Reserve Reform Show & Listen #3

23 June 2022

Agenda

I. Review of Show & Listen 2

II. Quick Reserve – Project timeline

III. Quick Reserve – System need

IV. Quick Reserve – Design parameters

   1. Time to full delivery
   2. Recovery period
   3. Dispatch mechanism
   4. Product duration
   5. Ramping envelope
   6. Performance & operational metering

V. Quick Reserve – Procurement service design

VI. Looking ahead to our next Show & Listen event

How to engage

- We will be using Mural to gather detailed feedback.
- If you have a clarification, question or discussion point, please use the "*raise your hand*" function in MS Teams and wait to be called.
- We will be recording the session in order to make sure we capture all feedback, this will not be published or shared.

Recap of Show & Listen 2

Recap of Show & Listen 2

- We shared an overview of two new Slow Reserve products – Positive Slow Reserve and Negative Slow Reserve.
- Key discussion points included our proposals for service windows, auction timings, metering and baselining. We addressed your feedback points on the Q&A document, which can be located using the link below.

Slides

Version: Updated 08.06.2022

	Question / Comment	Answer Provided
1	Standardisation of product length into chunks (e.g. 5/15/30 mins) should be considered to allow standardisation of products. Similiar to Replacement Reserve?	We have aimed to standardise key service parameters while allowing flexibility to accomodate different provider and technology types, and also factoring in compatibility with the Balancing Mechanism. We will continue to review service design to maximise operability and consumer value through effective competition.
2	Pricing should be pay as clear for both availability and utilisation - reserve and response are not locational products, they should be homogenous	Dispatching Reserve is interlinked with the Balancing Mechanism which is GB's largest balancing market and is founded upon Pay-As-Bid. For the new Reserve products, we propose to mirror this on day one but will consider a transition to Pay-As-Clear in future if this remains the most economic procurement method and systems / market
3	What guarantees NGESO will always activate according to merit order if pay-as-bid?	We always seek to balance the system in the most economic and efficient manner, while ensuring safe and secure operation. This is not affected by the choice of how to set the clearing price.
4	Pay as bid could be used for utilisation in the early days, with a view to moving to a clearing price once the product is up and running	Whilst we maintain our approach for utilisation pricing being Pay-as-Bid in the short term, we will continue to explore the most economic procurement mechanisms looking further ahead.
5	Activation times state a minimum of 30 minutes. Will this be the case for all slow reserve actions or could calls be shorter ?	The Minimum Activation Time is an optional parameter which is specified by providers. This must be no more than 30 minutes but could be as short as 1 minute if deemed acceptable by each participating unit.
6	Will limits be placed on the amount of reserve procured in the BM?	We don't propose that there will be any differentiation between BM and non-BM providers when procuring Reserve
7	What is the reason for 1Hz? Feedback I got internally is that this is a barrier and very unusual for an energy product.	We are proposing 1Hz metering for performance purposes to monitor compliant practice during the ramping envelope. 1-minute granularity data, as per STOR, is insufficient for this. For operational metering, we are looking to enhance our visibility of assets on the network, especially those participating in balancing services markets. 1Hz granularity is common for many assets participating in the Balancing Mechanism and enhances our capability for more granular demand forecasting and frequency modelling. We understand that 1Hz metering for single-site >1MW assets is broadly acheivable but recognise that our standards need to be implemented proportionately for aggregated units. We are convening an inaugural Power
8	1 Hz is a major barrier to entry when considering staking of multiple small assets	Thanks for your feedback. As above, we are convening a Power Responsive working group to understand how aggregated assets should provide operational metering to NGESO in a way that provides visibility but does not

Q&A document

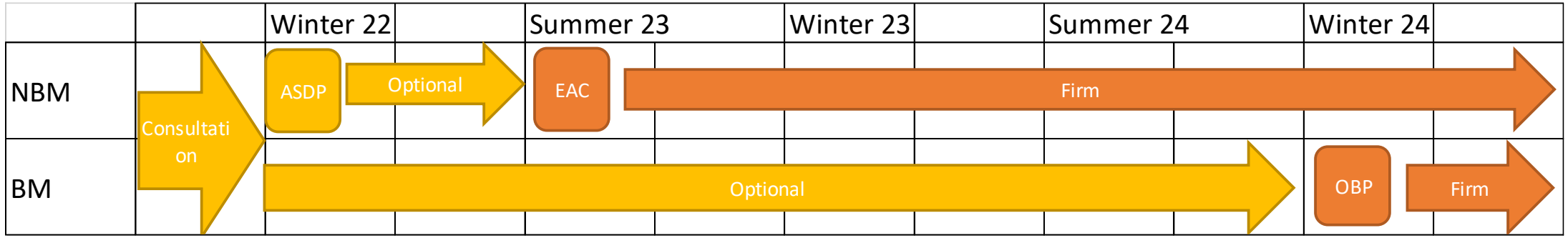
Quick Reserve – Timeline

Proposed Project Timeline

- Using an Agile approach we can introduce services and functionality in sequential releases.
- However, there are a number of dependencies for the different releases:

Dependency	Launch stage	Required for	Estimated timescales
Ofgem approval		All services	4 months
ASDP release	**Stage 1** Optional NBM + BM	NBM providers	6 months
Enduring Auction Capability project	**Stage 2** Firm NBM	Firm market	12 months
Balancing Transformation release	**Stage 3** Firm BM	BM providers	24 months

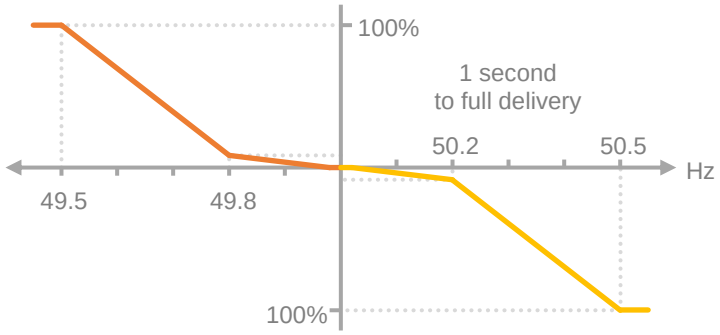
Proposed Project Timeline



- Launching a Firm NBM market ahead of a Firm BM market is estimated to deliver potential consumer value of £1-2M per month.
- Note that STOR day ahead will continue until the full NBM and BM Firm Positive Slow Reserve service is available.

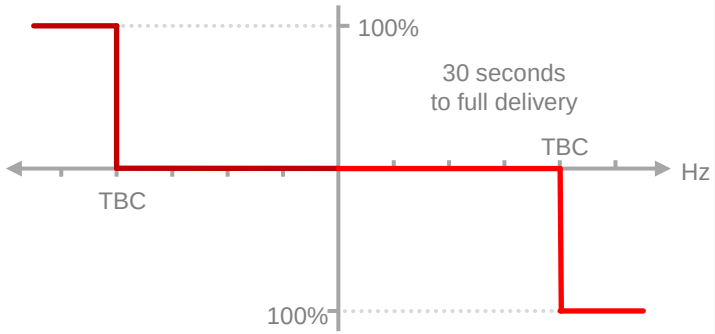

Overview of system need

Dynamic Containment



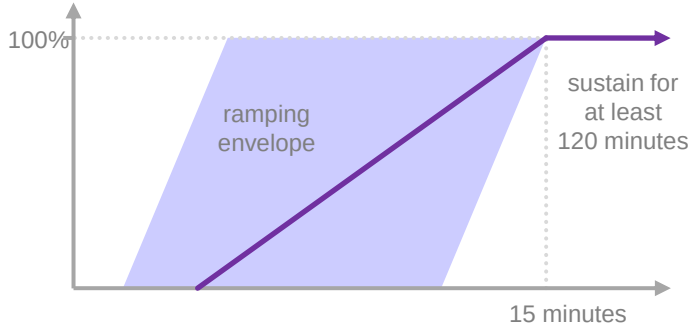
Prevent frequency deviations outside
-0.8Hz / +0.5Hz following large losses

Static Recovery



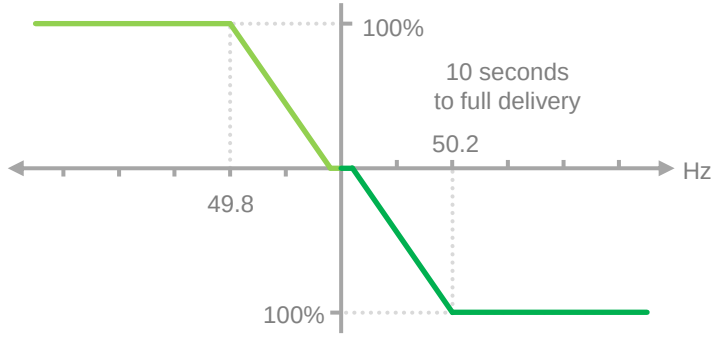
Recover frequency to 0.5Hz within
60 seconds following large losses

