



Consultation webinar: overview of DM and DR

23 November 2021

The webinar will start shortly.
To maximise participation and minimise disruption we will
be taking questions via MS Teams Chat, therefore your
microphones are muted.

Please note that the webinar will be recorded.

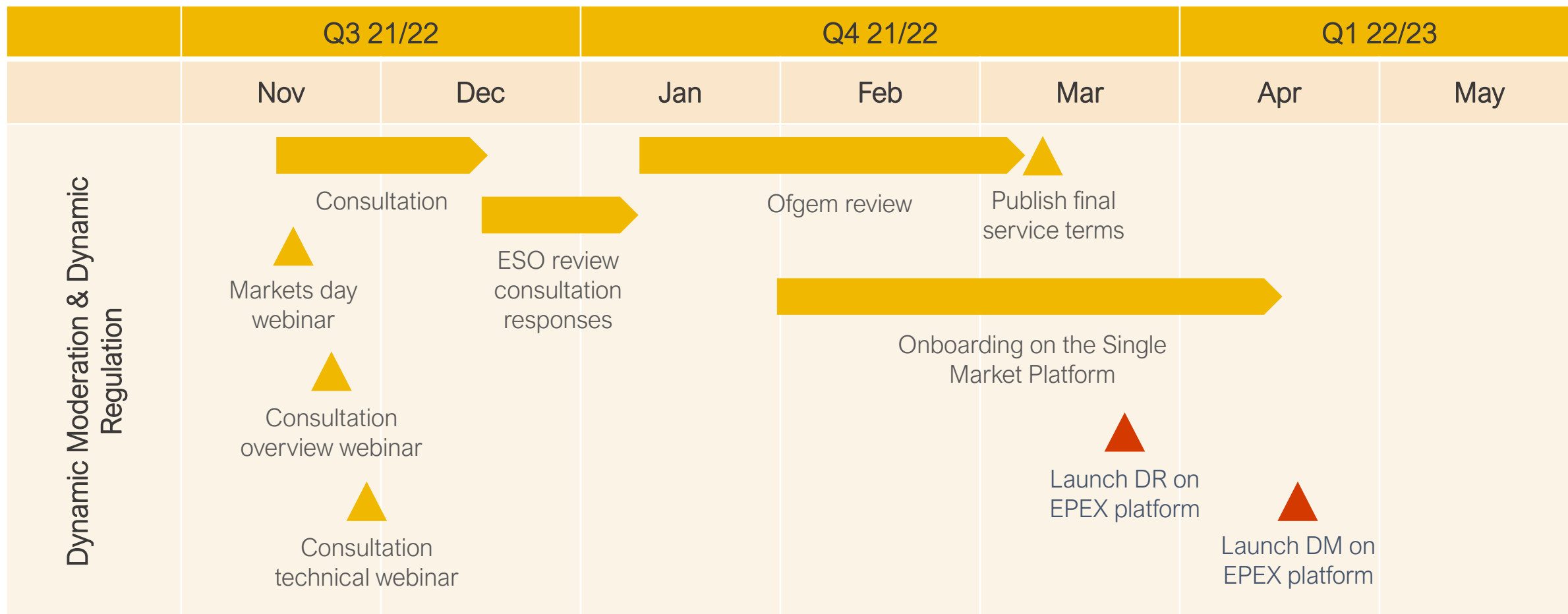
Agenda

1. DM & DR recap
2. Consultation overview
 - Service Terms
 - Testing
 - Onboarding
 - Performance Monitoring
 - State of Energy
3. Procurement
4. Consultation support
5. Q&A

A landscape photograph showing a rolling field at sunset. The foreground is a field of harvested crops, possibly corn, with a path leading towards the right. A large, dark, leafy tree stands prominently on the right side of the field. The background consists of rolling hills under a sky with scattered clouds, illuminated by the warm light of the setting sun.

