Dynamic Moderation & Dynamic Regulation

Output summary - technical workshops

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nationalgridESO

Contents

1. Performance monitoring

- **DM** – requirements for DM are the same as DC at 20Hz

	System need	Options	Impact of options	Recommended option
Performance monitoring - DR	To ensure service delivery compliance with respect to speed of response, adherence to the delivery profile and ramp rate limits	**20Hz**	- Provider view: seems excessive, could be a barrier for non-battery assets - Provider view: consistency is fine, same as DC so no issue - ESO: we don't require this amount of data for a slower service	1Hz, possibly move to 2Hz in the future
		2Hz	- ESO: better for data granularity - consider this for the future	
		1Hz	- ESO: providers already have this metering in place for other services so wouldn't incur additional costs - ESO: part of the initial design for Reserve – standardise metering - ESO: this is enough data to complete performance monitoring	

1. Performance monitoring – feedback from workshops

20Hz (DC is 20Hz)

- *Useful to keep consistent with DC at 20Hz e.g. easier to report for all products at same granularity*
- *20Hz is not an issue*
- *We could move to even higher granularity than 20Hz very quickly at low cost. The ESO has been signally increased speed for a long time, and we have invested to meet that need*
- *Prefer 20Hz as already used for performance monitoring by our system*
- *If assets are joining that already do DC then 20Hz is fine*

2Hz

- *Wouldn't be hard to move to 2Hz as already have capability from testing at 10Hz as part of FFR*
- *Appreciate it would cost more for smaller, aggregated assets*

1Hz

- *Prefer 1Hz as already used for performance monitoring by our system*
- *The minimum necessary. It should be proportionate to the response time.*
- *1Hz should be sufficient granularity for a 10s response service. 20Hz would typically add unnecessary costs and delays to replace measurement transducers*
- *If assets are purpose built for DR then 1Hz is key*
- *1Hz with a view to move to 2Hz - we'd like to see timelines for planning*

2. Bundling procurement

	System need	Options	Impact of options
Procurement of DM & DR	To keep the frequency as close as possible to 50Hz pre-fault, to maximise the availability of all response services post fault for a loss in either direction **DR** - The system need is symmetrical, the service is designed pre-fault to correct small deviations around 50Hz **DM** - Sudden imbalances of generation in demand (such as demand pick ups, or gusts of wind) happen frequently in both directions and therefore the need is symmetrical	**DM - Bundle LF and HF**	- Provider views: No preference / in favour of bundling - ESO: limits participation – wind etc. - ESO: impacts Clean Energy Package Article 6(9) - ESO: increases procurement – increases available volume by putting HF and LF together - ESO: meets the system need
		DR - Bundle LF and HF	
		DM - Split LF and HF	- Provider views: No preference / preferably don't bundle - ESO: introduces significant changes in power flows dependent on frequency could lead to undesirable consequences, including more onerous controls on locational procurement in mitigation - ESO: may have to impose limits on how much we procure in separate areas - ESO: lead to increased complexity of procurement and other inefficiencies - ESO: impacts Clean Energy Package Article 6(9)
		DR - Split LF and HF	

2. Bundling procurement – feedback from workshops

Bundling procurement

- *Bundling would make sense for DM as will lead to more efficient and lower costs for the batteries – DR is less likely to be provided by a battery, it is not as important to be able to bundle*
- *Auction simplicity – require complex clearing structure for stacking 3 products together – from that perspective, advantage to bundle*
- *Bundling as an option at the point of the auction or contracting and not mandatory*
- *DM High, DM Low and DM (bundled) surely all need to be considered as the capability is dependent on the day-ahead auction outturn*
- *For DR, bundling makes more sense*
- *Strong preference for bundling to be available as an option for each service*
- *DM and DC could be bundled as they operate in different frequency bands but have the same response times*
- *NOT bundling can also limit participation/value of bi-directional assets*
- *Unbundle DR and bundle DM – this balances the need to encourage price discovery with the acknowledgement of the likely participation of each service (storage offering symmetrical in DM, multiple technologies in DR offering asymmetrical & unbundled) - would allow shorter duration batteries a way to offer into services with longer duration requirements*

Split procurement

- *Preference for split service to enable wind to be more competitive*
- *Prefer split - bundling would limit amount of power to provide if had to keep symmetrical – some sites have a different import and export limits – could lead to curtailment and inefficiencies*
- *Wind – easily provide HF but to provide LF as well it would have to be constrained to provide headroom – be expensive*
- *It would be important to keep DM split as LF & HF*

3. Duration of energy limited assets

	System need	Options	Impact of options
Duration of energy limited assets - DM	We need to make sure duration is long enough to meet system needs for an event	**30 minutes**	- Provider view: this service would be thermally really difficult for my batteries to deliver - ESO: in comparison to DC, DM would need to activate before and after as well so therefore it will need to be more than 15 minutes - ESO: aware that batteries are tested for 30 minutes at maximum capacity in FFR - ESO: may be an issue with warranties
		15 minutes	- ESO: same as DC - ESO: not a possible option for DM due to the need to activate before and after the event in comparison to DC - ESO: in the future, we could possibly reduce to 15 minutes
Duration of energy limited assets - DR		**60 minutes**	- ESO: this would require double the amount of DM because it is the most activated service - ESO: there is a risk that batteries stop delivering after 60 minutes even though the event is still ongoing

