



Electricity System Operator

# Balancing Services Roadshow

London and Edinburgh 2023

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London and Edinburgh 2023





Electricity System Operator

Enduring Auction Capability

# Enduring Auction Capability (EAC)

The RIIO-2 Business Plan committed ESO to delivering **co-optimised procurement of day-ahead Response and Reserve services**, which would be **scalable** and **extendable** to new services and products



During 2022-23 a consortium of three firms will support ESO deliver the EAC.



## The EAC is expected to deliver the following benefits:



### Better user experience

- Fewer manual, duplicated processes.
- Increased use of technology to facilitate bidding
- Consistent / standardised user experience



### Closer to real-time procurement

- Increased market liquidity & participation
- Increased technology variation (e.g. renewables & demand flexibility)



### Consistent procurement route

- Single route to market, replacing interim solutions
- Enhanced transparency of our procurement activities
- Lower costs to move between services
- Reduced duplication of resource for bidding



### Connected and co-optimised auctions for ancillary services

- Efficient markets due to clearer price signals (increased algorithm efficiency)
- Easy access across multiple markets
- Greater diversity in bidding strategies (e.g. curtailable bids)
- Compatibility with downstream systems (e.g. settlement)



### Long-term benefits

- Improved levels of flexibility and configurability to adapt to changes in service procurement
- Accessible to new / future service providers

## EAC – What is it?

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- The Enduring Auction Capability (EAC) is being designed to deliver **co-optimised procurement for our day-ahead Frequency Response and Reserve products**. It is envisioned that this method of procurement will allow us to meet our needs in the most efficient way, while enabling providers to participate in multiple markets.
- The EAC Platform will be both **extendable** and **scalable** to future products and services whilst delivering a multitude of benefits.



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**Balancing Reserve**

# Background

This slide pack contains supporting information for the Balancing Reserve call for input.

We proposed a new ancillary service called Balancing Reserve (BR) because we identified it could provide potential system balancing cost efficiencies. The service provides a market incentive, which is not currently present, for plant selling in the wholesale market to also offer capacity to the ESO day ahead to meet reserve requirements. Balancing costs have risen significantly in the last four years, from £1.3b in 19/20 to £4.2bn in 22/23. In this context, Balancing Reserve presents a significant opportunity for us to reduce balancing costs, which in turn reduces the impact of these high costs on end consumers.

Whilst Ofgem commended our intent to prioritise development of a service which could reduce balancing costs, they had significant concerns with our proposed approach, particularly related to barriers to entry for small flexible providers and concerns whether our cap on reimbursement was a sufficiently powerful deterrent, [which led them to reject the service](#).

## How to get involved

This slide pack contains our additional work since the Ofgem decision. During this time, we have been developing BR further to remove barriers to entry for potential service providers and would greatly value feedback.

Specific areas are brought out in the green boxes at the bottom of each slide, however please do bring to our attention anything else that you would like to highlight.

Please provide feedback using the '**call for input response pro forma**' attached to the email to [box.futureofbalancingservices@nationalgrideso.com](mailto:box.futureofbalancingservices@nationalgrideso.com) by Friday 26 May 2023.

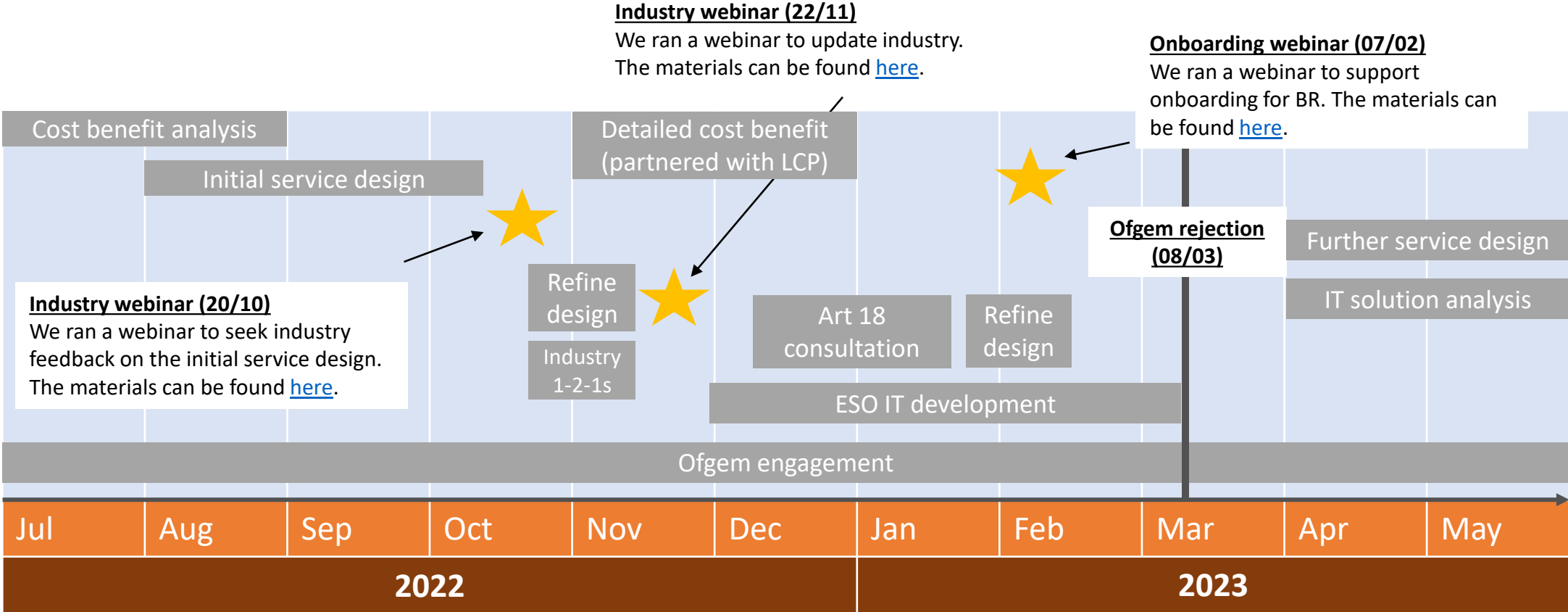
Alternatively we are able to arrange calls to discuss your thoughts - if you would prefer to do this please contact [vicci.page@nationalgrideso.com](mailto:vicci.page@nationalgrideso.com)

We will run a webinar on Tuesday 13<sup>th</sup> June at 2pm (invites will be sent nearer the time) summarising the responses and to talk about next steps.

**Call for input:** Example showing the location and format of call for input prompts.



# Balancing Reserve: The journey so far



**Call for input:** Please tell us about your experience of Balancing Reserve so far. How could we improve as we continue to develop the service?

# Ofgem Rejection Feedback: Barriers to entry for small flexible providers

- Following Ofgem's concern about barriers to entry for small flexible providers, we are proposing to reduce the minimum bid size to 1 MW.
- This improvement is made possible by enhancements to the Control Room multi-dispatch tools, along with new functionality which will be delivered through the Open Balancing Platform (OBP). This functionality increases our ability to dispatch smaller units efficiently.
- Any potential go live date for BR is not likely to be until 2024 which enables BR to align with the OBP development due in December 2023.
- Reducing the minimum bid size from 50MW to 1MW means that other consequential changes are needed to the BR service design to ensure it continues to meet the system requirement. These are detailed in the following three slides.

**Call for input:** Do you identify any other barriers to entry for small flexible providers in the BR service design? If so, please provide more information.

