Public

January 2025 Response Reform Webinar

NESO
National Energy System Operator

Agenda

- Introduction
- The Future of Mandatory Frequency Response (MFR)
- Static Reform
- Locational Procurement
- Dynamic Response update
- Industry Engagement
- Q&A

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Introduction

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The response services

Mandatory Frequency Response (MFR)

- Long standing, mandatory service instructed by control room “within gate”
- Requires reform to be compliant with energy regulations and better meet the needs of the future system and optimise as part of wider suite of services

Static Firm Frequency Response

- Longstanding service, post-fault service procured to meet restoration requirement
- Opportunity to optimise procurement as part of wider suite of services

Dynamic Response Services

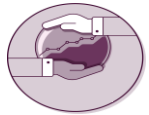
- The newest and now the backbone of the suite of response services
- Further opportunities for improvement including locational procurement

Service Design and implementation Timelines

Needs case

Options assessment

Service design



Formal Consultation

Go Live

Engagement

Mandator Frequency Response reform

Static Response Reform

Locational procurement

Future of MFR

A brief overview of MFR

Availability Calculations
Instructions
Pricing and Payments

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Future of MFR

- Why change?
  - Regulatory Compliance
  - Economic Operation
  - Improved Security

- (go watch the Oct 2024 webinar!)

Feedback

- Thanks to everyone who took the time to fill out the survey and take part in a 1-2-1.
- Survey is still open if anyone wishes to participate: https://forms.office.com/r/58Qrvnh6Nn

- We collected feedback on:

Balancing variable real-time response requirements with the need for robust post-fault containment

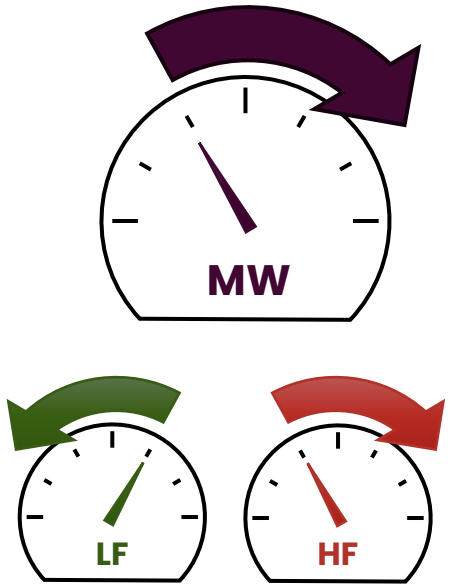
Avenues of investigation (Realtime Dx, shorter service windows, response energy payments, locational procurement)

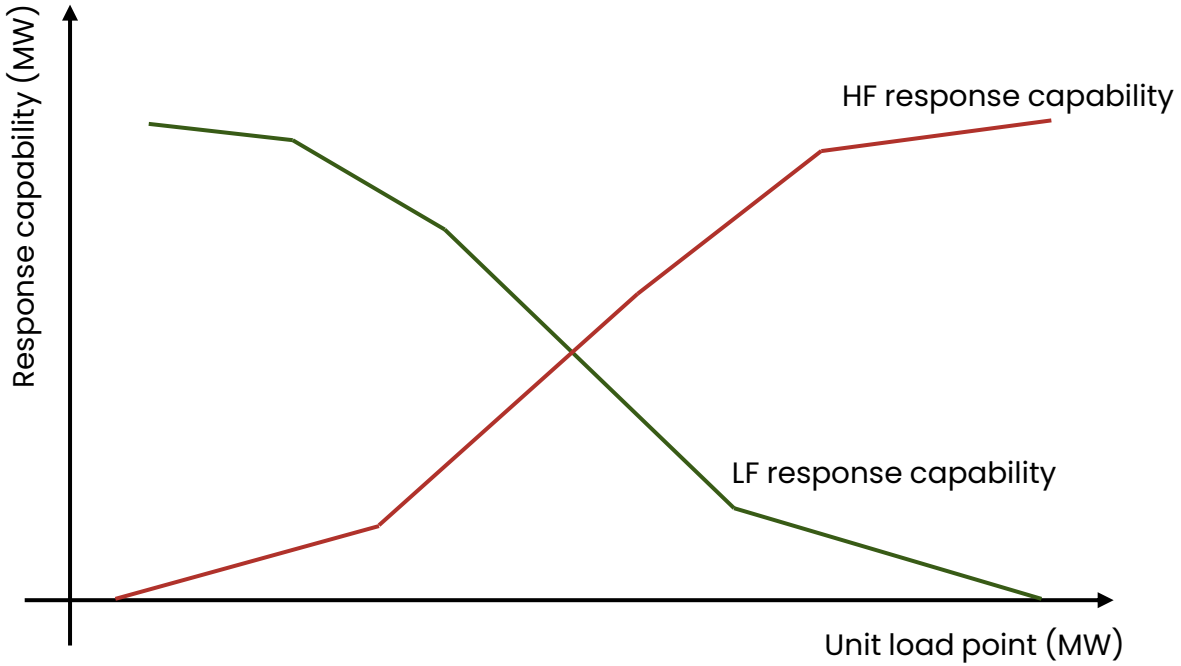
Other thoughts / challenges we had not considered

We did not receive strong views on topics (beyond improving the price submission process).