3. Duration of energy limited assets – feedback from workshops

DM

30mins

- *30 mins – feasible for batteries*
- *Up to 30 minutes duration is suitable (prefer 15 mins)*
- *We don't see any issue as this is similar to FFR. It does require a good tech build to support it so advance notice welcome*

15 mins (DC is 15 mins)

- *15 mins seems the best option - more volume could be procured if needed*
- *15 minutes will maximise participation, a 30 minutes requirement would potentially reduce the volume offered from a 30minute BESS*
- *Keep durations the same for ease of service stacking*
- *Strong preference to keep the services with the same durations*

DR

60mins

- *Seems excessive given quick reserve*
- *Would be a significant barrier to entry*
- *60 mins battery – thermal issues – would need to de-rate power especially in the hotter months with aggregated assets*

Other

- *Duration is a trade off against MW, so it is important that the service is correctly adjusted 'tuned' to the response requirement*
- *System stability requirements should not be missed in order to increase participation - this would restrict realisation of value of longer-duration storage assets*

4. Warranties – feedback from workshops

Concerns

- *Concerned about temperature issues due to the higher demand at lower frequency deviations - need to do testing to determine how much of an issue this will be*
- *Utilisation of the service for a 1 hour battery would be very high, might be a challenge to deliver it to a battery's full potential due to the warranty of the battery*
- *DR test – average of c2.2cycles/day – warranties don't typically cover this level of cycles/day – longer duration assets (or reduced power) would be required*

No issues

- *Not an issue if providers can stack products efficiently*
- *The warranties may be sufficiently flexible if the expected usage is well understood*
- *No issues - DR throughput will be similar to FFR which is within most warranties*
- *No issues - not all energy storage tech shares Li-type throughput-based warranty restrictions/costs*

5. Stacking – feedback from workshops

- *It would seem sensible to set up to stack to future proof the products*
- *Getting the stacking rules working well is crucial for reducing the cost to the final consumer*
- *Batteries can provide DR cheaply by stacking with DC/DM. To have dedicated DR units will be very expensive*
- *Stacking droop curves of the different products is easy to do. Stacking different response/ramps/delay times is much harder*
- *Yes; ideally to maximise allowed asset capacity factor; to address stacking at different periods vs stacking within periods vs stacking within capacity*
- *Stacking is a good plan, particularly DM and DC*
- *Yes, stacking should be allowed if feasible and we would try to stack across as many services as possible. Stacking should allow for the most efficient possible use of the asset*
- *Stacking - yes we would stack as much as possible (we can tag response MW from one service and/or another)*
- *Efficient stacking will allow the participants to suit each assets individual technical capabilities (and warranties limits) to a particular combinations of services. If designed correctly this will unlock value across the services, and lead to the lowest costs for consumers*

6. Optimising procurement – feedback from workshops

Day 1

- *Support learning by doing approach – staggered interim solution to gain learnings will be useful to get to desired end state*
- *Appreciate simultaneous auction would require a lot to be in place for day 1 – staggered is a good starting point in order of hardest to fill, most valuable first*
- *We suggest for Day 1, the auctions take place after the results of the DAH power auctions in order of value i.e. DC, DM, DR, Quick Reserve and Fast Reserve. NG should also explore a simultaneous auctions ahead of defining IT solution*
- *How will work with quick reserve – order the sequence e.g. DC, quick reserve, DM then DR*
- *These need to happen after 11:00 day-ahead following the result of the hourly day-ahead power auction (otherwise set points, PNs and ultimately capabilities will not be known)*

Ideal state

- *Simultaneous auction – works well in New Zealand*
- *Flexible auction timings is key in ideal state*
- *The auction design will determine the efficiency of stacking different products. Ideally, providers state their capability and price for each and the clearing algorithm determines what volume you clear for each product*
- *Key to have auctions well optimised so providers can submit full capability & NG can pick best combinations of offers otherwise guessing where best price causing higher cost to consumers – cleared together or linked or conditions between different bids in the auctions so optimal combo can be selected*
- *Ideally the auctions will happen not at the same time but one by one, with results published before the next auctions ends so that all the capacity is distributed over all service*

7. Testing opportunities – feedback from workshops

- *Support a standard suite of testing which would enable an asset to participate in all products - include a core set of tests and then optional additional tests depending on what products you wish to participate in*
- *Testing should reflect requirement of the service e.g. FFR – 10Hz testing, 1Hz – delivery – should be consistent with delivery*
- *Where an asset has already passed a faster service test, this seems to make sense and in this case a simpler reduced test set could be complied with*
- *Agree that a single test for DC/DM/DR would save time - those that have already passed DC could have a simplified DM/DR test*
- *Testing via Performance Monitoring is sensible for the 20Hz metered services DM and DC but does not work for DR as is still 1Hz*

8. Next steps

- Duration definition
- Wave 2 modelling of DM/DR
- Survey – topics covered in the workshops including warranties
- Interactions between service parameters
- Progress update in July

Contact us:
box.futureofbalancingservices@nationalgrideso.com