## Further Service Considerations: Dispatch flexibility

A key requirement of balancing reserve is the ability of BR providers to be able to dispatch flexibly. Reducing the minimum bid size to 1MW means that the following rule changes are needed to ensure that this system requirement is still met with the smaller bid size:

- Being able to deliver MFR at FPN and at any MW between FPN and full contracted output in accordance with a Mandatory Service Agreement (MSA) or commercial equivalent to which the Registered BR Participant is a party.
- BR dispatch is not limited by Notice to Deviate from Zero (NDZ) / Stable Export Limit (SEL) / Stable Import Limit (SIL) / Minimum Non-Zero Time (MNZT) / Minimum Zero Time (MZT) parameters.
- BR must be capable of being dispatched to each integer MW value from PN to full contracted delivery at 1 minute time interval.
- BR dispatch may only be limited by Notice to Offer (NTO), Notice to Bid (NTB), Ramp Up Rate Export (RURE), Ramp Down Rate Export (RDRE), Ramp Up Rate Import (RURI), Ramp Down Rate Import (RDRI) parameters.

**Call for input:** Do you agree with these changes? If not, please provide more information.

## Further Service Considerations: Ramp rates / time to full delivery

Our previous proposal had a minimum ramp rate requirement of 10MW/min (which was amended from 15MW/min based on industry feedback from the October webinar).

It is not clear that this requirement is still suitable as we drop the minimum bid size to 1MW. There is a risk that it is too quick for smaller providers, and there is a risk that a few large, slower providers might fulfil our reserve requirement, but provide little flexibility for the control room. Further 10MW/min expects units to ramp faster than Quick Reserve or even Primary Response, e.g. a 1MW unit would need to achieve full capacity in 6 seconds.

Therefore we are currently considering two different options to mitigate this risk and would welcome feedback on the two approaches.

### Replace 'Minimum Ramp Rate' Requirements with 'Time to Full Delivery' parameter

- Allows more units to participate in BR
- Gives control room confidence in the dispatch instructions
- Reduces risk of reserve being held on one/two/three big units with low flexibility
- Negatively impacts large and slow units

### Keep Minimum Ramp Rate Requirement but add 'Maximum bid size' (e.g. 300MW)

- Reduces risk of reserve being on one/two/three big units with low flexibility
- Reduces market potential
- Less flexibility as max. time to full delivery would be 30 minutes (with max. bid size of 300MW)

**Call for input:** Please provide your views on this topic and if possible, include examples of how your asset would be impacted.

# Further Service Considerations: Bid curtailment rules

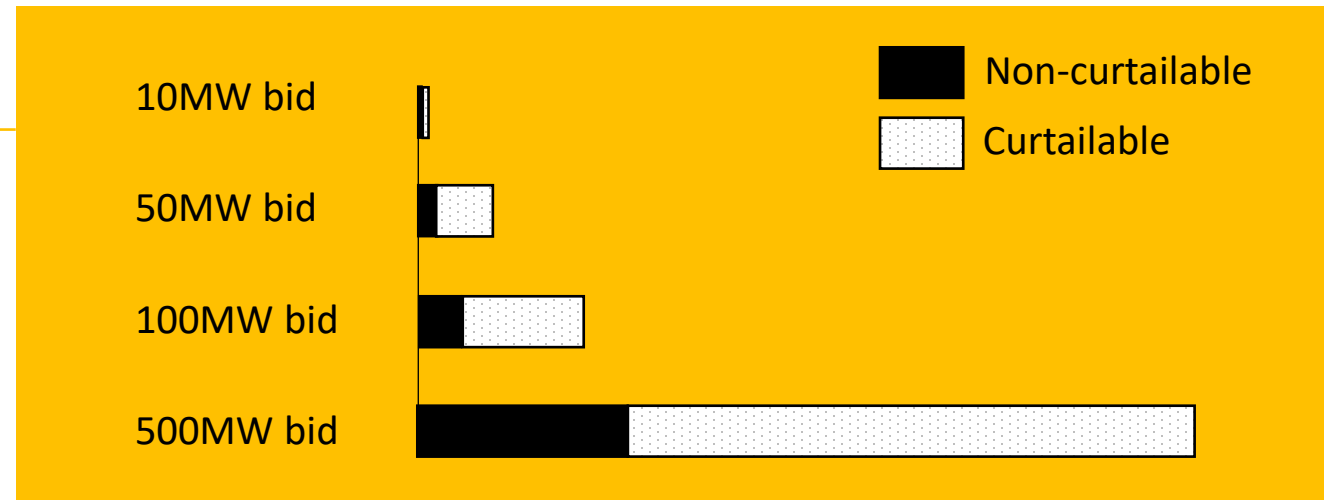
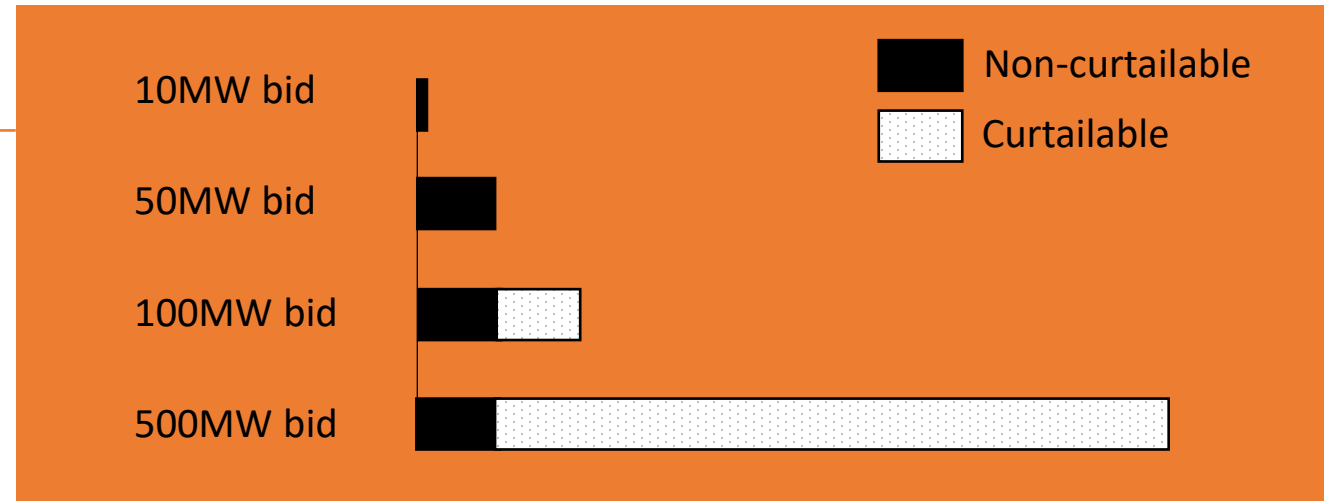
Our previous proposal allowed all bids to be “curtailable” to 50MW. This means that a BR unit could be partially accepted for any volume between the full bid volume and 50MW. We are currently considering the different options below and would welcome feedback.

1. Continue with 50MW minimum contract size, all bids are fully curtailable above this level. Any bids  $\leq 50$ MW are non-curtailable.

2. All bids have to be fully curtailable.

3. All bids have X% of the bid volume as non-curtailable. (e.g. 25% non-curtailable)

4. User defined curtailment.



**Call for input:** Which proposal do you prefer? If you have alternative proposals, please provide details.

## Ofgem Rejection Feedback: Cap on reimbursement

- Ofgem was concerned that our £250,000 cap on reimbursement was not high enough and needs to be a sufficiently high deterrent so that providers do not take advantage of a change in market conditions between the day-ahead auction for BR capacity and real time which would negate the benefit of the service without providing commercial detriment to providers.
- Therefore we are proposing to change the liability penalty to £10,000 per MW of contracted capacity not provided, per BR Unit, per settlement period.
- This ensures that the cap on reimbursement scales appropriately and is a sufficiently high deterrent for both large and small units if there is a change in market conditions.