Slow Reserve



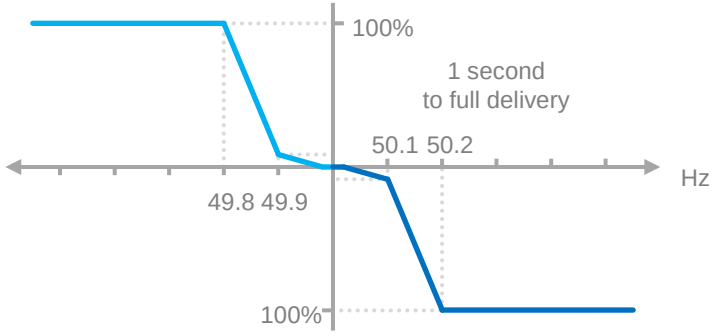
Recover frequency from
to 0.2Hz within 15 minutes

Dynamic Regulation



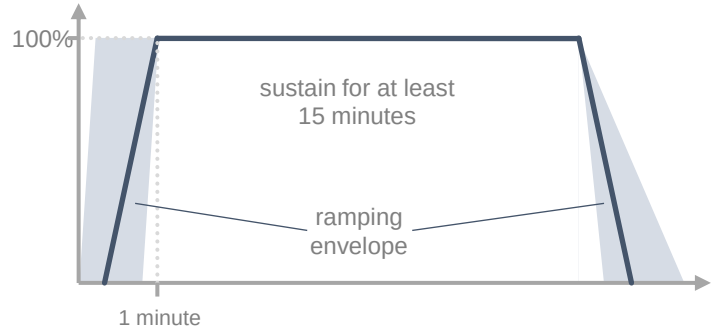
Assist in keeping frequency near
to 50Hz during normal conditions

Dynamic Moderation

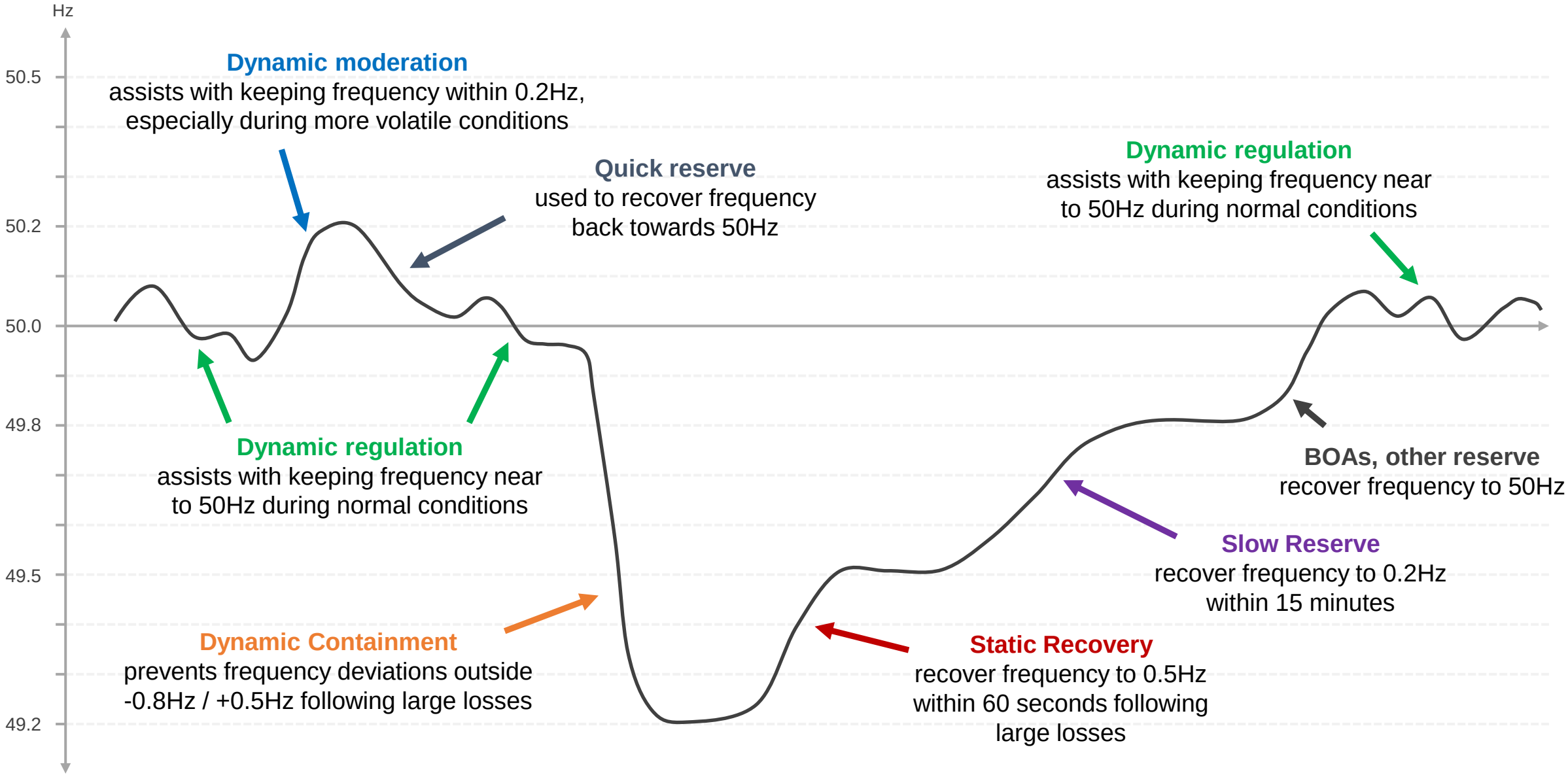


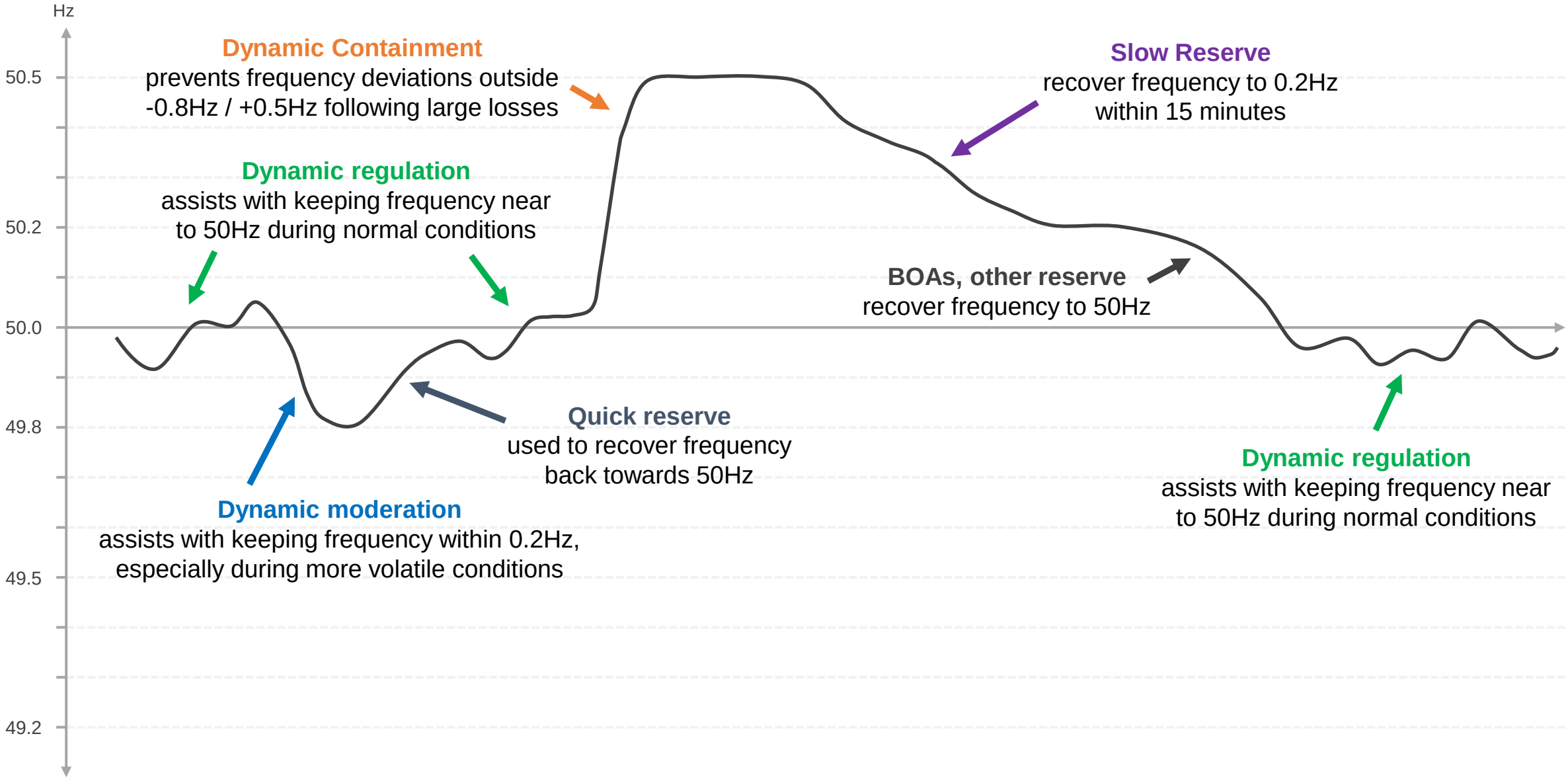
Assist in keeping frequency within 0.2Hz,
especially during more volatile conditions