DM & DR recap

DM & DR delivery plan



Service Design for “day one” – DM & DR

Topic	Day 1
Aggregation	GSP Group
Bundling of Procurement	Unbundled – looped bids available
Procurement Platform	EPEX platform
Auction	Day ahead
Period	EFA block
Settlement Basis	Availability only (Pay As Clear)
Auction Timings	DM & DR (& DC) cleared simultaneously at 14:30
Stacking	Stack only with the BM
Disarming	Disarming and re-arming instructions

Service Design for “day one” – DM & DR

Topic	DM	DR
Duration of Energy Limited Assets	30 mins	60 mins
Operational Metering	1Hz	
Performance Metering	20Hz	2Hz*
Operational baselines	In line with rules for submission of PNs via the BM	
Performance baselines	Submitted retrospectively, allows up to 4d.p.	
Unit cap	50MW	
Initial volume requirement	100MW of high and low per service	

* Performance metering for DR will be 2Hz, however we are implementing a transition phase, allowing 1Hz for the first 6 months

Consultation overview



Service Terms

- The Service Terms (ST) (and all the other documents) are built on the documents used for Dynamic Containment
- Read the ST with the Service Glossary open at the same time (numerous **defined terms**)
- Schedule 2 explains how Performance Monitoring works, this is really the most in-depth illustration of what good delivery looks like – i.e. what you need to do to get paid

Service Terms

- **Section 5** – visibility of real-time availability is key to operational security
- **Section 6** – how to deliver the service:
 - Submit an operational baseline, follow that baseline
 - Deliver appropriate quantity of response from that baseline
 - Some additional rules for energy limited providers

Service Terms

- **Section 6** – disarming and re-arming instructions
 - Disarm (stop) or re-arm (start) no later than 2 mins after instruction
 - You will still be paid even when dis-armed

Service Terms

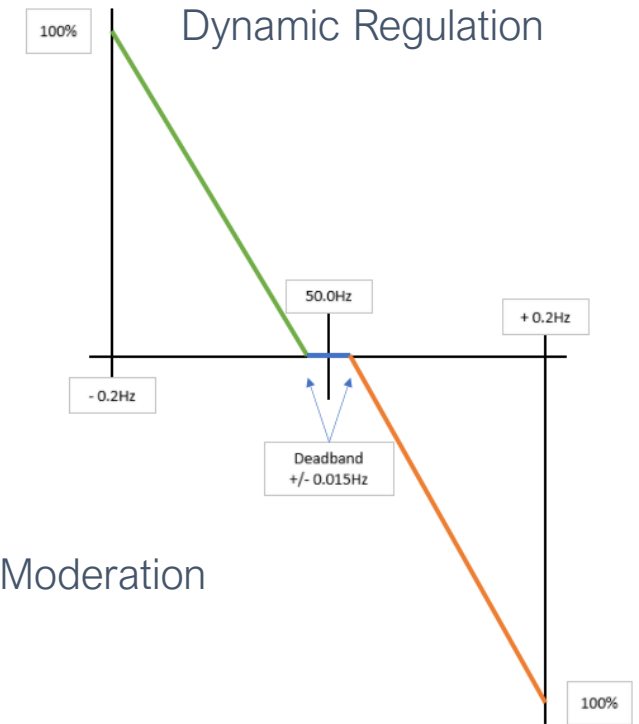
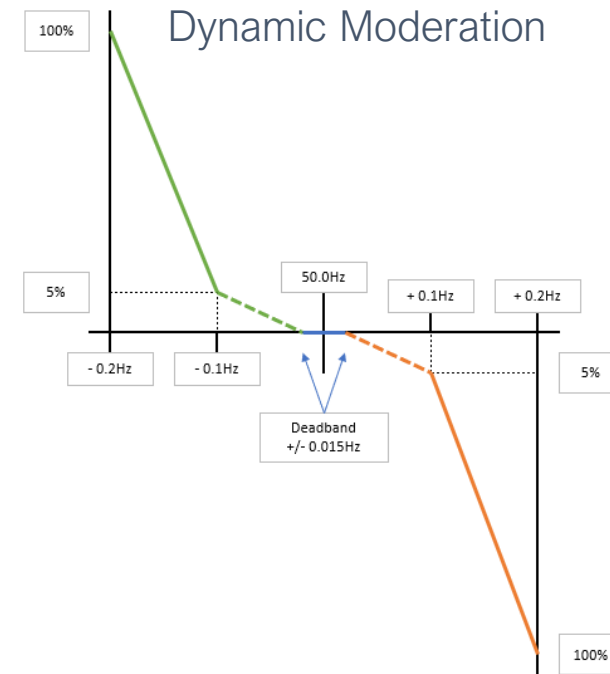
- **Section 7** – availability payments
 - Providers are paid availability only
 - A Performance Monitoring score is calculated as set out in Schedule 2 – this is applied to the Market Clearing Price to determine the payment
 - Deliver the service within the tolerances = 100% payment

