

Request for Information: Frequency Response Reform

Introduction

Frequency Response is an automatic change in active power output in response to a frequency change. This helps us to keep frequency within statutory and operational limits. It is essential that NESO have access to Frequency Response at all times. Therefore, depending on their size and location, a power station may be obliged to have the capability to provide Frequency Response. Provision under this obligation is known as Mandatory Frequency Response, or MFR. This requirement will be set out in their connection agreement, more information on the service including the technical requirements can be found [here](#).

The frequency response product Mandatory Frequency Response (MFR) is non-compliant with key regulations¹ and no longer well-aligned with the needs of the power system; it thus needs to be replaced or comprehensively reformed. However, for many generators, it is the only frequency response service they can provide: MFR thus plays a critical role in securing the power system. If at all possible, these generators should retain a route to market for their frequency response provision.

NESO had previously planned to transition current MFR providers to the Dynamic Regulation (DR) service. DR was designed with this intent: key parameters of DR were set to match the corresponding MFR parameters. In practice, no provider has yet made the transition, and while some are expected to achieve it in due course, it has become clear that most will not.

A key DR parameter is the delivery time: units have 10 seconds to deliver response, as opposed to 1 second for the Dynamic Moderation and Dynamic Containment services. Studies of emerging power system behaviour point to a need for at least part of the DR provision to be delivered more quickly. This would remove any possibility of existing MFR providers transitioning to DR provision. NESO thus intends to:

- Change the DR parameters to align with DM and DC.

¹ Regulation (EU) 2019/943 Article 6



- Either revise the terms of MFR or Introduce a new mandatory frequency response service, to serve as a new destination for current MFR providers.
- In due course, change Grid Code obligations to enable providers to transition while remaining compliant.

The Request for Information

- The purpose of this request for information is to gather comprehensive feedback on the issues which prevented providers from transitioning from MFR to DR, in order to inform the design of the new mandatory frequency Response service. In this document we lay out what we believe to be the key design decisions which might create barriers. To feedback on any of those decisions, and bring any other points to our attention, please respond through the following MS Form link: [Response Reform Request for Information – Fill out form](#).

We are also interested in feedback on the proposed change to DR parameters. As always, NESO welcomes all feedback on our broader strategy; as we are early in options assessment this is a good time to examine and discuss alternative approaches.

- Please provide all feedback by 17:00 03 July 2026, through completing the following MS Forms link: [Response Reform Request for Information – Fill out form](#). All questions asked can be found in this document under the relevant section with numbers corresponding to those in the MS Form.

If you would like a call to delve more into how these propose changes may affect you or for further clarifications on the content in this document, let us know via email:

box.futureofbalancingservices@neso.energy

Technical Parameters

While the Grid Code lays out the main provisions for delivery of MFR, many parameters are deliberately non-prescriptive and key service terms are negotiated bilaterally and captured in each party's Mandatory Services Agreement (MSA). By contrast, the newer Dx response services are highly prescriptive of unit behaviour and do not allow for differences in delivery characteristics between units.

This creates greater consistency in how the service is delivered, which in turn enables better quality modelling and monitoring of system security, as well as ensuring a level playing field between service providers. However, an overly prescriptive service design will limit participation in the market. Questions in this section seek to establish the correct balance between these two drivers.



1. Speed of Delivery

Speed is vital for a frequency response service. The greater the lag between a frequency move and the corresponding response delivery, the greater the risk that the service fails to contain a frequency move or even sets up oscillations. In practice, this means that a slower service will have a hard limit to how much of it we can procure, and the slower it is, the lower that limit will be.

The current terms of MFR state:

- Primary Response: Fully delivered at 10 seconds; ramping linearly from 0-10 seconds; sustain delivery for 30 seconds.
- Secondary Response. Fully delivered at 30 seconds; ramping linearly from 10-30 seconds; sustain delivery for 30 minutes.
- High Frequency Response. Fully delivered at 10 seconds; ramping linearly from 0-10 seconds; sustain delivery indefinitely.

Note that “full delivery” means the volume associated with the detected frequency, which will usually be a percentage of the unit’s contracted volume.

In practice, we do not believe (or expect) that any MFR providers ramp linearly from the moment of detecting a frequency deviation; rather the ramping will start as soon as possible. For any new service, as noted above, we would prefer to set an achievable target (and then monitor it).

Questions:

3. For assets you own or manage, how quickly can they reasonably start ramping following a change in frequency?
4. When ramping in response to a change in frequency, how closely can they follow a linear ramping profile once they have started ramping?
5. How long would it take for them to deliver the whole of their potential response volume?

2. Capability Curve

The capability curve of a unit defines the quantity of response which is available from a unit in real-time, depending on its position relative to its maximum and minimum output.