Managing Availability

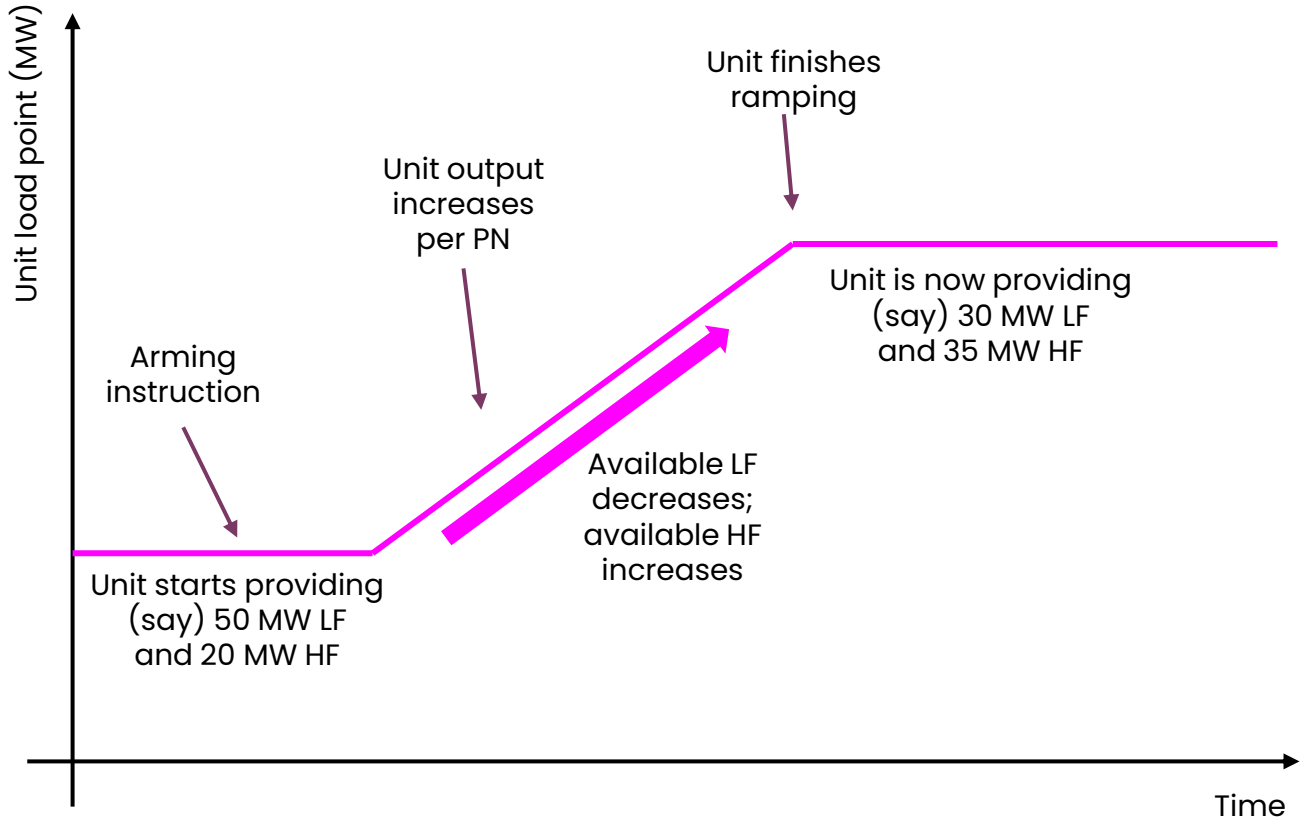
- An instruction can be sent at any time
- Units will be self-dispatching and/or responding to BOA's
- So the amount of response available is constantly changing