Service Terms

- **Section 15** – includes the data required by NGESO
 - **Operational data** – what the unit is doing right now
 - **Performance data** – more granular detail for calculation of payment
 - **15.8** – providers must measure frequency to the acceptable standard, at the moment simply ‘good industry practice’

Product Design – DM & DR

Topic	DM	DR
Speed of response	1 second	10 seconds
Pre/post fault	Pre-fault	Pre-fault
Delivery range	+/-0.1 to 0.2 Hz	+/-0.015 to 0.2 Hz
Deadband (delivery %)	+/-0.015 (0%)	+/-0.015 (0%)
Initial linear range (delivery %)	+/-0.015 to 0.1 (5% at +/-0.1Hz)	+/-0.015 to 0.2 Hz (100% at +/-0.2Hz)
Knee point	+/-0.1Hz	No knee point
Second linear range (delivery %)	+/-0.1 to 0.2 (100% at +/-0.2Hz)	n/a
Full delivery point	+/-0.2Hz	+/-0.2Hz
Max ramp start	0.5 seconds	2 seconds



Testing

- Approach will have the look and feel of existing DC and FFR testing documentation
- DM testing is based around the current DC testing as it has a knee joint delivery
- DR testing is based on existing FFR testing as it has proportional delivery
- Testing Analysis tool for each service will be release shortly

Onboarding

- For DM, DR and DC we will be moving the onboarding of these services onto the Single Market platform (SMP)
- The prequalification for each service will be outlined in the Contractual Documents
- We will still be publishing all our documents, including Forms A, B & C as signed versions can be uploaded on SMP
- For more information on the SMP, please sign up to the fortnightly update calls using the following link - [Single Market Platform Workshop](#)

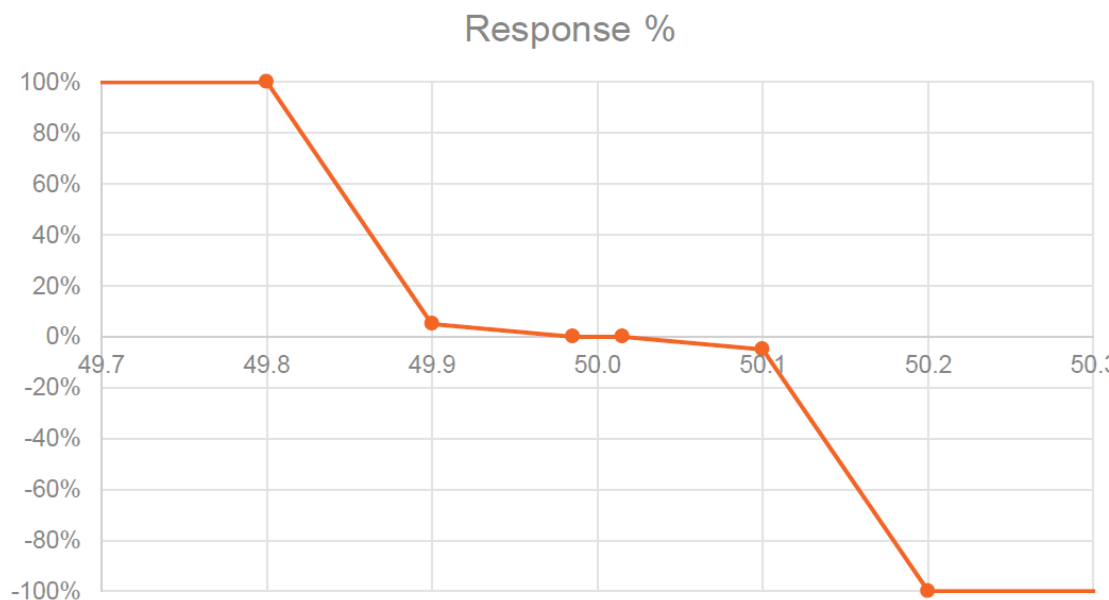
Performance monitoring – DM and DR

- Service Terms parameters for Performance Monitoring

Parameter	DM (Similar to DC)	DR
Data Frequency	20Hz	2Hz*
Max initiation time (T_{iMAX})	0.5s	2s
Max time to full delivery (T_{dMAX})	1s	10s
Ramp time (tr_{max})	0.5s	8s
Ramp rate (rr_{min})	$2s^{-1}$	$0.125s^{-1}$

Performance monitoring - DM

Saturation	$f_{S\pm} = f_0 \pm 0.2 \text{ Hz}$	$R_{S\pm} = \mp 100\%$
Activation	$f_{A\pm} = f_0 \pm 0.1 \text{ Hz}$	$R_{A\pm} = \mp 5\%$
Delivery/deadband	$f_{D\pm} = f_0 \pm 0.015 \text{ Hz}$	$R_{D\pm} = 0\%$