**Call for input:** Do you agree with this change? If not, please provide more information.

# Consultation Feedback: Defining headroom for PPMs

We received feedback through the Article 18 consultation process that the definition of headroom for Power Park Modules (PPMs) for the purpose of performance monitoring needed to be revised following the changes to the definition of Maximum Export Limit (MEL) introduced through Code Modifications [GC0063](#) and [CMP314](#).

## Old Definition

Available unit headroom must be greater than contracted capacity, where headroom is defined as MEL – FPN.

### **Positive Balancing Reserve**

MEL – FPN  $\geq$  contracted capacity  
*[for all units with PN  $\geq$  0 or who can flow through 0]*

Where FPN = Final Physical Notification

## New Definition

Where contracted BR units are PPMs the reference to MEL is replaced by Power Available (PA).

### **Positive Balancing Reserve**

PA – FPN  $\geq$  contracted capacity  
*[for all PPMs with PN  $\geq$  0 or who can flow through 0]*

This approach encourages accurate FPN submissions to improve operational visibility of reserve units.

**Call for input:** Do you agree with this change? If not, please provide more information.

# Consultation Feedback: Auction Timings

We received feedback through the Article 18 consultation process that the proposed Auction Results Time of 09:00 didn't allow sufficient time for market participants to prepare and submit their bids for the GB DA energy auctions, the first of which runs at 09:20.

It is important to the principle of BR to complete the auction *before* the DA energy auction to move scarcity signals from away from BM timescales and allow the wholesale market to resolve demand and supply imbalances inclusive of ESO's reserve requirement.

**We therefore propose to move the Auction Gate Closure time back by 15 minutes and aim to publish the results by 08:45 to give the market more time to react.**

Item	Timing
Auction Opening Time	00:00 D-7
Auction Closing Time	08:15 D-1
Auction Results Time	09:00 (Target 08:45) D-1

**Call for input:** Do you agree with this change? If not, please provide more information.



Please send feedback using the '**Call for input response pro forma**' attached to the email to [box.futureofbalancingservices@nationalgrideso.com](mailto:box.futureofbalancingservices@nationalgrideso.com) by Friday 26 May 2023.

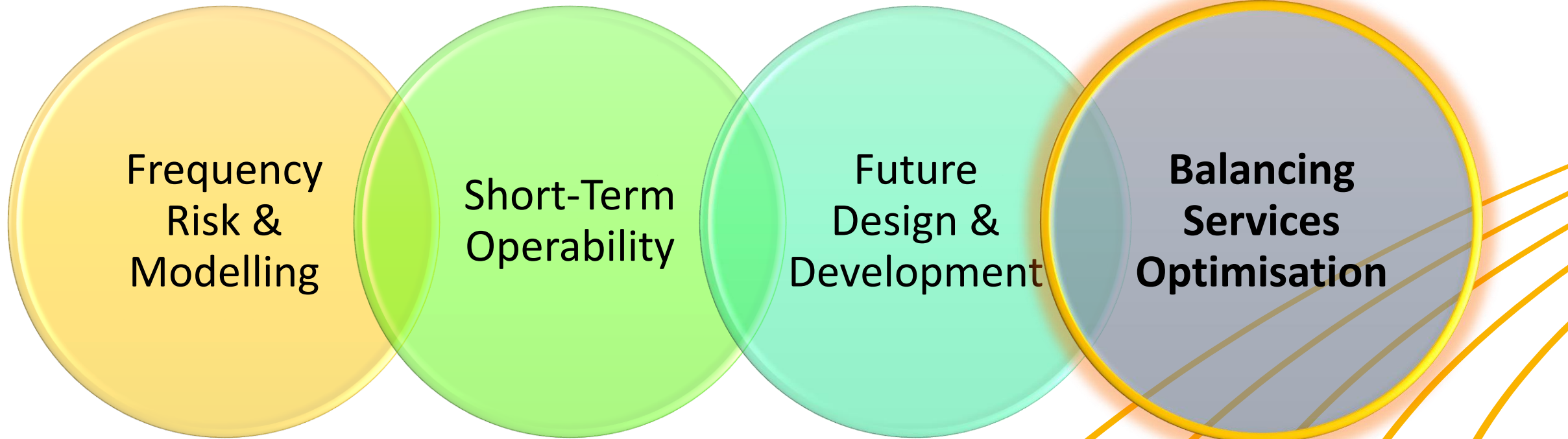
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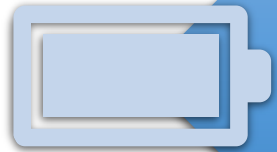
Electricity System Operator

**Balancing Services Optimisation**

Who are we?



# What do we do?



## Procurement

The responsibilities of the Balancing Services Optimisation (BSO) team can be broken down into these three primary categories.



## Ancillary Services Analysis

The team is also engaged in other routine and ad-hoc projects, such as industry engagement events, additional analyses and training.



## Service Design & Development



# Procurement



## Day-Ahead

- Dynamic Frequency Response (DC-DM-DR)
- Short Term Operating Reserve (STOR)
- Static Firm Frequency Response (SFFR)



## Month-Ahead

- Dynamic Firm Frequency Response (FFR)



## Ad-Hoc

- Demand Flexibility Service (DFS)

The BSO team coordinate daily, monthly and ad-hoc procurement events for our suite of Balancing Services.

Our Day-Ahead services are procured via 'pay-as-clear' auctions, while our monthly FFR service and the new, ad-hoc DFS are procured through a 'pay-as-bid' tender process.

While the bid assessment processes are largely automated, and hosted on platforms operated by our trusted partners, the team is still required to produce Buy Orders for each one of our services, which states how much we want to procure and at what price.

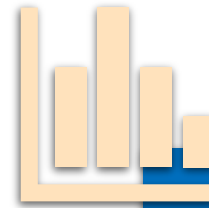


# Ancillary Services Analysis



## Objectives

- Ensure system security by systematically procuring our operational requirements of Balancing Services.
- Accelerate net consumer benefits by maximising competition in our markets.
- Continue to make progress towards net-zero system operation by 2025.

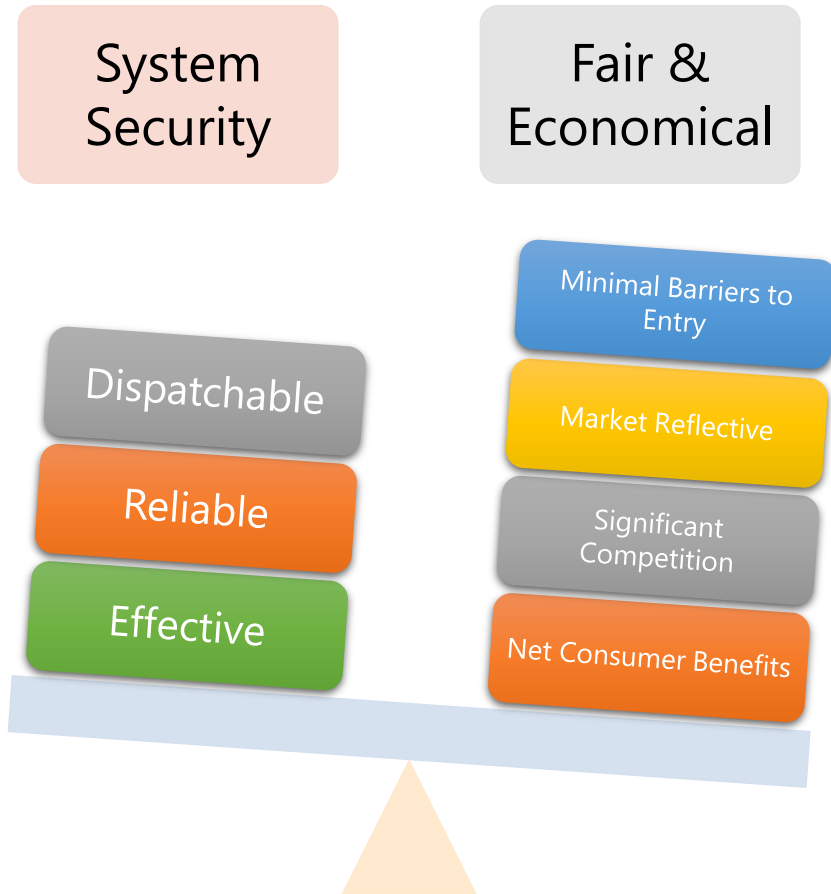


## Responsibilities

- Continually optimise our Buy Order methodologies to promote competition and consumer value.
- Identify uncompetitive behaviour in our markets.
- Develop more efficient and sophisticated modelling capability to underpin our Buy Order methodologies.
- Assess the impact of new services on the Ancillary Services landscape, Balancing Mechanism and wholesale market.