Quick Reserve



Recovery frequency back towards
50Hz, mainly during normal conditions


Hz
50.5
50.2
50.0
49.8
49.5
49.2
Dynamic moderation
assists with keeping frequency within 0.2Hz, especially during more volatile conditions
Quick reserve
used to recover frequency back towards 50Hz
Dynamic regulation
assists with keeping frequency near to 50Hz during normal conditions
Dynamic regulation
assists with keeping frequency near to 50Hz during normal conditions
BOAs, other reserve
recover frequency to 50Hz
Slow Reserve
recover frequency to 0.2Hz within 15 minutes
Dynamic Containment
prevents frequency deviations outside -0.8Hz / +0.5Hz following large losses
Static Recovery
recover frequency to 0.5Hz within 60 seconds following large losses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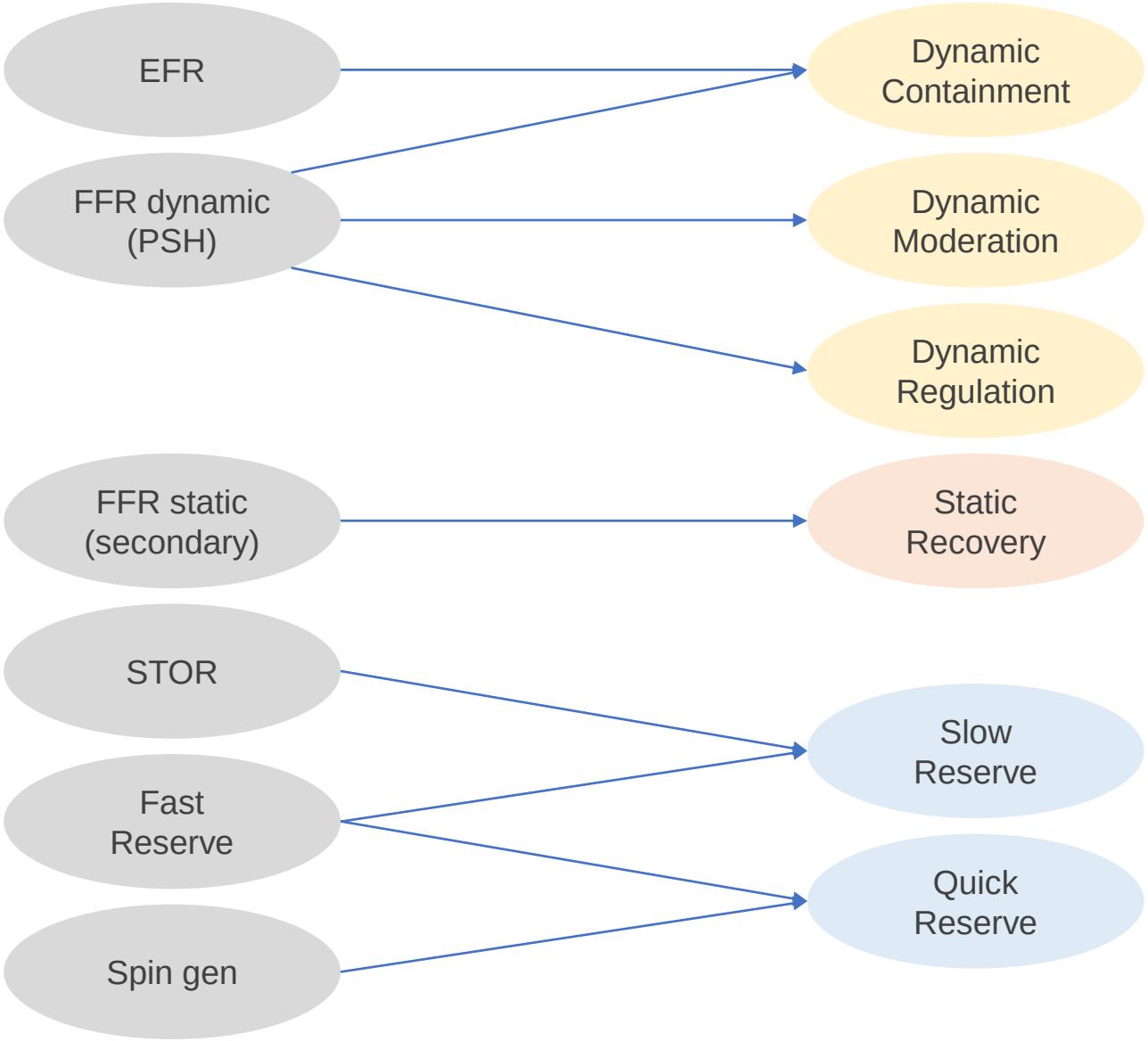
assists with keeping frequency within 0.2Hz, especially during more volatile conditions

Anticipated service transition

This is just indicative view on service transition in the future.

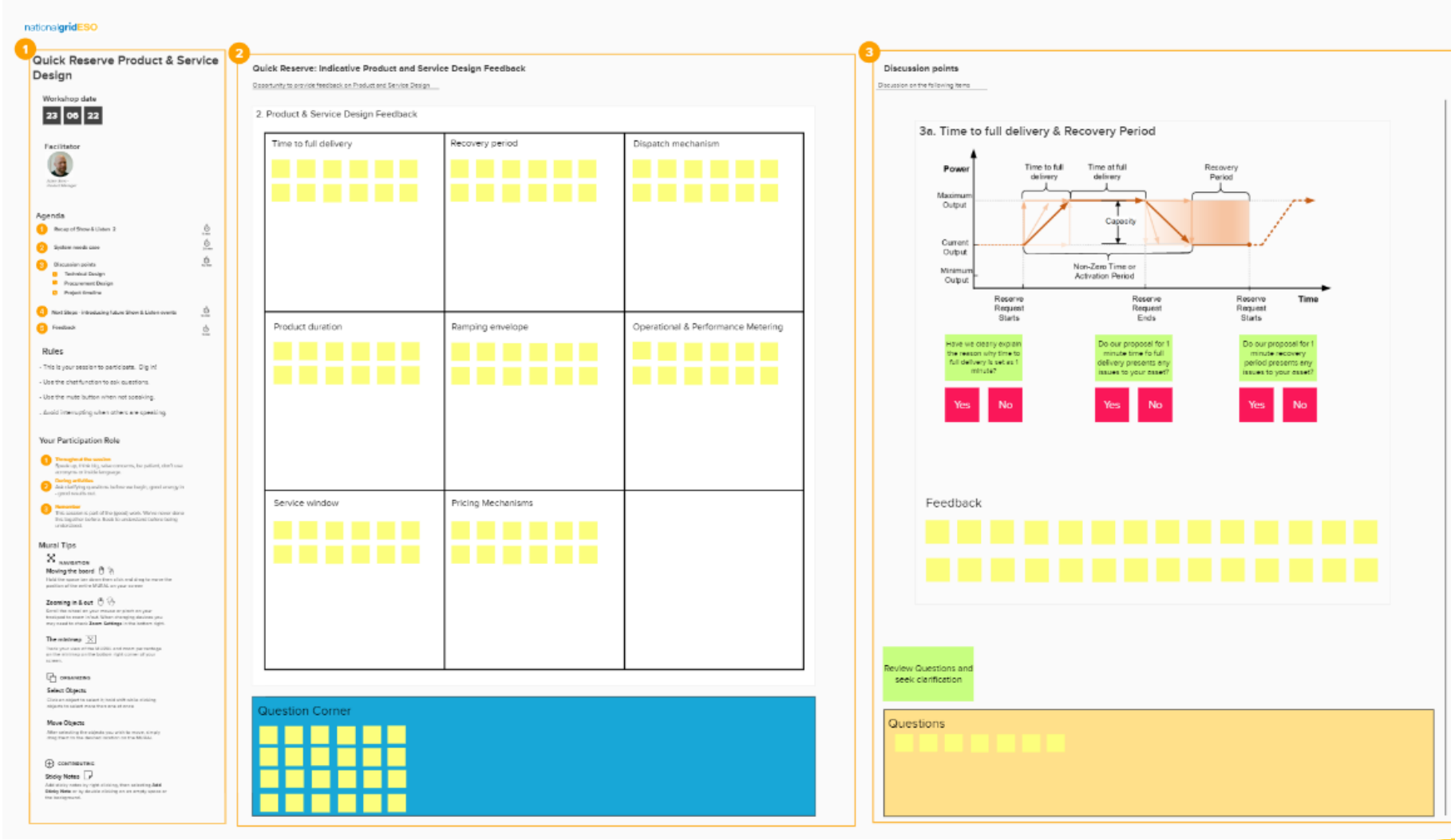
We are not proposing closing any services at this stage.




