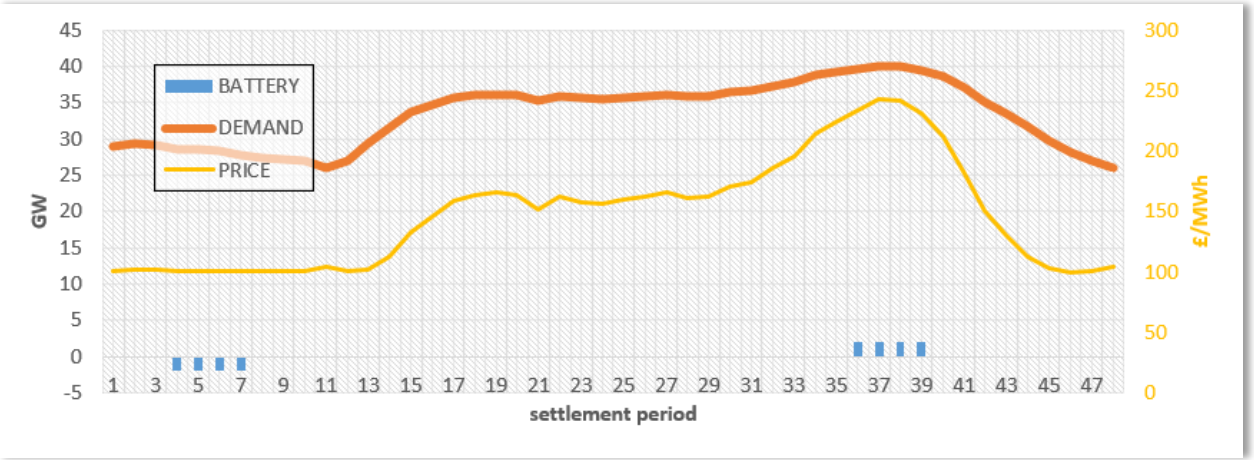
SOC + limits (for planning)

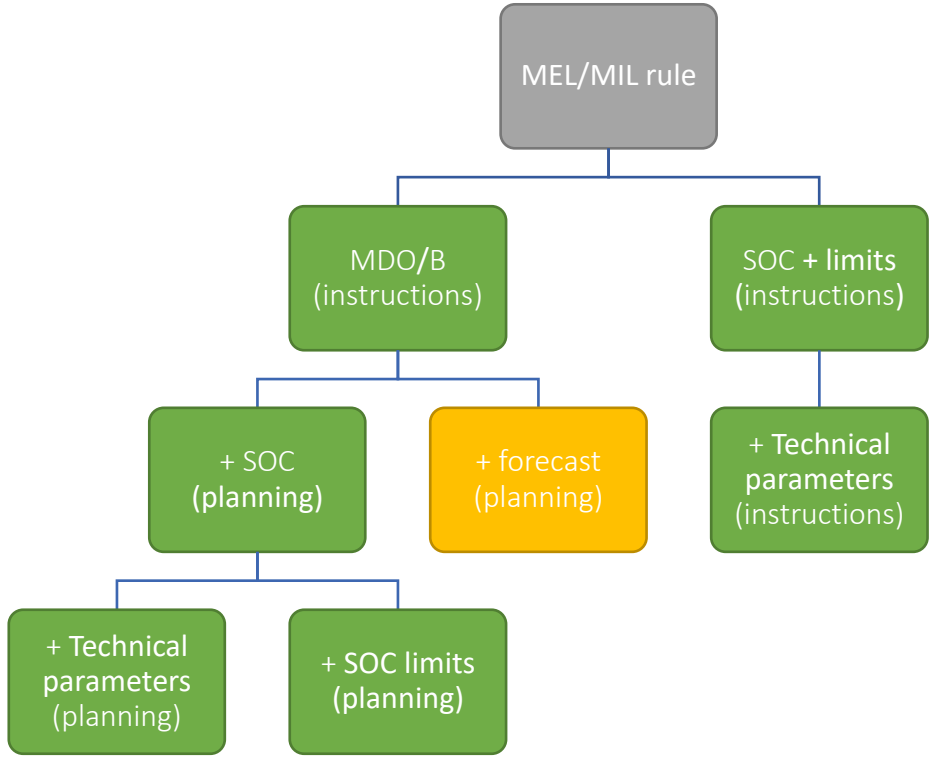
- SOC (to determine current asset state) + SOC limits (within the asset is allowed to move) > ESO assumes asset availability
- Should give the ESO as good as view of possible for asset contractual commitments (e.g. DSO contracts in the future) and restrictions in asset operation arising due to those 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?