# Service Design & Development



Developing new Ancillary Services requires us to carefully balance the needs of the electricity system with our obligation to procure our services in the most economical way to save end consumers money.

Often there is a trade-off between these objectives, so the BSO team work closely with other teams from the ESO, and with our industry partners to ensure we get it right.

In addition to ensuring new Ancillary Services are consistent with our objectives of System Security and creating a fair and economical market, our decisions must align with our objective to **operate a zero carbon electricity system by 2025.**



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Markets Roadmap

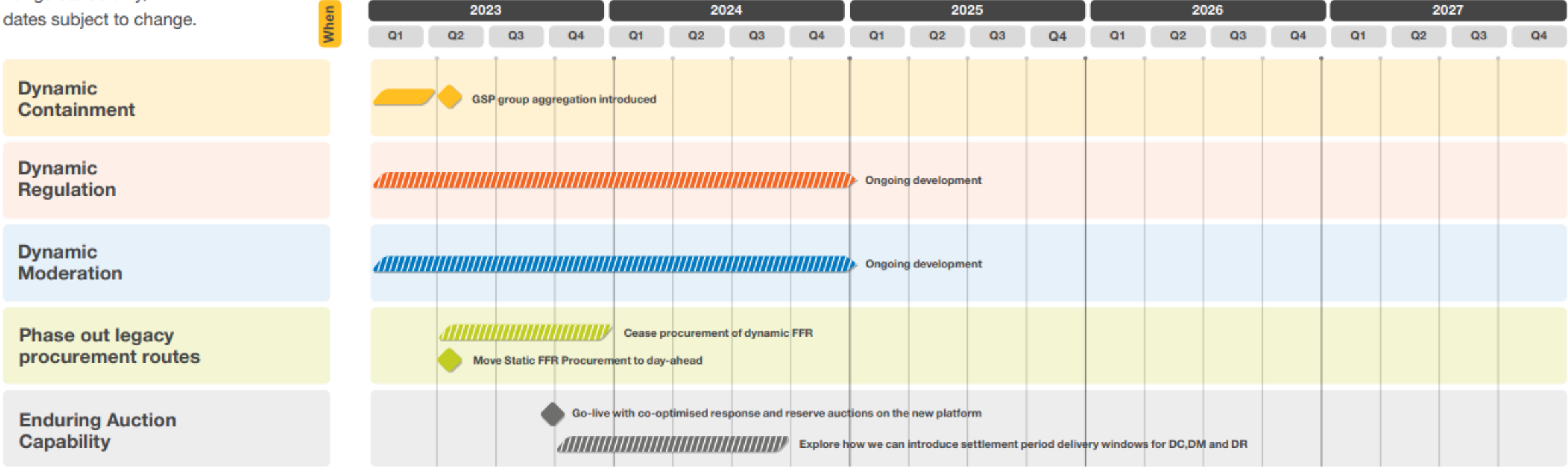


# Frequency Response Reform

For guidance only,  
dates subject to change.

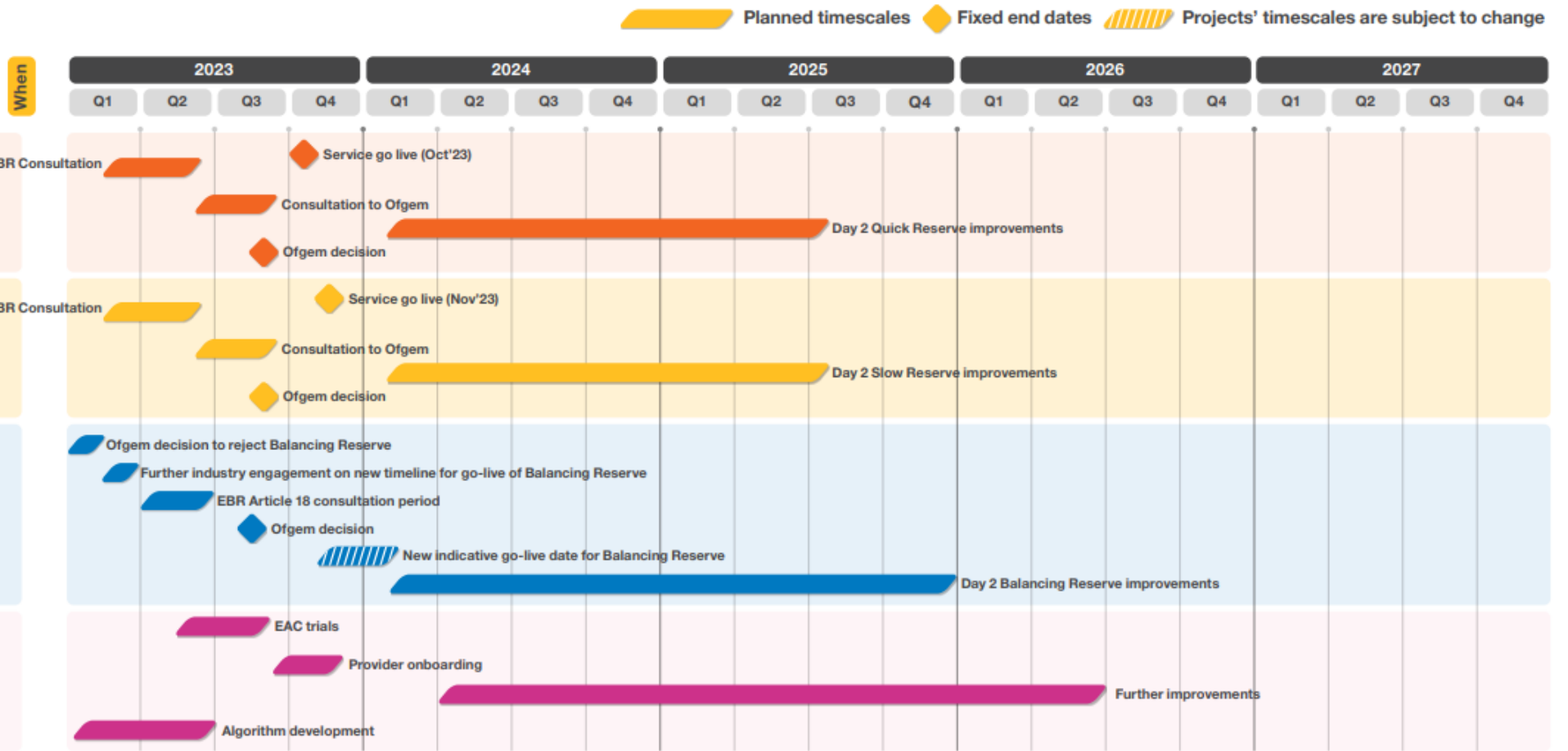
When

Planned timescales   Fixed end dates   Projects' timescales are subject to change