Lags and ramp limits

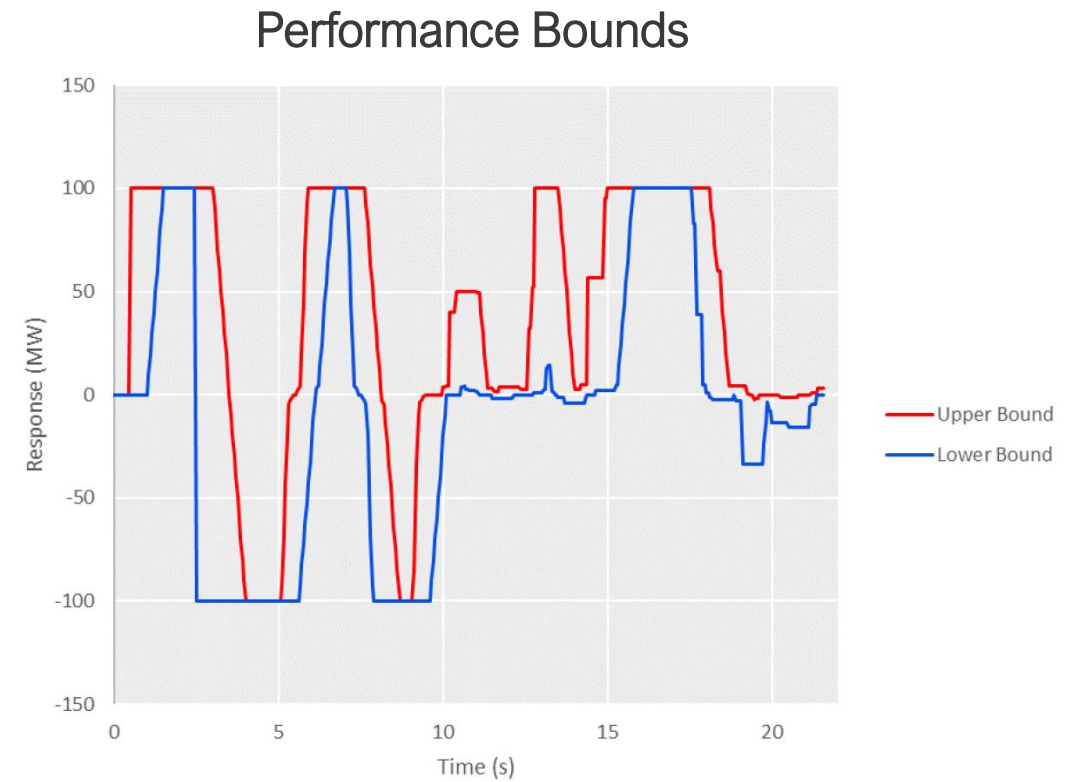
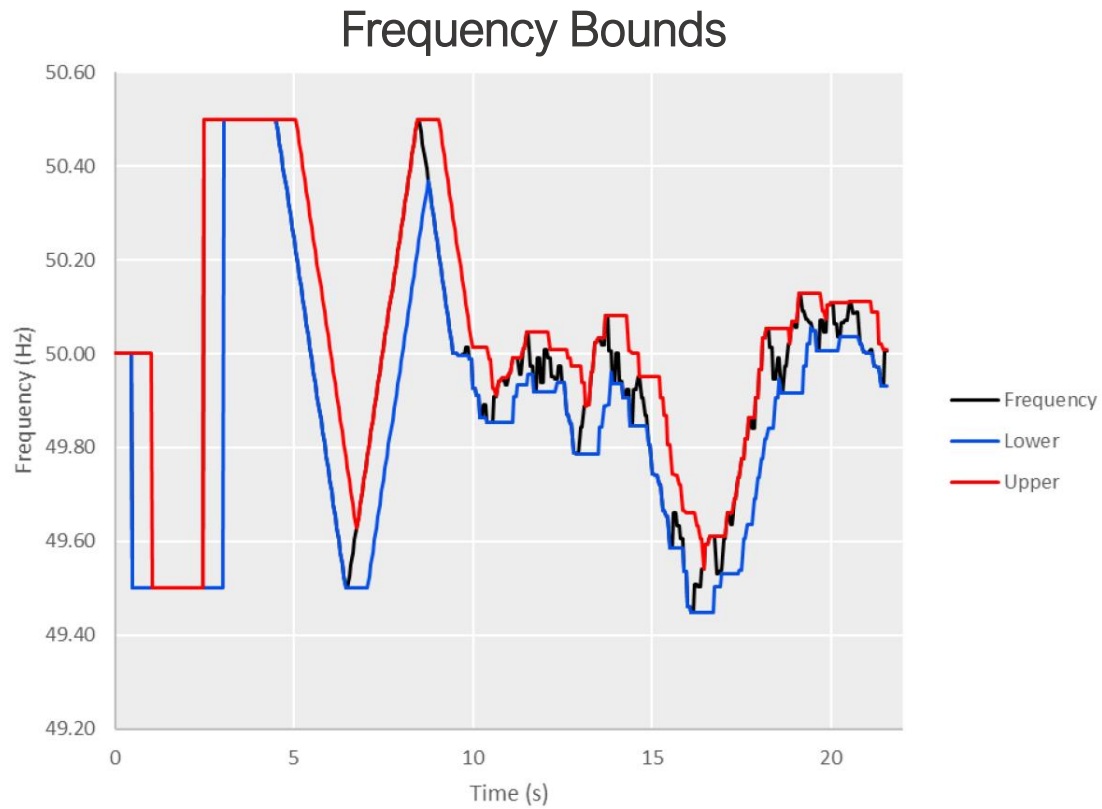
Lag upper bound (maximum initiation time): $T_{iMAX} = 0.50 \text{ s}$