Quick Reserve

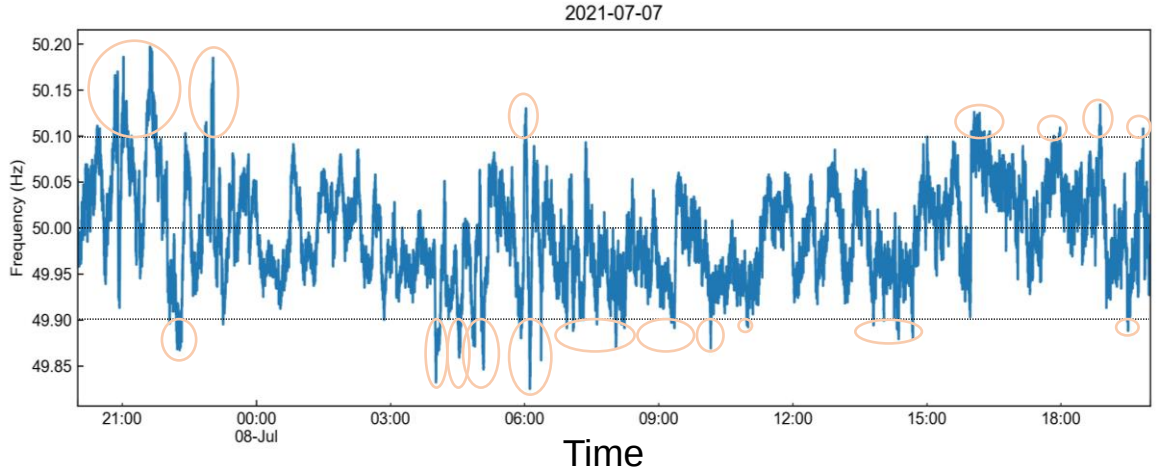
Mural

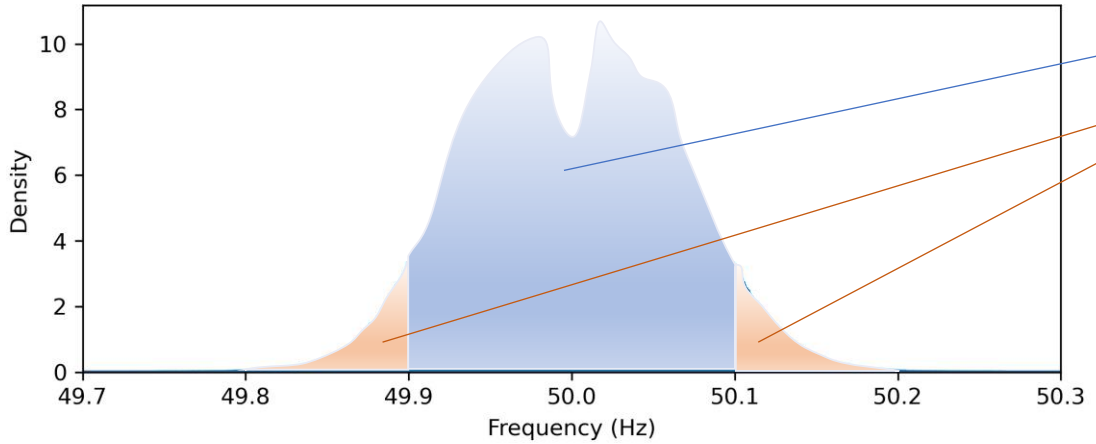
How to use Mural for live feedback in this event?