# Reserve Reform

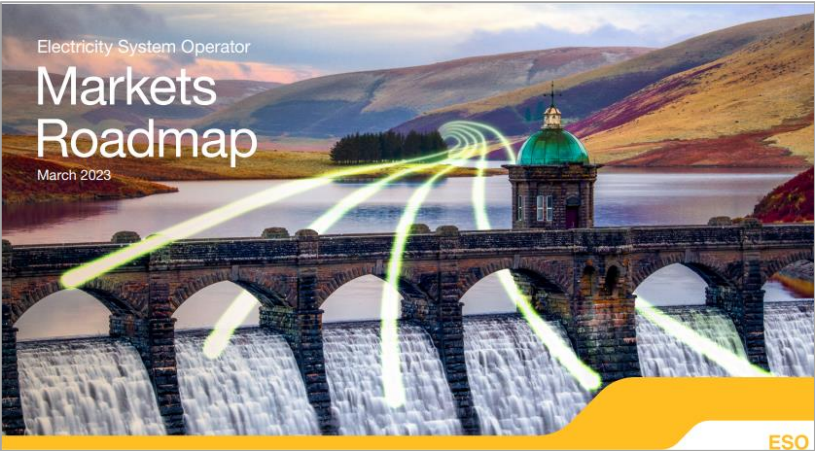
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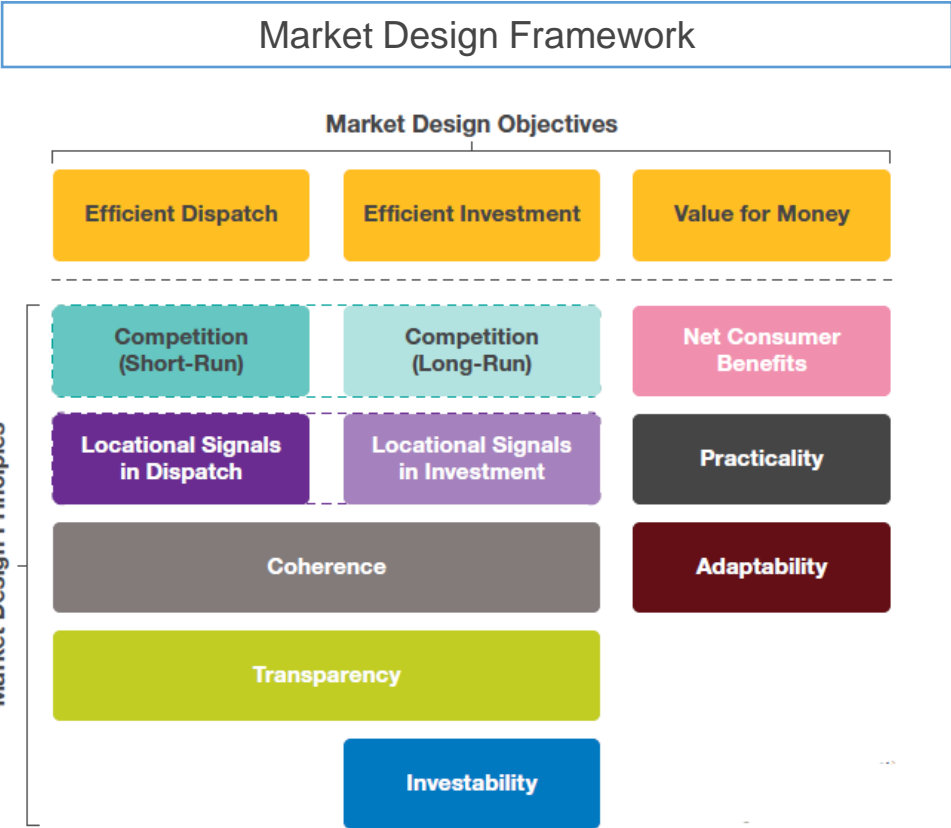
# The Markets Roadmap outlines the ESO's plans to reform our markets to enable zero-carbon operation by 2025 and fully decarbonise by 2035

The markets roadmap also:

- Provides key insights into the different ESO markets as well as the key drivers for reform.
- Gives stakeholders confidence that we are making the right market reform and design decisions.
- Shares strategic questions we are currently tackling and signposts how industry can work with us to answer them.



[Markets Roadmap webpage](#)



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[Markets Roadmap webpage](#)



Help shape the next Markets Roadmap



- If you have any questions or would like to talk to us, please contact us:  
[box.market.dev@nationalgrideso.com](mailto:box.market.dev@nationalgrideso.com)

# We're looking at how we can build on the roadmap and provide more certainty about future market design

Currently, we:

- Outline the drivers for reform.
- Planned changes to improve the markets in the near term.

In future, we:

- Want to provide more clarity on the strategic direction of travel for 2025-30.
- Will design markets, which are co-optimised where possible.
- Want to find markets solutions, which are cost-effective for the consumer as well as ensuring system operability.

If you have feedback/suggestions for improvement, please get in touch:

[box.market.dev@nationalgrideso.com](mailto:box.market.dev@nationalgrideso.com)

	Before	Now / imminent	2025 - 2030	2030 and beyond
<b>Frequency: Response &amp; Reserve</b>	Over 20 different products. Longer term tenders. Pay as bid. Procured through the BM.	New, simplified response products. Day ahead pay-as-clear auctions.	Intraday markets for response/ reserve. Co-optimisation of ESO response and reserve markets.	<p>The longer-term future of our ancillary and balancing services depends heavily on several key questions being tackled by DESNZ's Review of Electricity Market Arrangements (REMA):</p> <ul style="list-style-type: none"> <li>• Will the wholesale market remain one single national price, or will it be locational?</li> <li>• Will we continue with self-dispatch, or will it be scheduled more centrally?</li> <li>• Depending on dispatch, can ancillary services be co-optimised with the wholesale market?</li> <li>• Will we see reform to the duration of settlement periods or gate closure?</li> <li>• How will the capacity market and contracts for difference be reformed?</li> </ul>
<b>Stability</b>	Provided by synchronous machines as a by-product of producing electricity. ROCOF managed by reducing size of largest loss.	Long-term tenders (pathfinders) for new investment to meet shortfall in 'baseload' requirement. BM redispatch for short-term needs.	Short-, medium- and long-term procurement.	
<b>Voltage</b>	Build new network assets. Synchronise through the BM.	New Service Procurement (pathfinders) to secure shortfall in residual requirement. BM redispatch for short-term needs.	Short-, medium- and long term procurement.	
<b>Thermal</b>	Build new network assets. Turn assets up and down in the BM.	Network build. Constraint Management Intertrip Scheme.	Significant network build to meet NOA7 and holistic network design outcomes. Continued tactical commercial interventions.	
<b>Balancing Mechanism (BM)</b>	Designed to be a largely residual energy balancing market.	Increased actions to manage energy and system requirements and procurement of new stability products. Short term strategy of moving actions out of BM to mitigate high balancing costs.	Higher level of automation will allow much smaller units to be dispatched in BM. Co-optimisation of ancillary services.	
<b>Restoration</b>	Restoration from small number of large fossil-fuel generators.	Opening tenders up to DER and renewables.	DER and renewables contracted to provide restoration services. Distribution Restart Zones introduced by 2028.	