Lag upper bound tolerance: $tol_{iMAX} = 0.05 \text{ s}$

Ramp time upper bound: $tr_{max} = T_{dMAX} - T_{iMAX} = 0.50 \text{ s}$

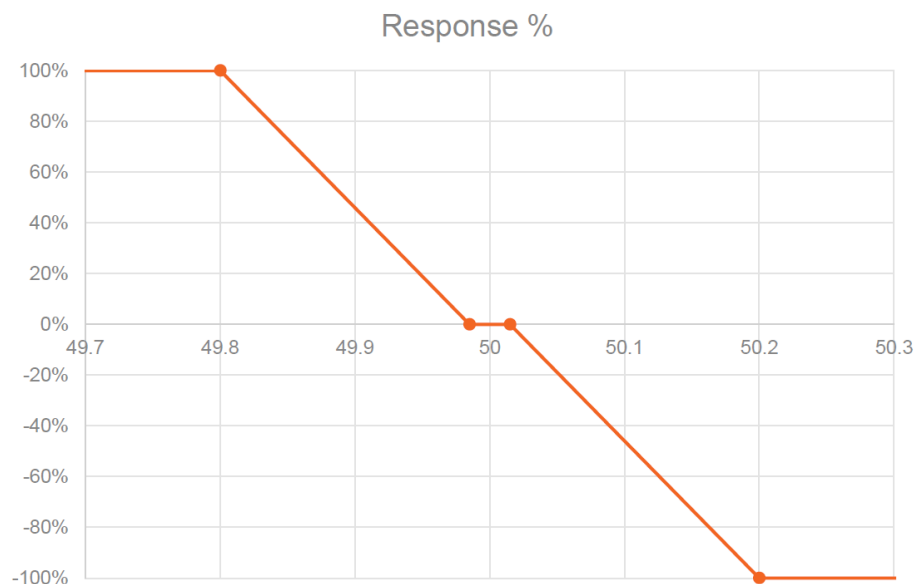
Ramp rate (proportional) lower bound: $rr_{min} = \frac{1}{tr_{max}} = 2 \text{ s}^{-1}$

Performance monitoring - DM



Performance monitoring - DR

Saturation	$f_{S\pm} = f_0 \pm 0.2 \text{ Hz}$	$R_{S\pm} = \mp 100\%$
Delivery/deadband	$f_{D\pm} = f_0 \pm 0.015 \text{ Hz}$	$R_{D\pm} = 0\%$