Time to full delivery

- Frequency behaviour

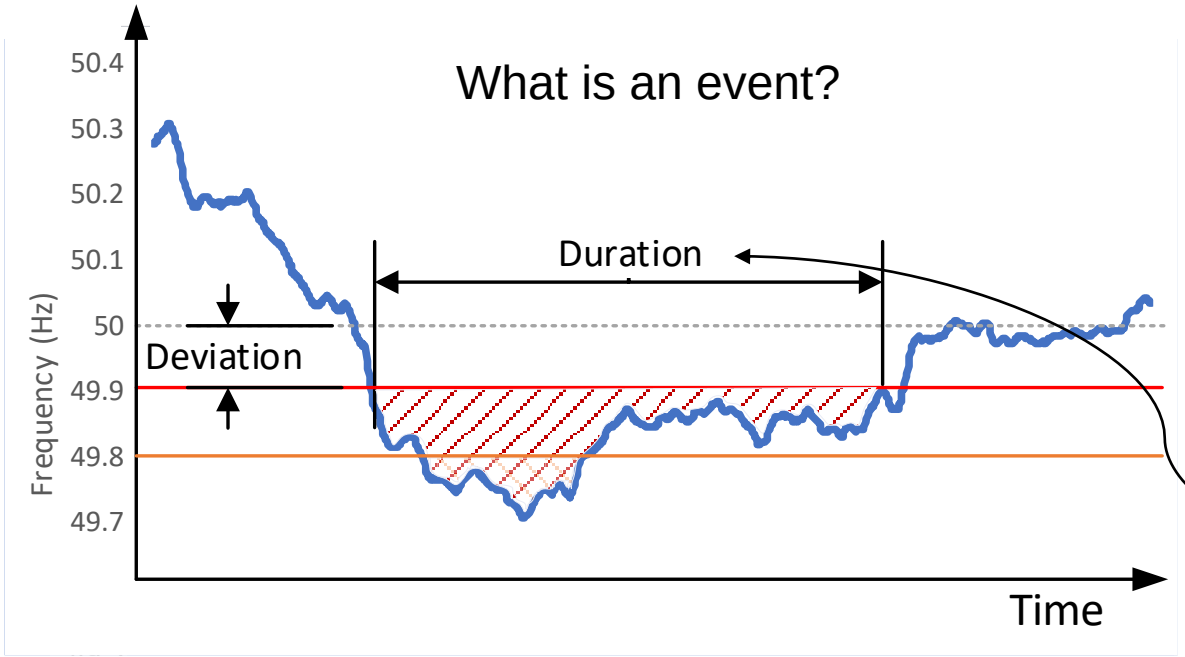


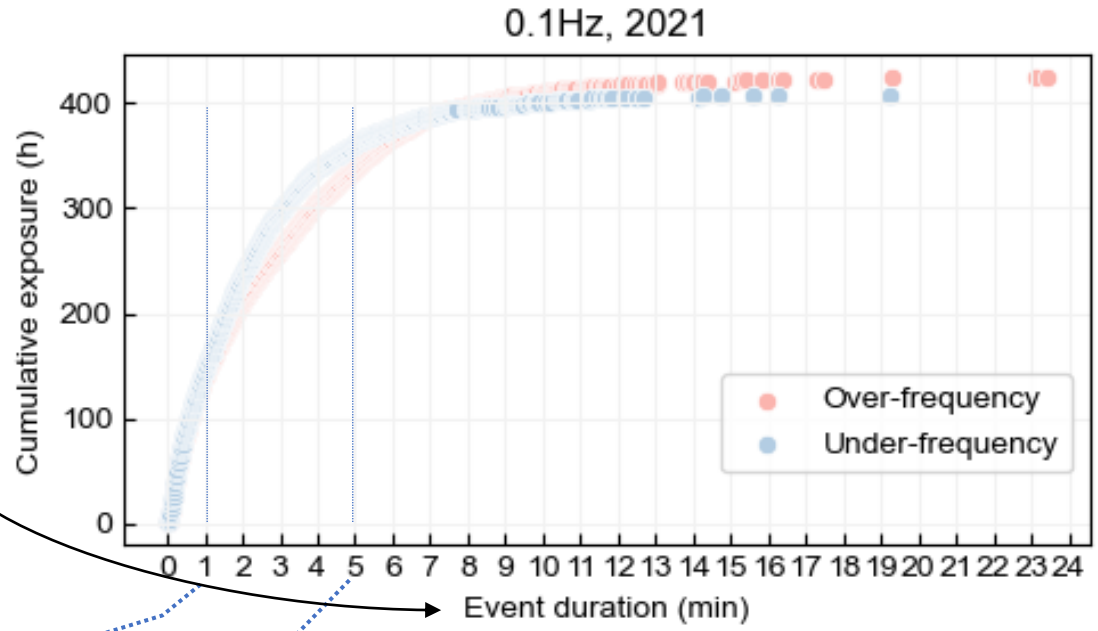


- Typical frequency trace. Moving closely around 50.0 Hz.
  - Random fluctuations
  - Disturbances
- Frequency response is procured assuming a pre-fault frequency different from 50 Hz.
- *How is the frequency distributed over the year?*
  - Around 90% of the time.
  - Around 10% of the time. ~ **832 hours** per year.
- *How are these ~ 832 hours per year distributed, based on the duration of the events?*

Time to full delivery

- How are the total number of hours per year dependent on the duration of the events?





❑ Around 65% of the total time outside ±0.1 Hz is due to events lasting 60 s or more.

❑ Only around 15% of the total time outside ±0.1 Hz is due to events lasting 5 minutes or more.

Time to full delivery

- Cumulative yearly exposure (%)

Event duration (s)	0.05 Hz		0.1 Hz		0.15 Hz		0.2 Hz	
	UF	OF	UF	OF	UF	OF	UF	OF
30	2.81	2.78	1.03	1.02	0.14	0.15	0.01	0.01
60	4.58	4.59	1.68	1.63	0.23	0.24	0.02	0.02
90	5.89	5.77	2.22	2.05	0.31	0.30	0.03	0.02
120	7.00	6.81	2.70	2.43	0.35	0.35	0.03	0.02
180	8.77	8.37	3.39	2.99	0.38	0.43	0.03	0.03
240	10.41	9.77	3.86	3.50	0.40	0.46	0.04	0.03
300	12.01	11.09	4.13	3.86	0.41	0.48	0.04	0.03
> 300	23.3	22.5	4.7	4.8	0.4	0.5	0.05	0.05

❑ ~290 hours per year

❑ ~700 hours per year

❑ A time to full delivery of **60 s or less** would assist in reducing the exposure to deviations of ±0.1 Hz from around 8% of the time to around 3.3% of the time (a reduction of 4.7%).

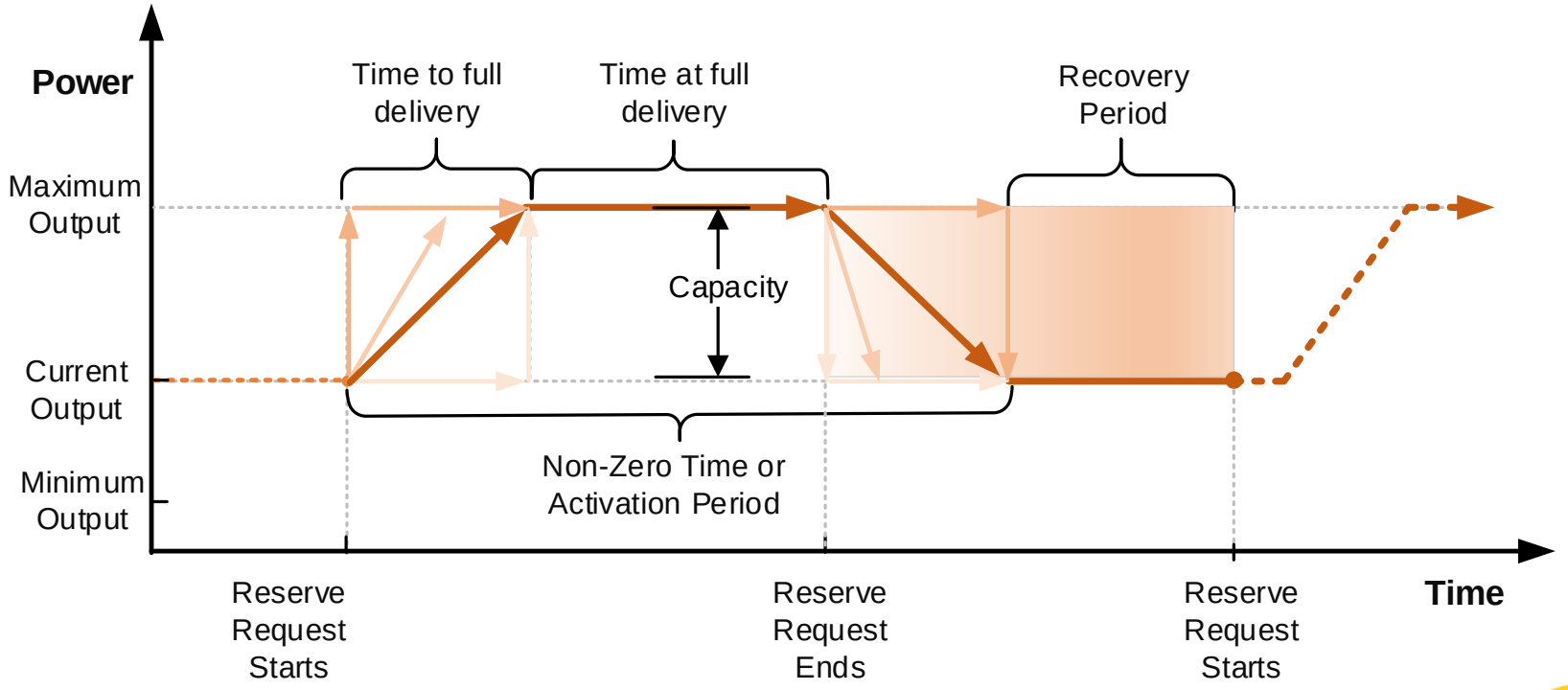
❑ This implies a drop from 700 to 290 hours per year (net reduction of around 410 hours).

Future perspective

- Looking at the past as indication of the future:
  - In 2014 frequency was inside the ±0.1 Hz range for 94% of the time (~534 hours outside). Compared with 90% in 2021 (~832 hours outside).
- We are anticipating this exposure to increase in the future as the system is getting more volatile (more renewable connected, low inertia, large uncertainty).
- Strengthens the need for faster response and reserve products.