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**Reserve Reform**

# Reserve Reform

## What is reserve?

- At certain times of the day we need access to **additional energy** in the form of either increased generation or demand reduction. These additional energy sources available to is called 'reserve'
- Reserve products are **instructed** within gate closure and have different response and activation times depending on the product in question.
- They are broadly split into 'pre-fault' and 'post-fault' products, depending on whether they are intended to be used before or after a frequency deviation



# Reserve Reform

## Why do we need reserves?

**Uncertainty** in forecast generation profile and forecast demand profile at differing lead times

### Example scenarios

- Wind forecast error (long and short term)
- Demand forecast error (long and short term)
- PV forecast error (long and short term), seen as demand suppression
- Short notice of interconnector profile changes
  - Interconnector ramping (especially compounding with multiple ICs)
- System planning data does not match actual conditions



# Reserve Reform

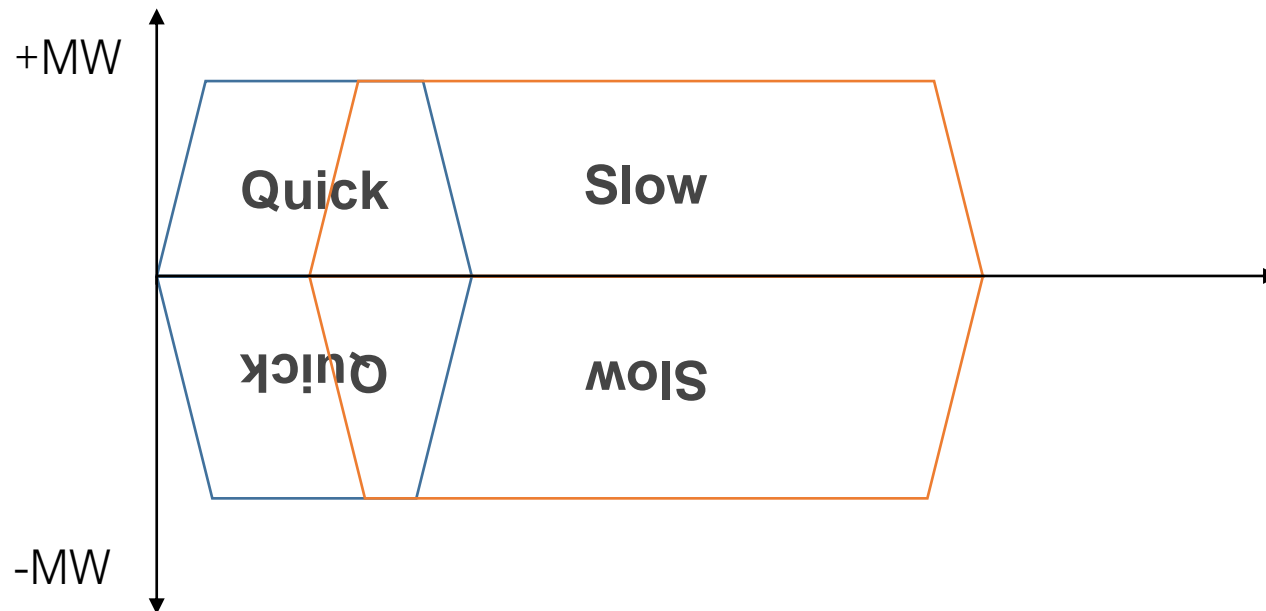
## Why are we changing?

- To reach net zero, we need competitive markets which unlock new flexibility and secure the future operation of the electricity system
- Existing reserve products are not standardised, making auction-based procurement difficult
- Existing products have been designed around available technologies rather than to meet statutory obligations
- New operability challenges require products that are faster and also access to downward flexibility



# Reserve Reform

## Proposed new reserve products



### Quick Reserve

Full output within 1 minute from instruction.  
Up to 5-minute minimum activation time  
15-minute maximum activation time

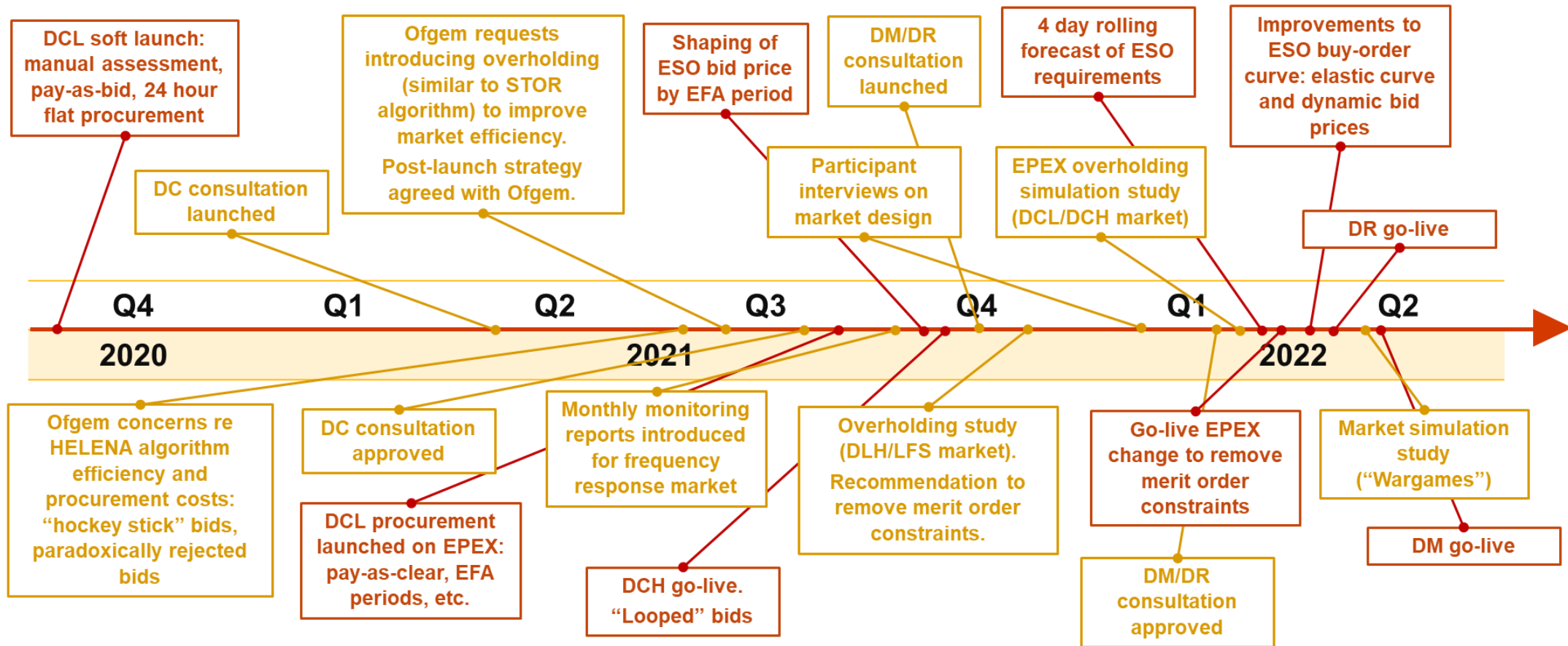
### Slow Reserve

Full output within 15 minutes  
Up to 30-minute minimum activation time  
120-minute maximum activation time