Lags and ramp limits

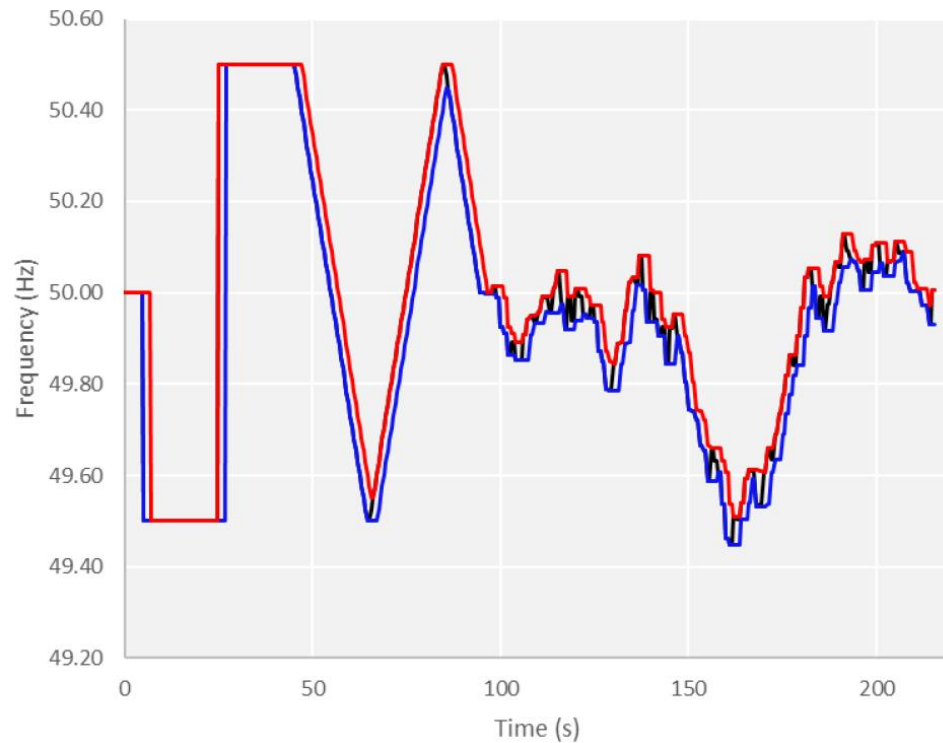
Lag upper bound (maximum initiation time): $T_{iMAX} = 2 \text{ s}$

Ramp time upper bound: $tr_{max} = T_{dMAX} - T_{iMAX} = 8 \text{ s}$

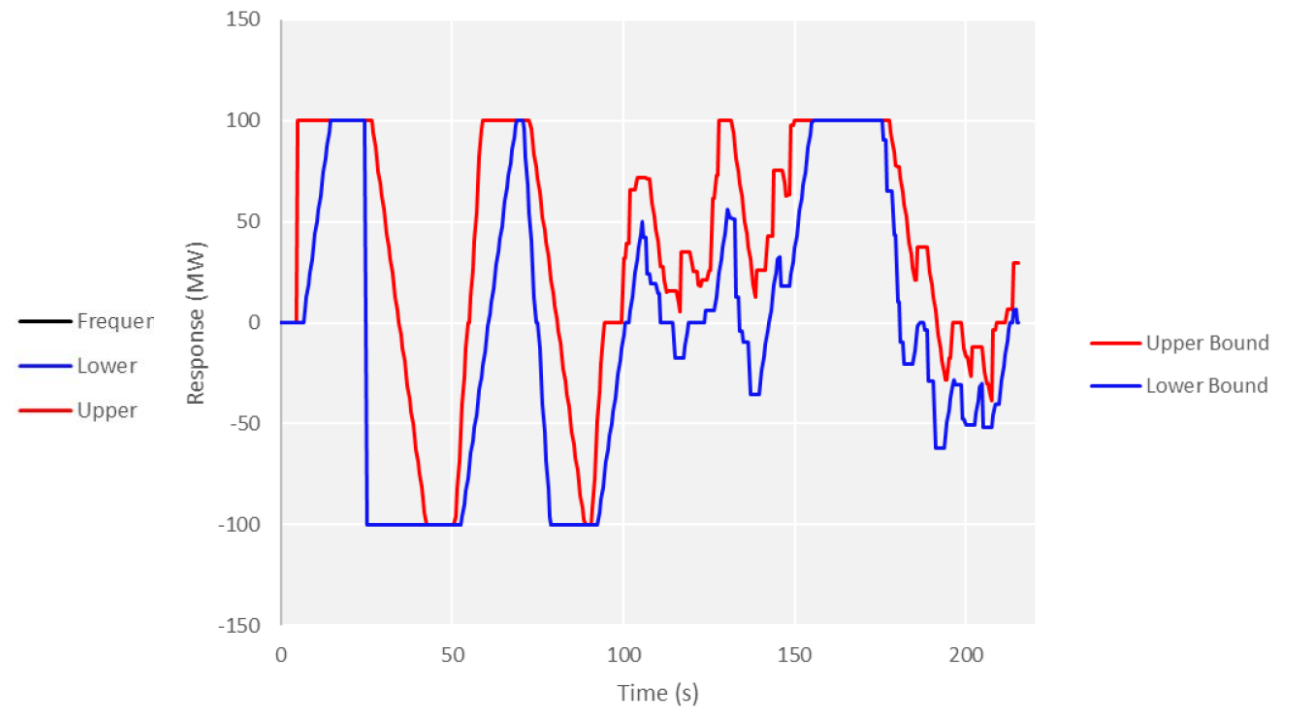
Ramp rate (proportional) lower bound: $rr_{min} = \frac{1}{tr_{max}} = 0.125 \text{ s}^{-1}$