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?*



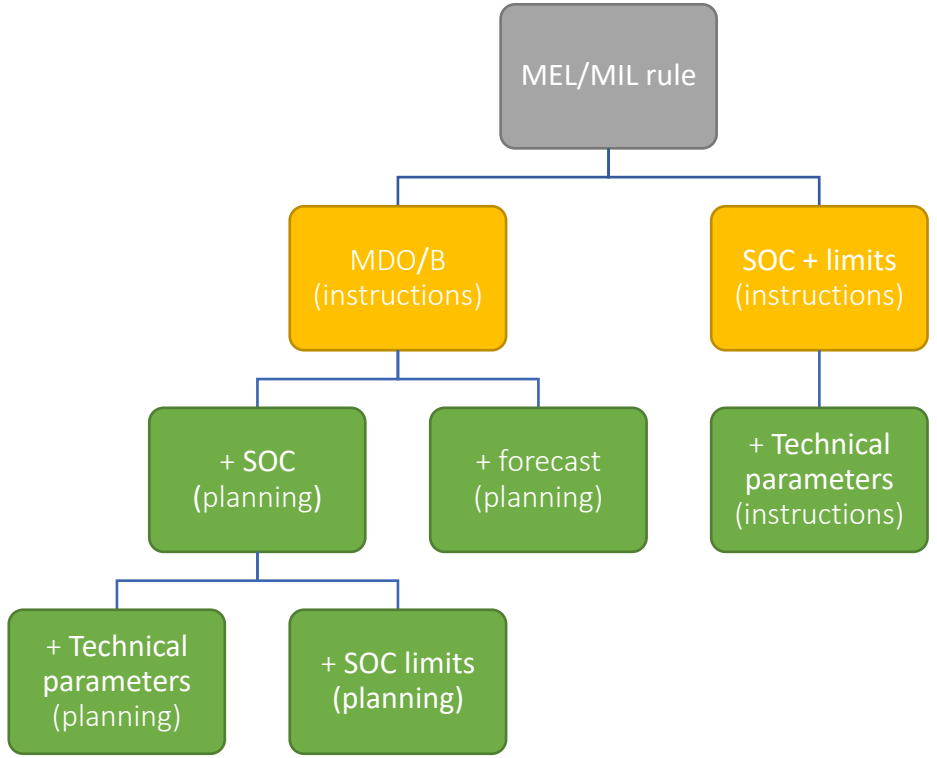


- Challenging to ensure a common derivation methodology (understand underlying assumptions) or check validity of data
- *ESO would still have to make assumptions about whether the asset is available in the BM*

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*



Next Steps

- Take back and consider the feedback you have given today
- Replay this discussion to our Storage Stakeholder Forum
- Determine if we have enough information to start a Grid Code Change Process

GCDF – Increase in the number of instructions

02 Aug 2023

ESO

Background

The Balancing Programme

- The ESO has initiated a programme to update the tools and capabilities within the control room in readiness for net-zero operation
- Details of the programme can be found at the following location [Strategic capability review | ESO (nationalgrideso.com)]
- The programme holds quarterly face-2-face reviews (all are invited to attend)
- The first production release of our new IT platform, called the Open Balancing Platform (OBP), is due on 15th December 2023
- This provides the control room with a new capability called Bulk Dispatch Optimisation (BDO)
- It is our intention that BDO will be applied in two zones – the “Small BMU Zone” and the “Battery Zone”
- BDO will automatically create instructions to meet a given zonal target MW and so we are expecting an increase in the number of instructions to those BMUs that are in these two zones
- Initially, there will be no change for BMUs in any other zone
- However, in future releases we would hope to include more zones covered by BDO
- Today we would like your feedback on the increase in the number of instructions and would this cause you any issues

Maximum number of instructions

BDO has been designed to handle the following non-functional requirements

	Maximum taking into account down stream systems (such as existing EDL)	Theoretical maximum (to be tested without downstream systems)
Number of instructions per BDO run	300	1000
Maximum rate of sending instructions	5/s	25/s
Limit of the total of inflight instructions	100	300

- It is highly likely that the actual number of instructions will be less than this per BDO run
- Actual numbers will be determined during testing and fine-tuning over the next few months

Next Steps

- Request that you share these figures with your software providers
- Provide feedback to the ESO on the capabilities of your IT systems
- ESO to evaluate if some BMUs should be left out of a zone so that BDO will not automatically instruct them (instead we will use existing manual processes)
- ESO to share test results via our Optimisation Stakeholder Forum

Dynamic System Monitoring (DSM) Project

August 2023

ESO

Dynamic System Monitoring (DSM) Project

Background

- ESO needs to monitor the performance of service providers (e.g. generators) on the grid in order to carry out post fault analysis, manage network risk and verify compliance. There is an increasing need to evaluate the providers' dynamic behaviour during system event.

- The difficulties in accessing data creates a risk for ESO to investigate events adequately. Requiring data manually without an established system following a system event or fault, this could result in delays, and missing data when investigating system issues.

Future Expectation

- A new system is needed for the ESO to seamlessly access DSM data from transmission connected generators and interconnectors within 24 hours of identifying a fault event anywhere in England, Wales and Scotland.

- The recommended strategic solution is to securely link all the known and future DSM devices for all generator units that are directly connected to the transmission network to a central system that is owned and maintained by ESO.

Next Steps

- ESO would appreciate opinions form the grid code users before establishing the new data collection system
- Questionnaires to be sent out to all the grid code users to collect :
  a. their installed DSM units' information (e.g. settings, status and accessibilities)
  b. their preferences of data collection

Current Status

No uniform data collection method through the whole network. Under some circumstance, ESO has to request service providers to provide data manually for post fault analysis.

Potential Future Options

Providers to upload DSM data to file sharing system e.g. sharepoint or data portal

Replace existing system with supported system and bring under ESO's control – expand network coverage to link all direct connects

➡ Based on the feedback received through questionnaires, ESO will put forward a proposal for the optimum method to access and acquire recorded data from these DSM devices.