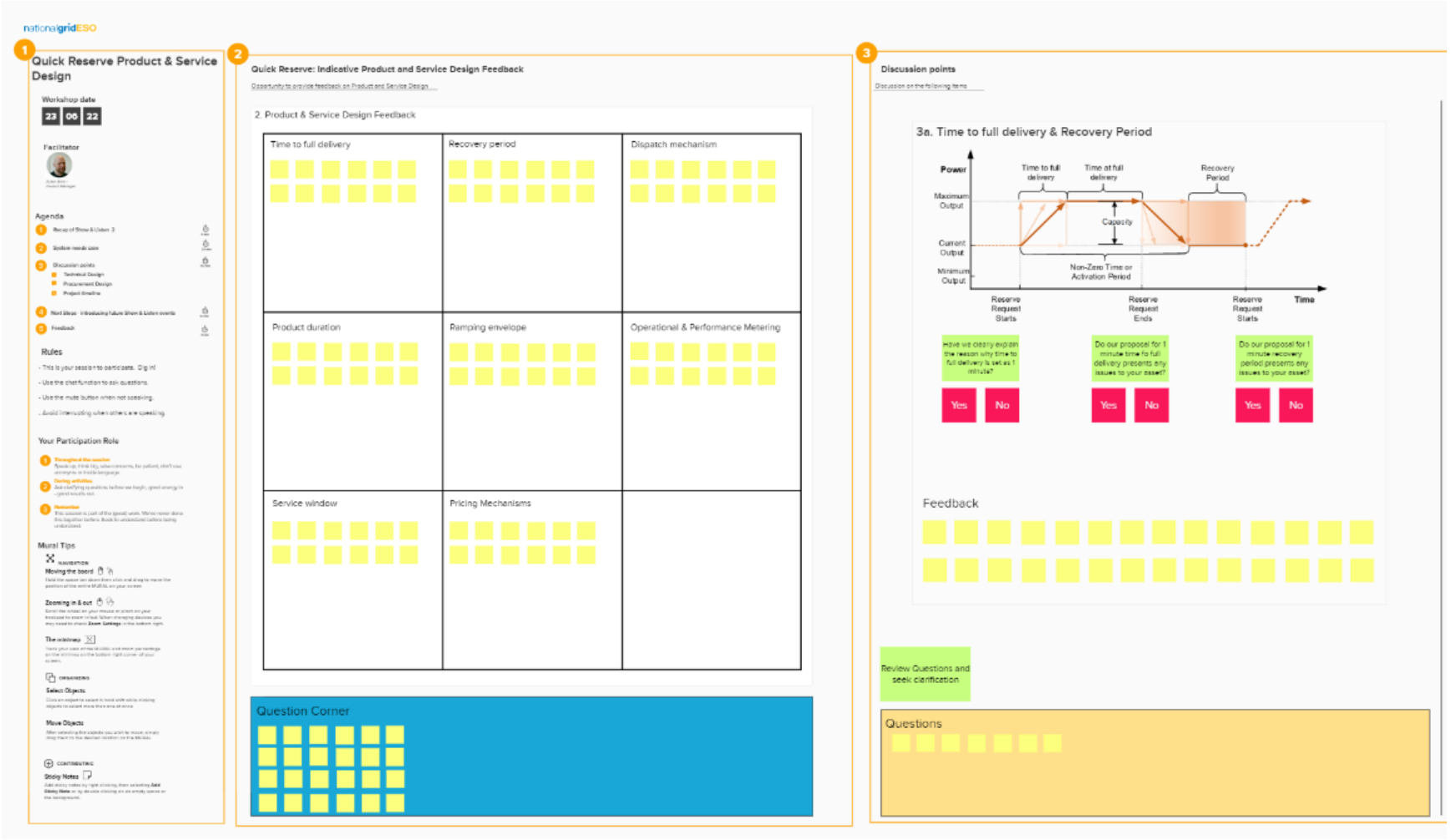
Recovery Period

- This refers to the time interval in which a unit is allowed to recover and return to availability following an instruction.
- For Quick Reserve, a recovery period of 1 minute or less is proposed.



Mural

Please head to the [Reserve Show & Listen Mural board] to provide feedback on our proposals.

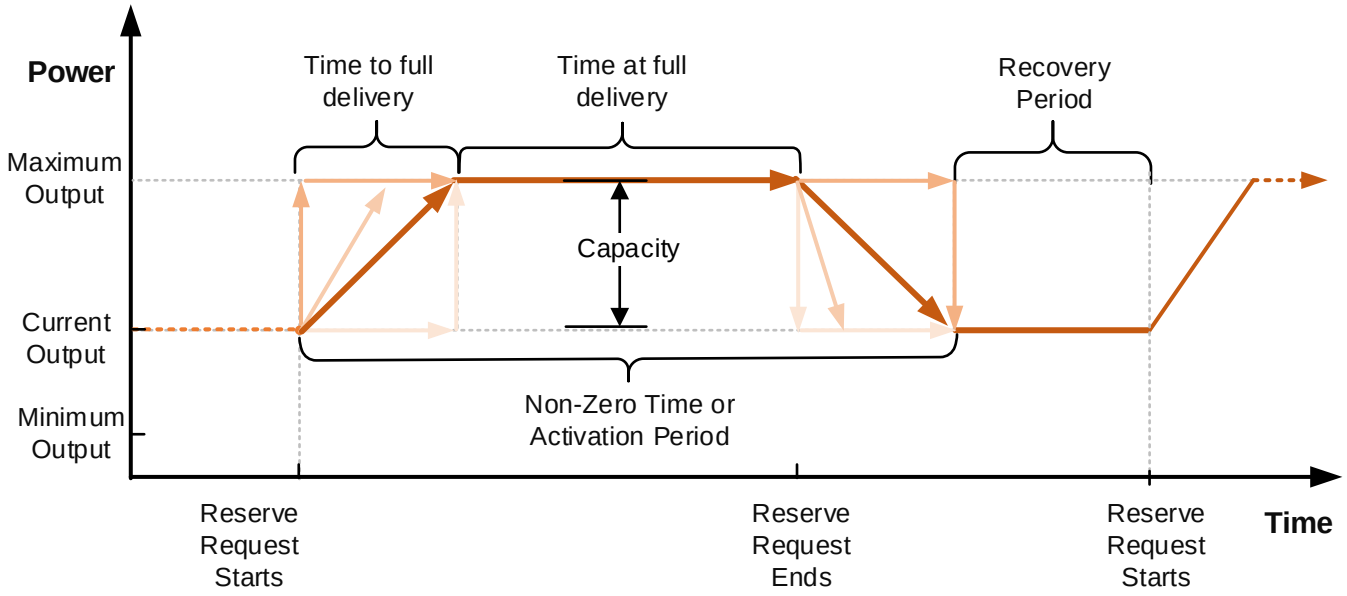


Dispatch mechanism

- Dispatch instructions to BM providers will be by way of Bid-Offer Acceptances via EDT/EDL.
- A Non-BM provider will be dispatched via the Ancillary Services Dispatch Platform (ASDP) system.
- Both Quick Reserve (Positive & Negative) services will be dispatched and ceased manually by ENCC.
- In the future, we are proposing to add optional (additional) dispatch mechanism for frequency relay for automatic dispatch following frequency deviation.

Product duration

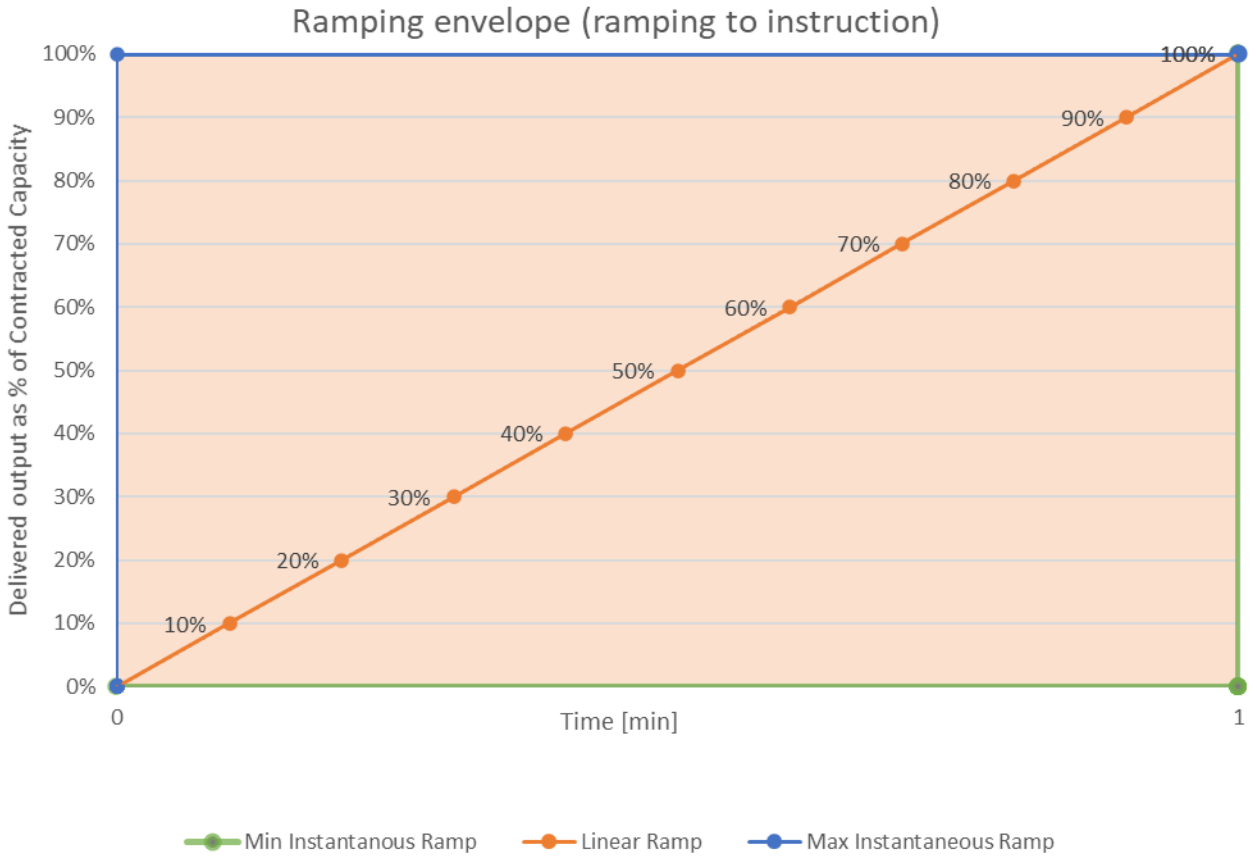
- **Minimum Activation Period is** the minimum duration for which an instruction can be issued, as specified by providers. For Quick Reserve, we proposed Minimum Activation Period to be **up to 5 minutes**.
- **Maximum Activation Period** is the maximum duration for which an instruction can be issued, as specified by providers. For Quick Reserve, we proposed Minimum Activation Period to be **at least 15 minutes**.
- Minimum and Maximum Activation Periods are inclusive of ramp to instruction, time at full delivery and ramp from instruction.
- All instructions can be extended in intervals of one minute from the Minimum Activation Period up to the Maximum Activation Period.