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**Response Reform**

# Frequency response overview



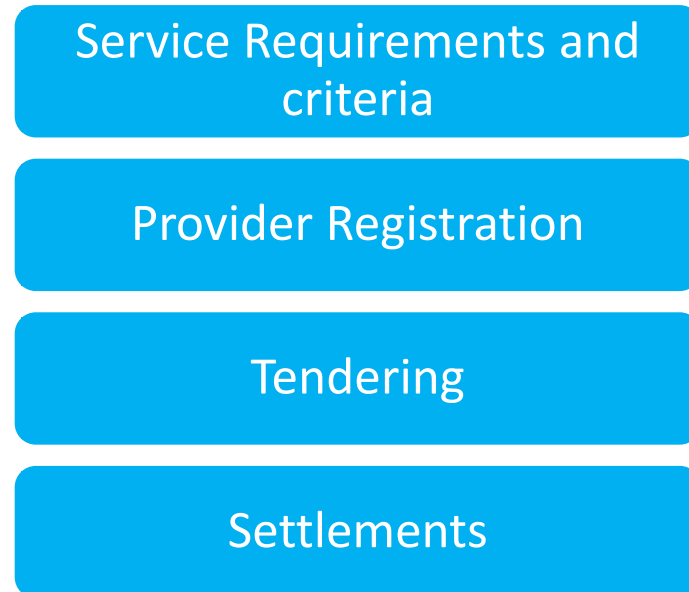
Implementation of market change

Engagement and analysis

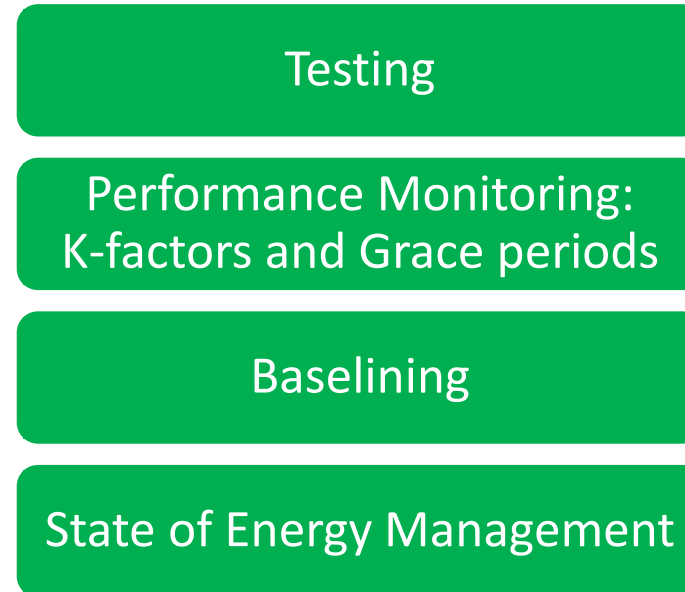
# A guidance for new, transitioning and existing providers – Dynamic Suite

- “All about the service guidance”. One stop shop for any provider queries
- Additional depth on technical aspects
- Use cases
- Updated independently and more frequently than service annual cycle

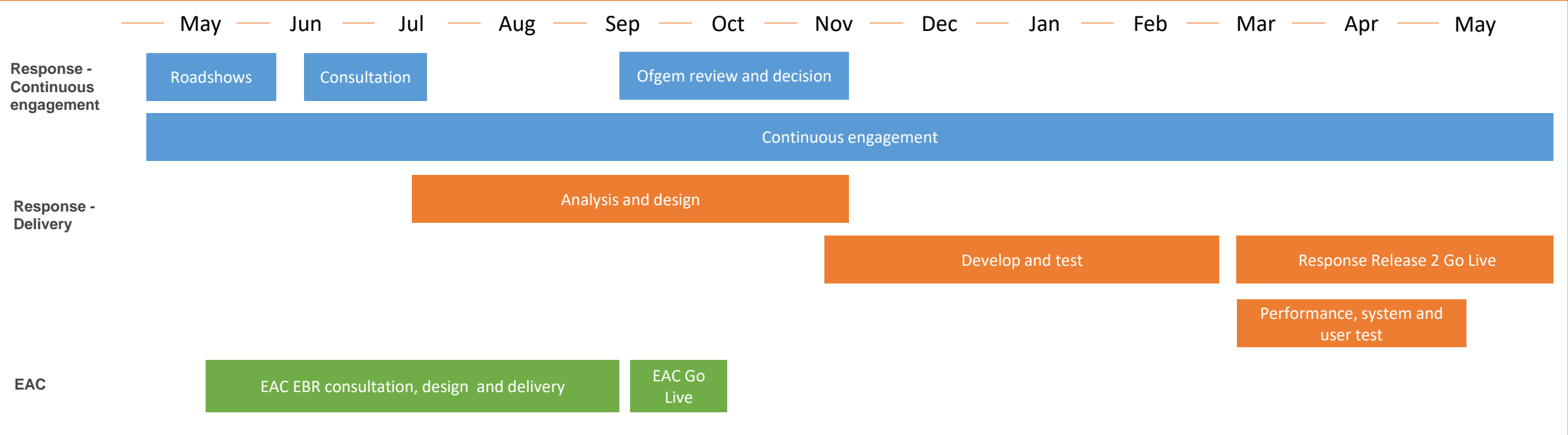
## Participant journey



## Technical delivery information

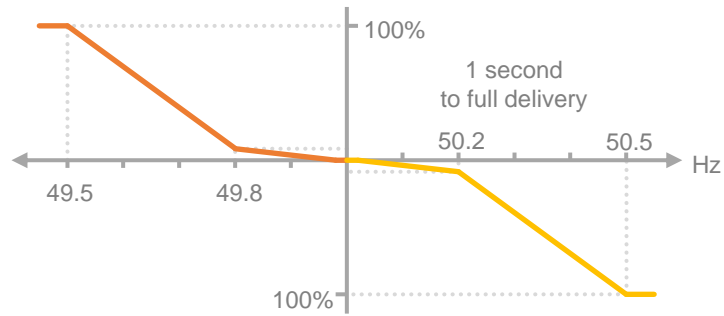


# We will be adopting a more agile reform and transforming our engagement approach



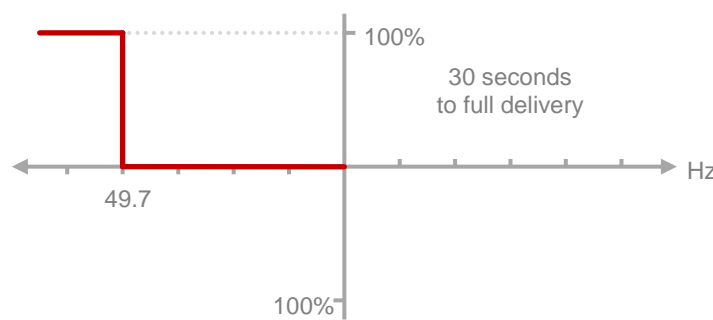
- We will make greater use of the Guidance Document to allow us flexibility to provide clarifications outside of the consultation cycle and implement change in a more agile way
- We will consult when making changes to the services, providing opportunity for feedback
- In support of this we will be implementing a new engagement approach with regular sessions to provide updates and gather input on reform topics throughout the year
- Appropriate notice for any changes to be implemented

### Dynamic Containment



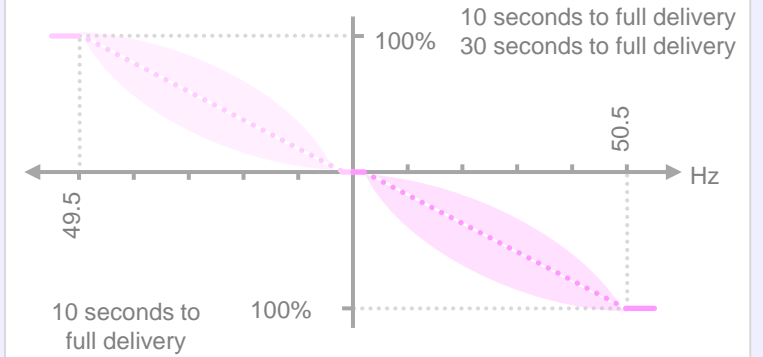
Prevent frequency deviations outside -0.8Hz / +0.5Hz following large losses

### Secondary Static FFR



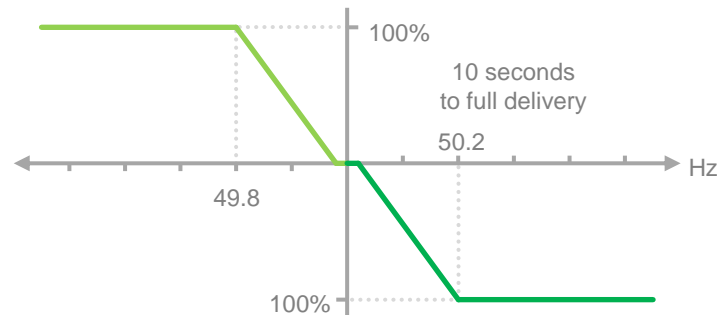
Recover frequency to 0.5Hz within 60 seconds following large losses