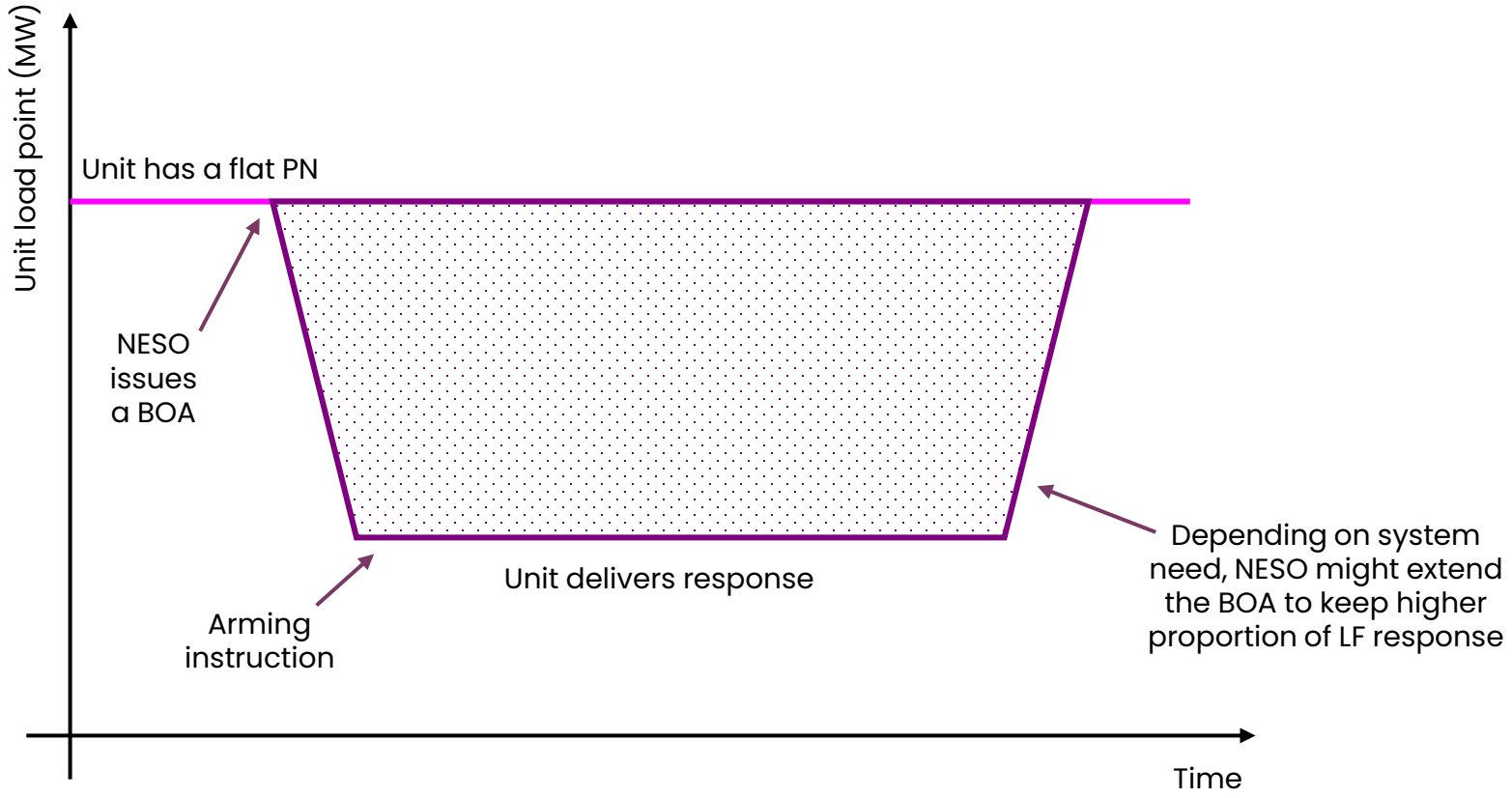
Managing Availability

- Scenario: a unit is armed for MFR and is changing its output



Managing Availability

- Scenario: a unit is armed for MFR while delivering a BOA



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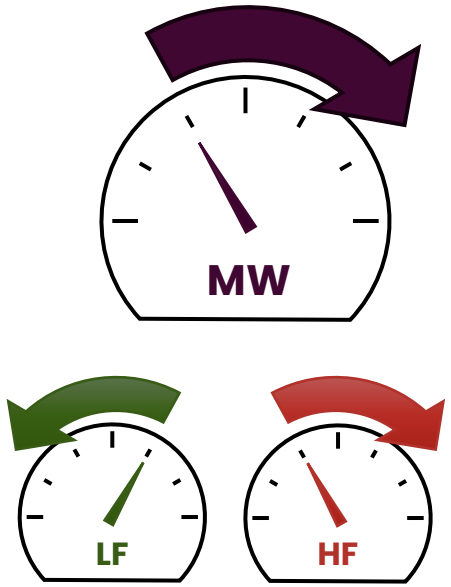
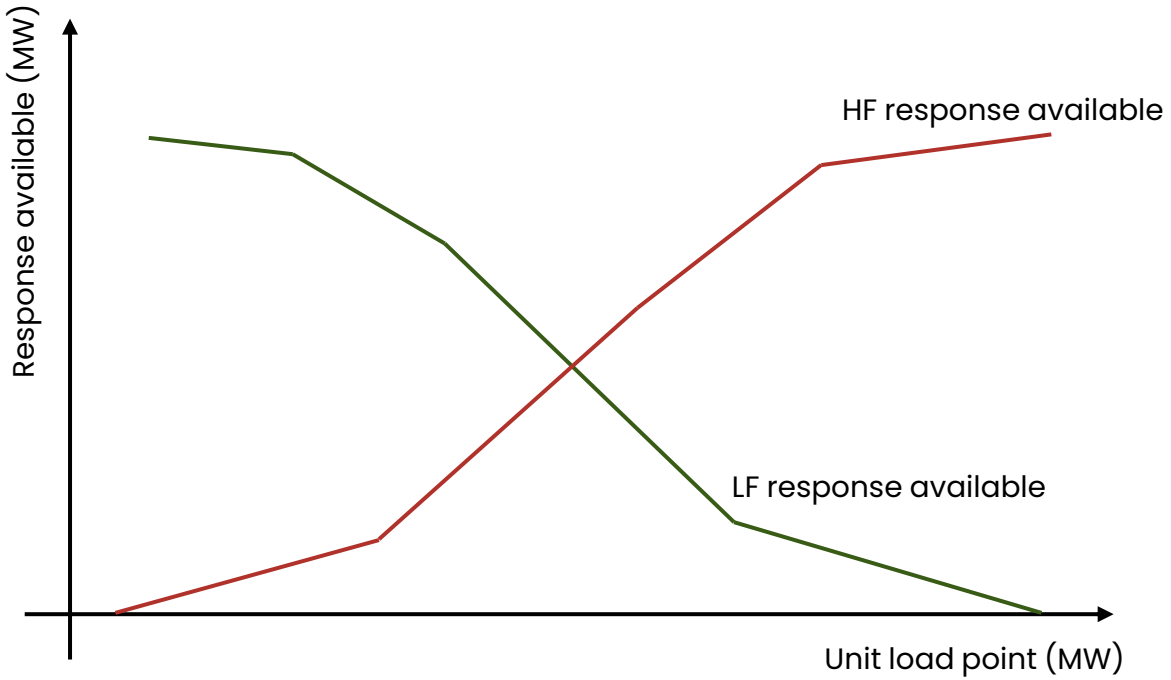




Instructions

- Three services (sort of):

	range	*start*	*maintain*
Primary	LF 49.5-50 Hz	10s	30s
Secondary	LF 49.5-50 Hz	30s	30min
High	HF 50-50.4 Hz	10s	Indefinite

- Instruction types “PSH” (all three services) or “PH” (Primary and High only); no single-service instructions.
- Each service still has a separate price, because they might well still be instructed in different ratios.
- Instructions are all-or-nothing
- Issue time rounded to minute boundary
- Two minutes to start delivery (from issue time)
- Open-ended (unless unit reaches zero)
- No maximum arming duration

Payments and Pricing

Arming Payments: single flat monthly price per service

Submission month

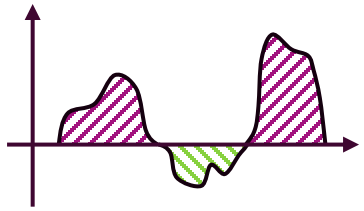
Delivery month

5th–15th business day

Submission window

Energy Payments: Market Index Price +/- 25%

Determine theoretical net delivery



Determine market index price

Positive delivery: energy purchased at 125% of market index price

Negative delivery: energy sold at 75% of market index price

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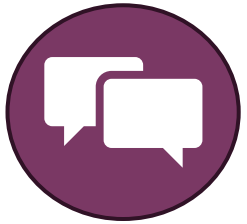
What's worth keeping?

Availability Calculations	Some form of response capability curve will be needed
Instructions	• Unbundle instructions (mandatory) • Finite delivery period for HF • Allow partial instructions? • Open-ended or closed-ended? • Allow limits to arming duration? What else?
Payment and Pricing	Arming payments: • Granularity: Daily? EFA block? Settlement period? • Submission deadline: day-ahead? Gate closure? Energy payments: • Ex-post calculation? • Ex-ante submission? • Ex-ante implicit pricing?

Preference for alignment with the day-ahead service!