Performance monitoring - DR

Frequency Bounds



Performance Bounds



State of Energy

- Begin the initial settlement period with a level of stored energy (i.e. **Response Energy Volume**) adequate for its contracted response quantity (i.e. **Contracted Quantity**)

$$\begin{aligned}\text{Response Energy Volume [MWh]} &= \text{Contracted Quantity [MW]} \times \text{Delivery Duration [0.5 h]} \quad \text{for DM} \\ &= \text{Contracted Quantity [MW]} \times \text{Delivery Duration [1 h]} \quad \text{for DR}\end{aligned}$$

- Review the level of stored energy at the start of each settlement period, looking at the net energy delivery in the previous settlement period
- Aim to return the stored energy level to an appropriate level (i.e. at least 20% **Response Energy Volume**) by the submission (and following) of a new **Operational Baseline**. This means charging or discharging by following a baseline

$$\begin{aligned}\text{Energy Recovery [MWh]} &= \min (20\% \times \text{Response Energy Volume [MWh]}, \text{Net Energy Delivery in} \\ &\quad \text{previous SP [MWh]}) \quad \text{for low frequency DM and DR} \\ &= \max (20\% \times \text{Response Energy Volume [MWh]}, \text{Net Energy Delivery in} \\ &\quad \text{previous SP [MWh]}) \quad \text{for high frequency DM and DR}\end{aligned}$$

Procurement



DM and DR procurement overview



Procurement: DM and DR will be procured alongside DC on the existing platform via day-ahead auctions, with delivery by EFA blocks



Payment: All services will be settled on a pay-as-clear basis



Unit cap: Initially, there will be a unit cap of 50MW for both DM and DR



Volume cap: Each product will have a volume cap of 100MW, e.g. 100MW DML and 100MW DMH



Bidding: All the bidding capabilities from the DC auctions, such as linked families and looping, will be available for DM and DR ([more information](#))



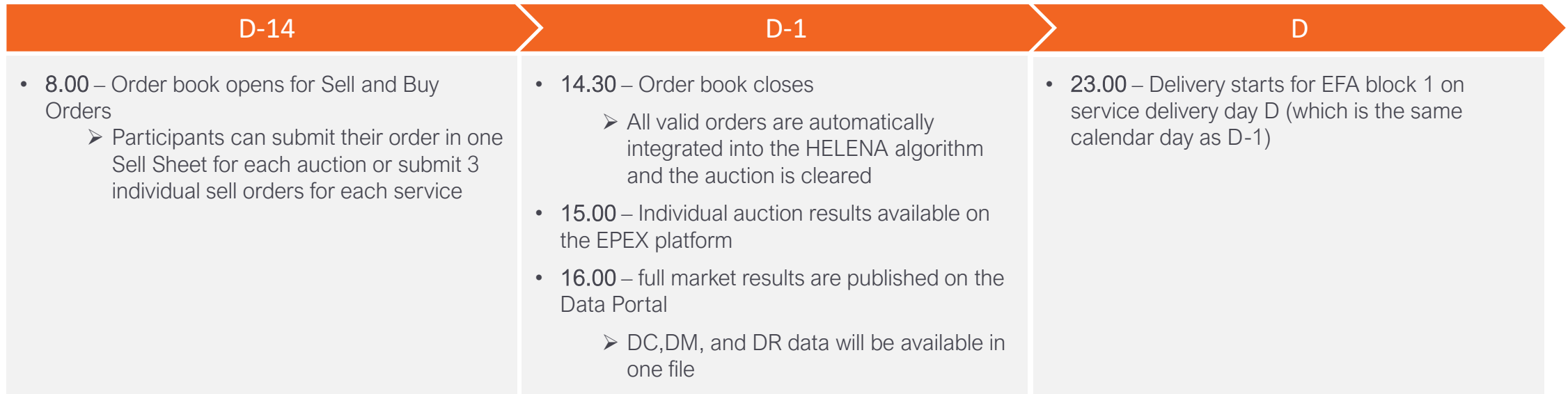
Stacking: For Day 1, participants will be able to deliver only one of the three services (DC, DM, or DR) per EFA block