### Mandatory Frequency Response



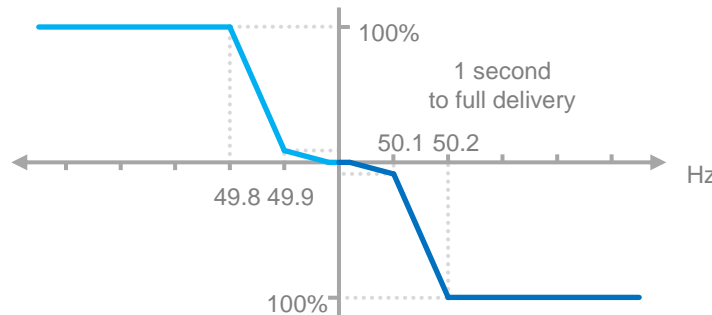
“Frequency Sensitive Mode” under Grid Code – response of last resort

### Dynamic Regulation



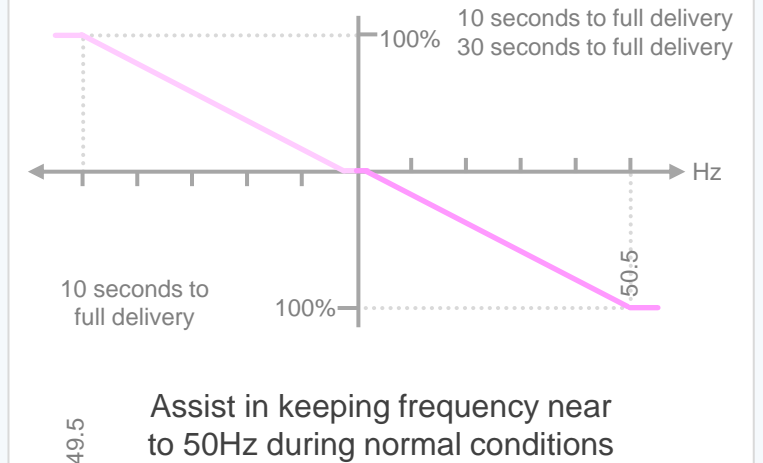
Assist in keeping frequency near to 50Hz during normal conditions

### Dynamic Moderation



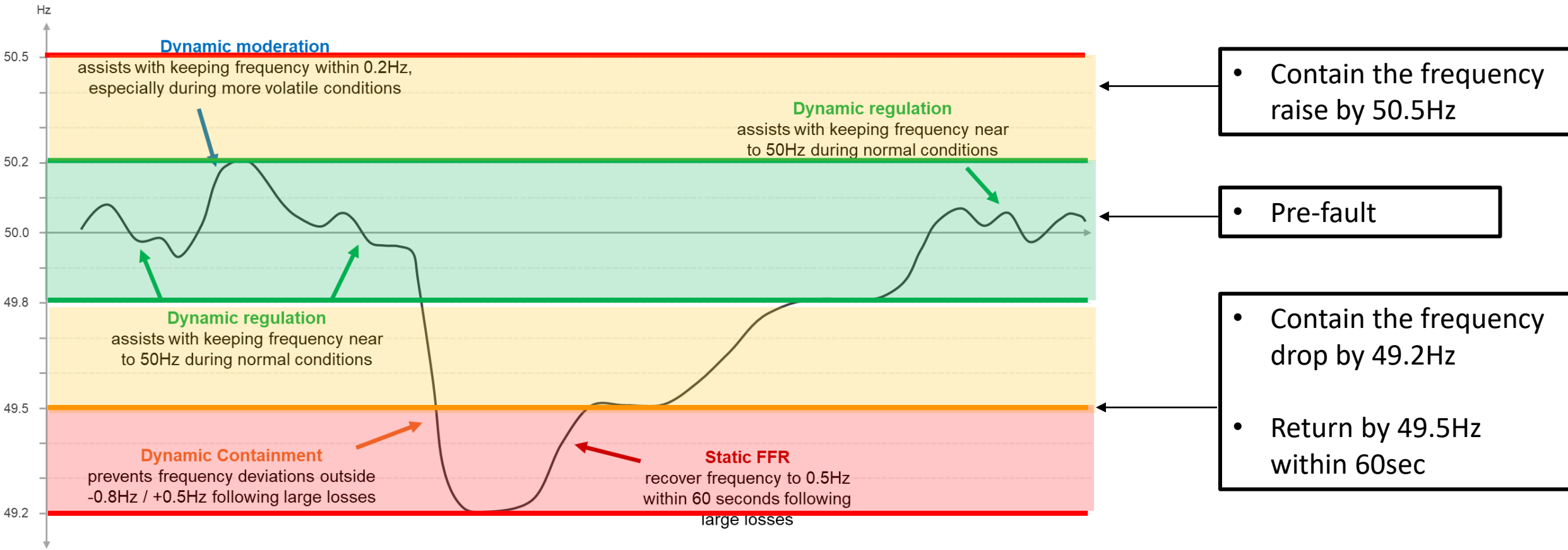
Assist in keeping frequency within 0.2Hz, especially during more volatile conditions

### Dynamic Firm Frequency Response



Assist in keeping frequency near to 50Hz during normal conditions

# Calculation Requirements





# How do we procure response?

Dynamic Containment	Dynamic Moderation	Dynamic Regulation	Mandatory Frequency Response	Dynamic Firm Frequency Response	Static Firm Frequency Response
Procured day ahead	Procured day ahead	Procured day ahead	Procured real time	Procured through monthly tenders	Procured day ahead
Pay as Clear	Pay as Clear	Pay as Clear	Pay as Bid	Pay as Bid	Pay as Clear
Auction Time: 14:30	Auction time: 14:30	Auction time: 14:30	N/A	N/A	Auction Time: 11:00
DCL Cost: £98M	DML Cost: £293K	DRL Cost: £5M	Cost: £59M	Cost: £53M	Cost: £10M*
DCH Cost: £20M	DMH Cost: £993K	DRH Cost:£4M			

All the cost figures are shown for FY 22/23.

\* Day ahead procurement and Pay as Clear started from 01-Apr-2023

# We have developed a list of topics to focus on for Response Reform this year

Topic	Primary focus	Explanation
<b>Reform of Ramp Rates</b>	Access	Assessment and implementation of changes to ramp rates and monitoring.
<b>Improving Re-submitting of Performance Data</b>	Access	This will improve providers experience of re-submitting data and reduce processing time.
<b>Introducing Data Derived Metering (Baselining)</b>	Access	Potentially removing a barrier to entry for behind the meter assets, lead to increased competition and reduced costs.
<b>Improving Re-submitting of Performance Data</b>	Access	This will improve providers experience of re-submitting data and reduce processing time.
<b>Improving Disarming / Re-arming for Stacking [R1b]</b>	Usability	Further enhancements to disarming by frequency service facilitates a number of enhancements including stacking of response services and lifting the procurement of greater volumes of the dynamic services.
<b>Frequency Measurement Standard</b>	Usability	Provide a guidance document that details the ESOs standard method for measuring frequency. This will bring increased data quality and greater confidence in service delivery.
<b>Automating Buy Orders (proof of concept)</b>	Usability	There is the potential to reduce/remove manual processes and facilitate enhanced procurement options.
<b>Improving PNs</b>	Usability	Improved visibility of response services in ENCC.
<b>Improving Availabilities</b>	Usability	Improved visibility of response services in ENCC.
<b>Improving Disarming / Re-arming [R2]</b>	Usability	Further improvements to disarming and rearming to improve the usability.
<b>Improving ENCC Visualisation and Situational Awareness</b>	Usability	The ENCC will have better situational awareness for response services.