Next steps



Feedback on areas mentioned today

1-2-1 conversations with current and prospective providers

Follow-up session to discuss options for service design

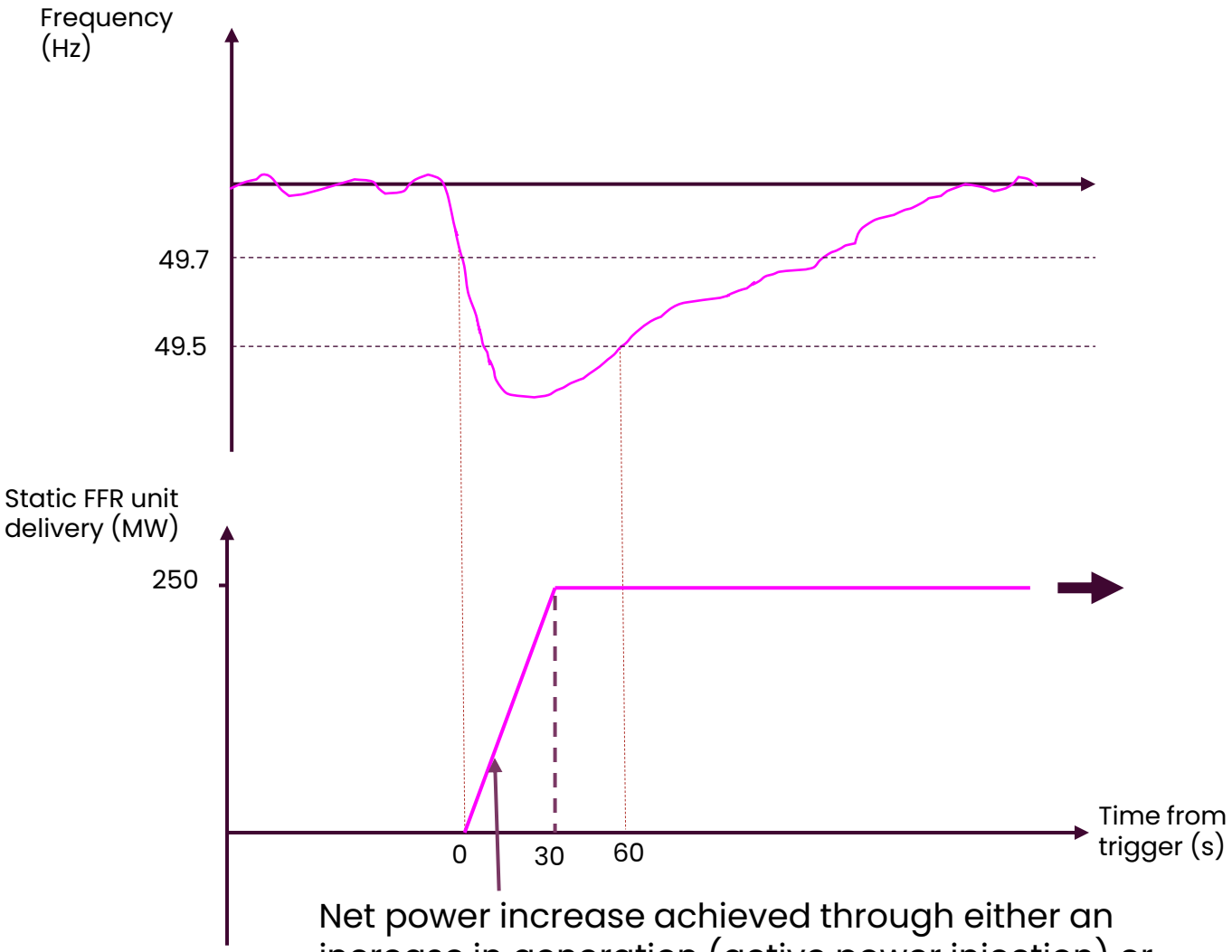
Static Reform

Current Market Design

The role of static

Areas being explored

Current Market design



Key market principles

- Low frequency service only
- Daily auction (11am)
- Triggered at frequency level 49.7
- Full response within 30 seconds
- Activation period 30 minutes
- 1Hz Performance monitoring