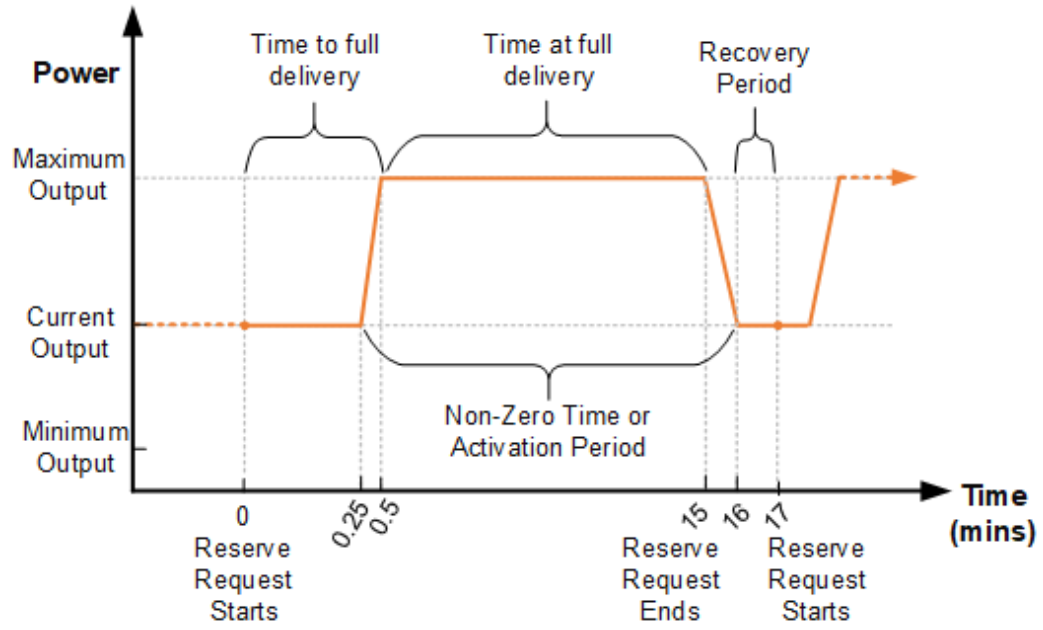
Ramping envelope

Proposal:

- **No maximum ramp rates limit when ramping up or to instruction or ramping down and from instruction.** The unit can ramp to and from instruction freely (continuously or instantaneously) with any ramp rates.
- The unit may not deliver at a rate less than 100% of contracted capacity per minute (**minimum ramp rate for ramp to and from instruction**).
- The unit may start delivery immediately after accepting a dispatch instruction.

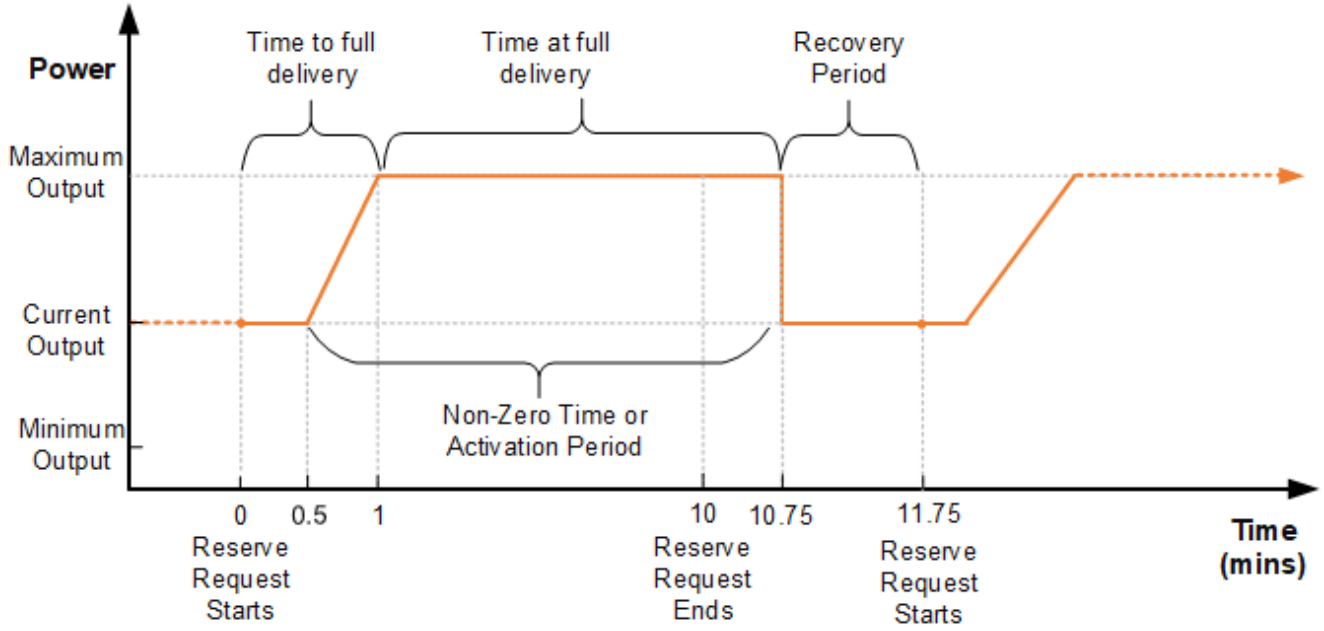


Delivery Examples



- Ramp-up: **0.5 min**
- Time at full delivery: **14.5 min**
- Ramp-down: **1 min**
- Activation period: **15.75 min**

- Ramp-up: **1 min**
- Time at full delivery: **9 min**
- Ramp-down: **0.75 min**
- Activation period: **10.25 min**



Performance & Operational Metering

- **We are proposing that Quick Reserve has 1Hz (once per second) read frequency for both operational and performance metering for all participating units.**
- **Operational metering** frequency to align with the Balancing Mechanism. It is needed to aid control room visibility of units when dispatched and ramping. We are also developing new systems which will enhance forecasting capability, also improved by more granular metering data.
- For **performance metering**, it is important to be able to check compliant ramping within the envelope, over and deliveries for monitoring purposes.
- These metering requirements are consistent with Slow Reserve metering requirements for standardisation purposes.