Co-optimisation: Future co-optimisation of services is currently under review

Volumetrics and Auction Process

- Expected volume
 - NGENSO will start with low volume, which will gradually increase, and eventually replace legacy Firm Frequency Response services
 - Overall, we are expecting to procure less of the new services compared to our old services due to higher effectiveness. Note:
 - DC will always be driven by the size of the largest losses
 - As pre-fault services, DM and DR are expected to be delivered more frequently but at lower volumes than DC
- Auction process
 - DM and DR will be procured on the existing EPEX SPOT platform, along with DC
 - All services (DC/ DM/ DR) will be cleared simultaneously in a single auction at 14.30



Stacking Bids

- 'Stacking' is defined as the simultaneous delivery, or simultaneous availability to deliver, more than one frequency response service by a single unit
- Stacking options **for the same EFA period** are the following:
 - Stacking with BM - **allowed**
 - Stacking Low and High products within the same service – **allowed**
 - Stacking across different services – **not allowed**
- Operational feasibility of stacking between the three frequency response services is currently under review

Example	Order	Unit	Product	Block Type	Price	EFA 1	EFA 2
Example 1 Stacking within the same service in the same EFA period	0001	ABC01	DCL	C01	£ 10.00	8 MW	
	0002	ABC01	DCH	C01	£ 12.00	8 MW	
Example 2 Delivery stacking - different services with stacking low and low or high and high in the same EFA period from the same unit	0003	ABC02	DCL	C01	£ 10.00	8 MW	
	0004	ABC02	DML	C01	£ 12.00	8 MW	
Example 3 Stacking with different services in different EFA blocks	0005	ABC03	DCL	C01	£ 10.00	8 MW	
	0006	ABC03	DML	C01	£ 12.00		8 MW

▶ **Valid** (same service, same EFA period)

▶ **Invalid** (different services, same EFA period)

▶ **Valid** (different services, different EFA periods)

Current service design doesn't allow stacking across DC,DM and DR in the same EFA period

Looping Bids

- ‘Loop blocks’ are an extension of linked families and can be used to link bids from **the same unit but between different products**
 - E.g. participants can link LF and HF products from the same service in the same or multiple EFA periods, with the requirement that both products are cleared, or neither i.e. conditional acceptance of blocks
 - More information on Looping rules can be accessed [here](#)
- Subject to the stacking rules, orders for different products from different services can also be looped

Example	Order	Unit	Product	Block Type	Price	EFA 1	EFA 2
Example 4 Linking different products within the same service in the same EFA period	0007	ABC04	DCL	C88	£ 10.00	8 MW	
	0008	ABC04	DCH	C88	£ 12.00	8 MW	
Example 5 Linking different services in the same EFA period	0009	ABC05	DCL	C88	£ 10.00	8 MW	
	0010	ABC05	DML	C88	£ 12.00	8 MW	
Example 6 Linking different services in different EFA periods	0011	ABC06	DCL	C88	£ 10.00	8 MW	
	0012	ABC06	DML	C88	£ 12.00		8 MW

▶ **Valid** (same service, same EFA period)

▶ **Invalid** (different services, same EFA period)

▶ **Valid** (different services, different EFA periods)

Looping with different services is only possible on different EFA periods

Consultation support

A landscape photograph featuring a rolling hill under a dramatic, cloudy sky at sunset or sunrise. The foreground is a field of golden-brown crops, possibly corn, with a path leading towards a large, dark, leafy tree on the right. The text 'Consultation support' is overlaid in white on the left side of the image.

Consultation support

- **EBR Art. 18 Consultation close – 15 December**
- **Consultation support**
 - Service Terms video
 - [Technical webinar – 30 November](#)
 - For 1-2-1s, contact: box.futureofbalancingservices@nationalgrideso.com

For more information including links to register for webinars and the consultation documents, please see the DM and DR webpages

Q&A

Please submit your questions via Teams chat

If you have further questions or feedback, please send them to:
box.futureofbalancingservices@nationalgrideso.com