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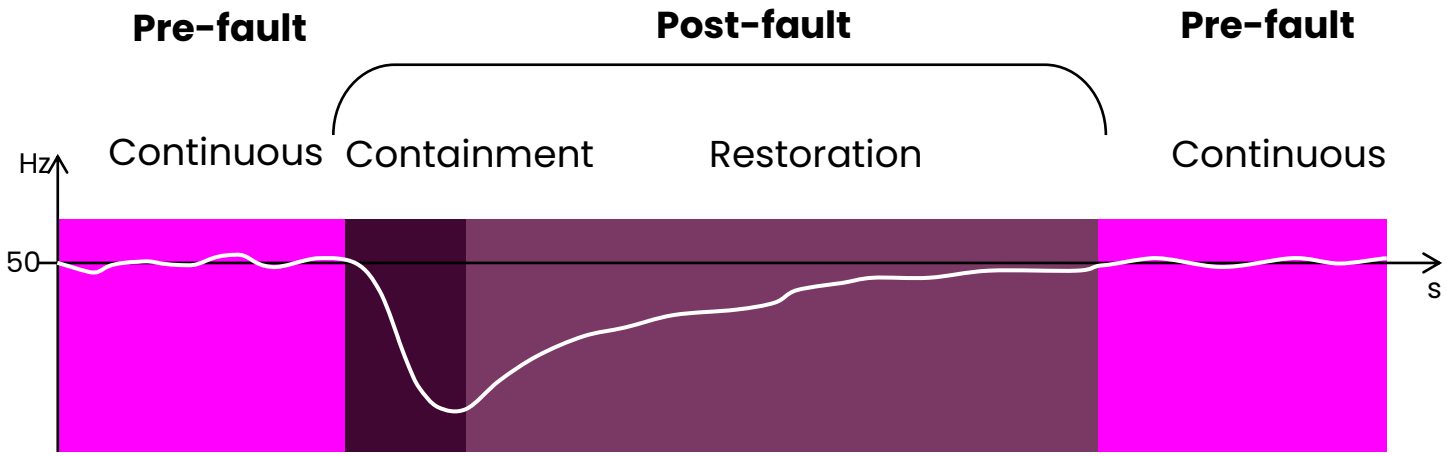
The role of Static FFR

Post fault service

We have two requirements we need to meet following a fault on the system

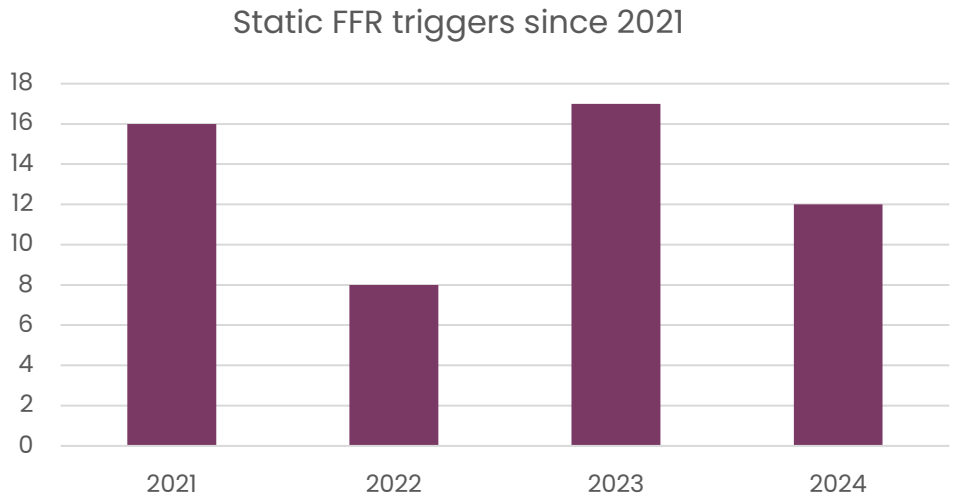
- Ensure system frequency doesn't drop below 49.2 – ***Containment requirement***
- Restore system frequency to within statutory limits (49.5) within 60 seconds – ***Restoration requirement***