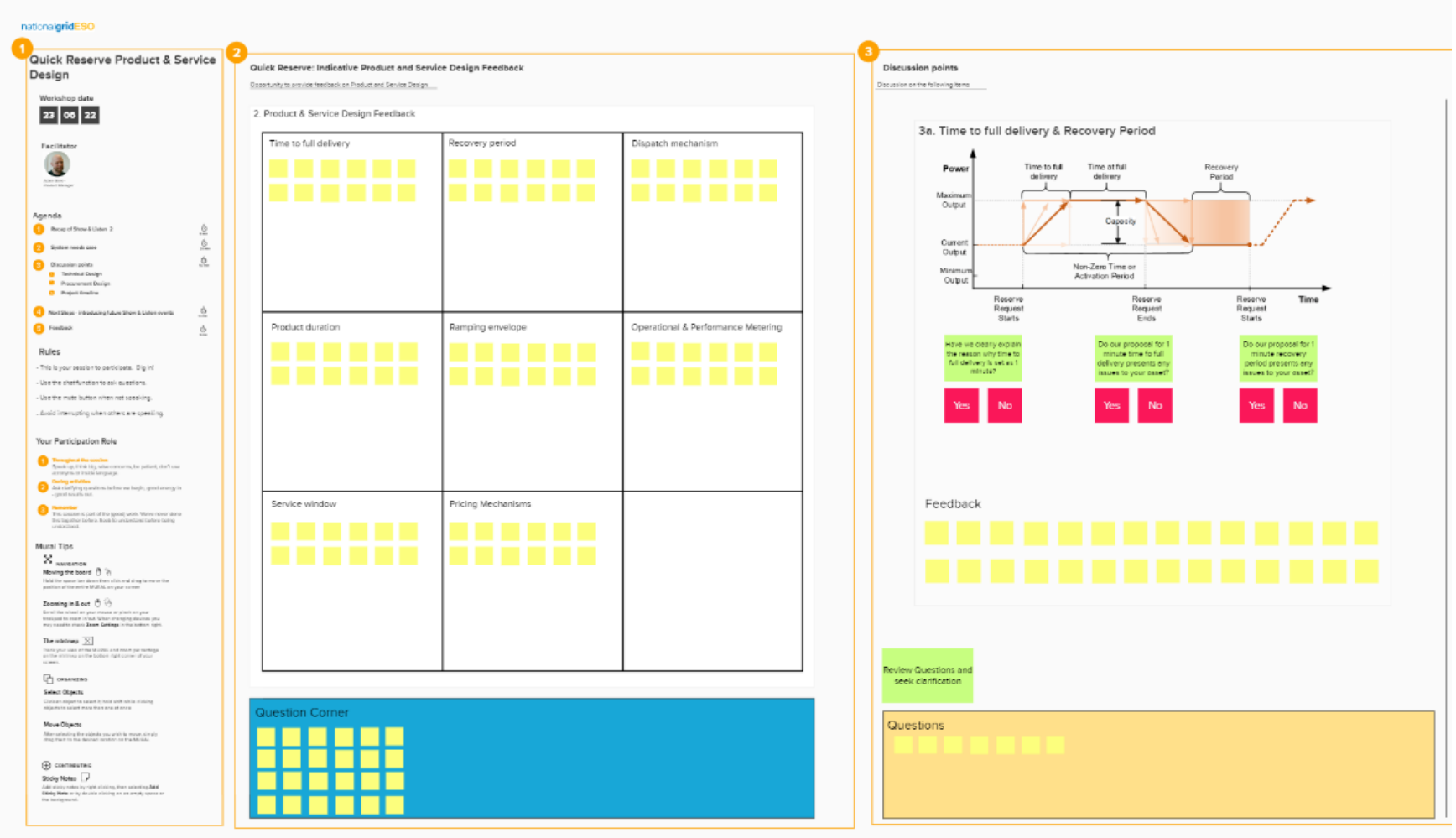
Quick Reserve: Indicative Product Technical Design

Product Criteria	Proposal
Minimum Capacity	1.0MW
Time to Full Delivery	Providers must reach full activation within 1 minute from instruction
Maximum Activation Period	A minimum of 15 minutes
Minimum Activation Period	A maximum of 5 minutes
Maximum Recovery Period	A maximum of 1 minutes
Aggregation rules	Providers can aggregate units within a GSP Group
Dispatch Mechanism	BM – BOAs / Non-BM - ASDP
Operational Metering	1Hz
Performance Metering	1Hz
Ramp rates	As per envelope restrictions
Baselining	60-minute nomination baseline

Where possible we kept the Quick Reserve technical design as close to the Slow Reserve technical design for standardisation across products in Reserve Reform

Mural

Please head to the Reserve Show & Listen Mural board to provide feedback on our proposals.



Procurement Design

	Launch Stage 1 Optional (BM & Non-Bm)	Launch Stage 2 + Firm Non-BM	Launch Stage 3 + Firm BM
Unit Cap	500 MW	500 MW	500 MW
Frequency of Procurement	Ad-hoc	Daily	Daily
Auction Timing	N/A	D-1 14:30	D-1 14:30
Service Window	2h Window	2h Window	Settlement Period
Auction Platform	N/A	Enduring Auction Platform	Enduring Auction Platform
Stacking	Same MW cannot be sold twice	Same MW cannot be sold twice	Same MW cannot be sold twice
Linking of Bids	No	No	No
Payment Structure	Utilisation only	Firm service: Availability+ Utilisation Optional service: Utilisation	Firm service: Availability+ Utilisation Optional service: Utilisation
Payment Mechanism	Pay-as- bid	Availability: Pay-as-clear Utilisation: Pay-as-bid	Availability: Pay-as-clear Utilisation: Pay-as-bid

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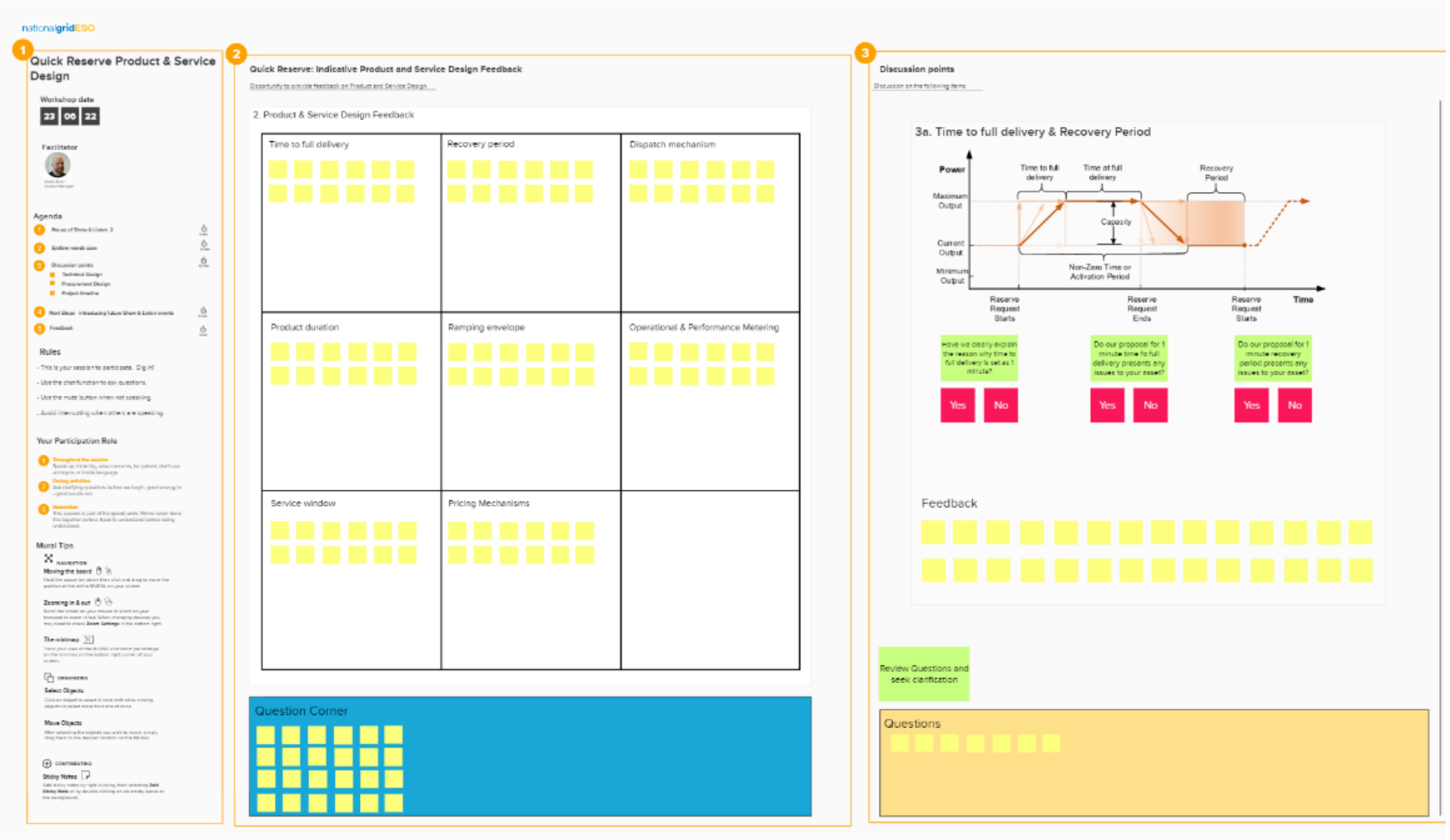

Next steps

Quick Reserve – Next Steps

- Feedback from today's session – does this style and structure work for you? Box.futureofbalancingservices@nationalgrideso.com
- We would like to propose another session in July where we hope to share more information and Q&A session around Quick Reserve product.
- Further written feedback would be appreciated on Quick Reserve design elements via email (Box.futureofbalancingservices@nationalgrideso.com)
- Mural board will be open for 1 week to provide a space to give us a feedback

Appendices

Meet The Team

Adam Sims

Reserve Reform Product Manager

Steve Dugmore

Reserve Reform Market Services Lead

Mike Coldwell

Market Requirements Future Design Manager

Francisco Sanchez Gorostiza

Reserve Reform Product Design

Rob Westmancoat

Reserve Reform Product Design

Ewa Krzywkowska

Reserve Reform Product Design

Yingyi Wang

Reserve Reform Procurement Design