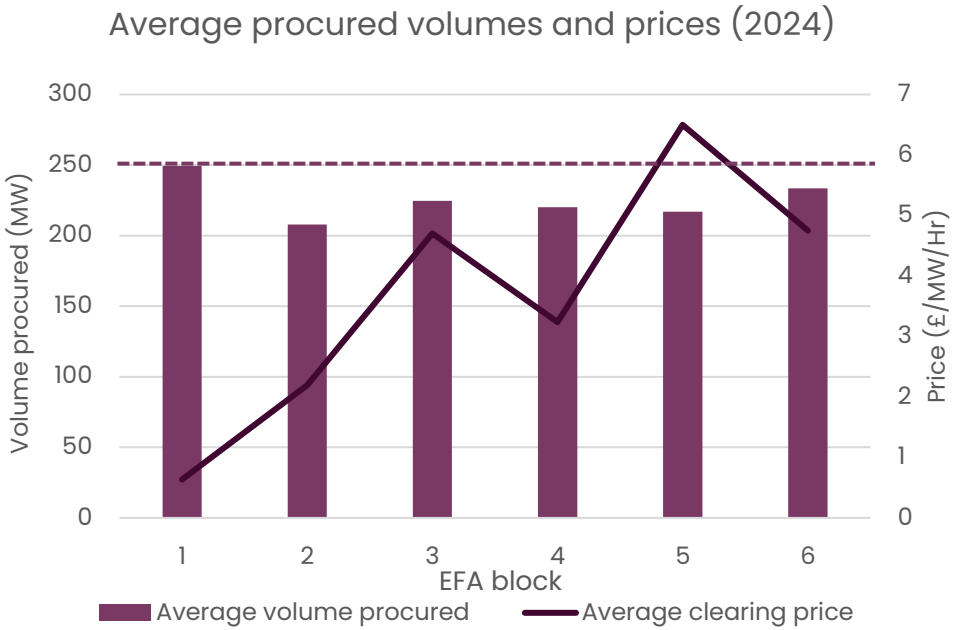


Our containment and restoration requirements are calculated as a function of the **Demand**, **Inertia**, **Largest infeed loss** and **response held** on the system at any given period.

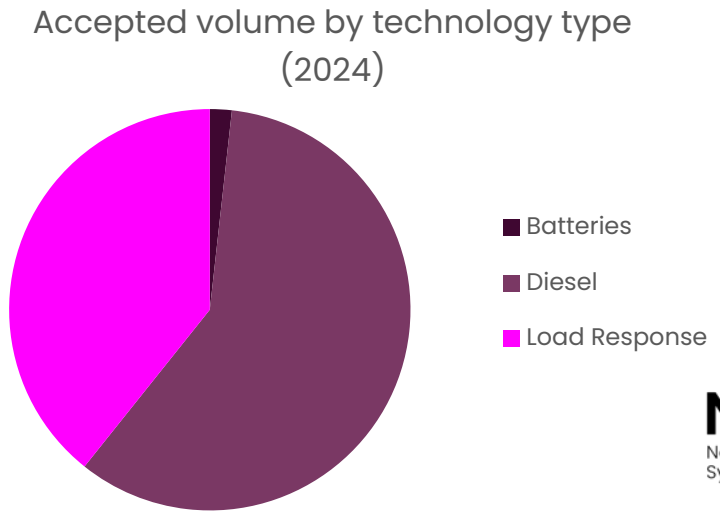
Static FFR ensures that we can meet our **restoration requirement**. **Dynamic Containment** can meet both our **restoration & containment requirement**, therefore Static FFR procurement is assessed against the **corresponding reduction in DC**.

Context





- Service triggered around 12 times a year
- 250 MW target procurement each EFA block
- Market predominately filled by diesel generators and load response units



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Problem statement

Problem:

Increasing capacity of static response can lead to an increase in operational risk

- Frequency disturbances at the end of a delivery period
- High frequency events during initial delivery
- Unnecessary actions taken following a low frequency event

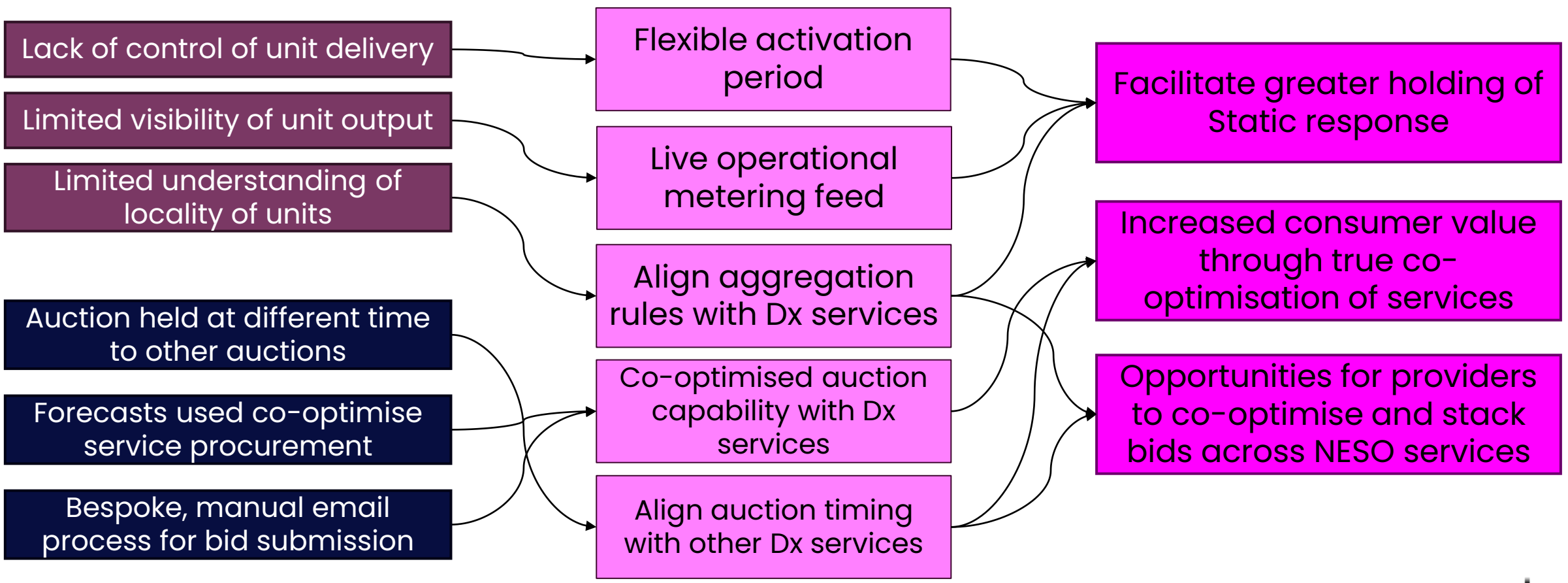
The current procurement rules and process has limitations for providers and NESO

- Limited options to stack unit revenues across balancing services
- Potential loss of value from not co-optimising auction with DC
- Additional complexity of a bespoke auction process

Due to:

- Lack of control of unit delivery
- Limited visibility of unit output
- Single trigger frequency (e.g. 49.7Hz)
- Limited understanding of locality of units
- Auction held at different time to other auctions
- Forecasts used to optimise service procurement
- Bespoke, manual email process for bid submission

Priority areas being explored



Additional areas of consideration

We are keen to have discussions with providers to understand how other service or procurement rules might impact their involvement in a static product

Trigger level(s)	Alter trigger level to reduce number of triggers or introduced a range of trigger levels to stagger delivery based on loss size.
High Service	Evaluate the potential benefit a high service could have in securing against outfeed losses.
Response times	Evaluate current response times against system needs.
Performance monitoring	Assess opportunities to automate and assess against other NESO services

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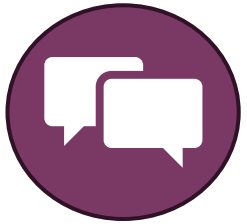
Next steps



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Follow-up session to discuss options for service design

Locational Procurement

Drivers for locational procurement

Key considerations

Drivers for Locational Procurement

Impact on network constraints:

- Constraints in the transmission network increase the risk of response and reserve units being unavailable to deliver when required. Furthermore, units can be in a place where their delivery will exacerbate rather than alleviate the constraint.
- Distribution network operators are also increasingly facing localised constraints in parts of their networks. Active Network Management (ANM) schemes are therefore more widespread, and these could erode some of our day-ahead response and reserve procured capacity.

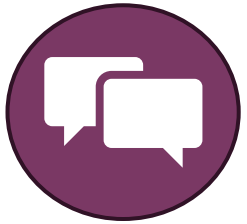
Impact on stability:

- The node(s) where response and reserve are injected to the grid have implications on frequency and angle stability. This relationship is complex and depends on fault location, pre-fault power flows and pre-fault inertia distribution.
- Uneven inertia distribution leading to appearance of regional frequencies and potentially localised requirements.

Key Considerations

- GSP Data Visibility
- Review required locational data
- Minimum bid and unit sizes
- Fractional bids
- Partial unit dispatch
- Locational constraints visibility
- Buy and sell order format review
- Clearing price definitions
- DNO constraints
- Update Procurement Rules
- Update Service Terms

Next steps



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Dynamic Response updates

Monitoring, reporting and penalties

ABSVD for NBMUs

Dynamic Response Updates

Monitoring Reporting & Penalties

- Phased introduction of automated reporting and penalisation for non-compliance with Service Terms throughout 2025 to improve data quality and ensure a level playing field
- Provisions for additional checks to monitor provider behaviour and introduce a tiered penalty regime will be reconsulted on when delivery timescales are confirmed with implementation expected in early 2026

ABSVD for NBMUs

- We will be launching a joint ad hoc Article 18 and Condition 9 consultation
- This will be introducing changes to facilitate applying ABSVD to non-balancing mechanism units (NBMUs)
- Timelines will be communicated with industry once implementation dates are confirmed

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Industry engagement

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Ongoing Engagement

- We appreciate and value the engagement we have with you
- We want to create a regular cadence of webinars and drop in Q&A sessions
- Allowing for critical industry input into changes to the response services as well as deep dive teach in sessions

- We appreciate feedback on frequency of these sessions:

Monthly

6 weekly

Bi-monthly

Q&A

Please submit any questions via the Q&A function