For MFR providers, this quantity must be specified at:

- Designed Minimum Operating Level: defined as the output below which the unit cannot provide high frequency response.
- Minimum Stable Operating Level: defined as the minimum non-zero power at which the unit can operate indefinitely (barring fuel/energy limitations).
- Registered Capacity (RC): defined as the unit’s normal full load capacity (as declared at unit registration)



- 70% of Registered Capacity
- 80% of Registered Capacity
- 95% of Registered Capacity

(note that all of these quantities have alternative names depending on the unit's fuel type, but all of these names mean functionally the same thing for frequency response purposes)

See paragraphs 2 and 9 and Appendices 1 and 2 of the [Real-time Dynamic Response service design](#) for an explanation of how this will be applied to the Dynamic Response services.

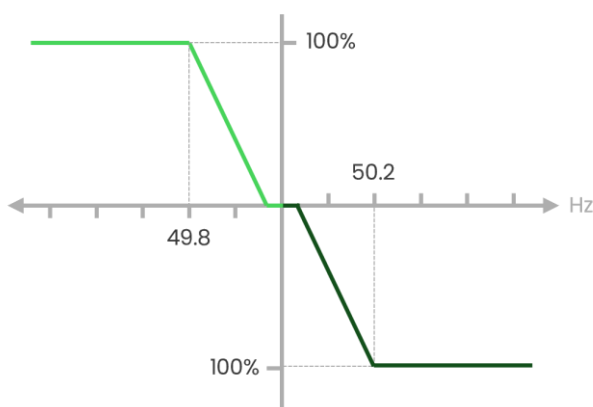
Question:

- Are the six points specified in MFR a good fit for representing the capability of assets you own or manage? Are there points which are redundant or irrelevant?

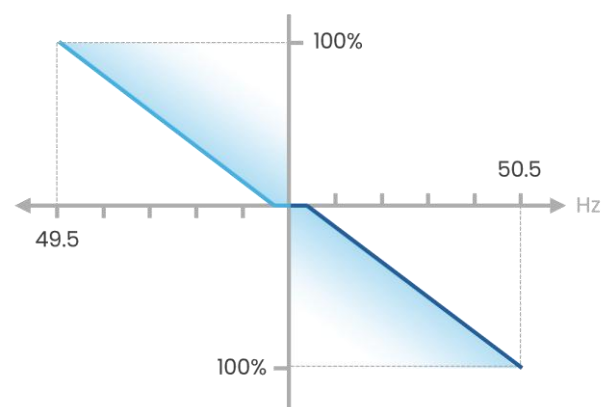
3. Delivery Curve

The delivery curve defines how much power is delivered for a given frequency deviation, as a percentage of the instructed response. For the Dynamic Response services, the delivery curve is specified at a service level. This means that the system impact of arming five units for 10MW each will be the same as arming one unit for 50MW (aside from any locational considerations).

For MFR units, by contrast, the delivery curve is specified by each unit individually and not made visible to the rest of the market. It must still fall within certain parameters: a deadband no greater than $\pm 0.015\text{Hz}$, and then delivery greater than or equal to linear. This means that not every MW of MFR is equal, which makes valuing it and determining an appropriate merit order into a complex problem which changes from day to day.



Delivery curve for DRL/DRH



Range of possible delivery curves for MFR

As inertia reduces, the speed required for a frequency response service to contain large losses has increased. Any service which takes longer than 2 seconds to deliver is only of use for managing pre-fault frequency (and that 2 second figure will continue to fall). This means that the service would have greater value if it were mostly (or entirely) delivered close to 50Hz. This was



the driver behind our previous intent to migrate existing MFR providers to the DR service; a delivery range no greater than $\pm 0.2\text{Hz}$ will make the service most effective (and hence most competitive with the Dynamic Response services).

Questions:

7. For assets you own or manage, how consistent a delivery curve can be achieved over different frequency ranges?
8. At what level of inconsistent delivery would it thus be appropriate to reduce service payments?
9. How close can those assets come to a linear delivery curve (with or without a specified deadband)?
10. How narrow a frequency range can those assets fully deliver their response energy in? Do you anticipate any problems with changing the frequency range in which response is delivered?
11. Do you anticipate any problems with moving to a single, centrally defined delivery curve?

4. Instructions

The Grid Code currently requires MFR units to start provision “without delay” following instruction. NESO has no clear view on how long this takes in practice but believes it to be in the 1-2 minute time range.

Questions:

12. In practice, how long do assets you own or manage take to start providing MFR from the point of instruction?
13. When those assets start, or cease, providing MFR, is there a period where they are providing a more limited version of the service, or does full provision start straight away?

5. Delivery Period

MFR is currently required to deliver for at least 30 minutes on the low frequency side and indefinitely on the high frequency side.

Questions:

14. Are there any reasons to reconsider indefinite delivery on the high frequency side?
15. Conversely, are there any units which need to stop after 30 minutes of continuous delivery on the low frequency side, or could that period be extended?



6. Unbundling

MFR currently has two types of instructions: “PH” and “PSH”, asking a unit to deliver Primary and High, or Primary, Secondary and High respectively. GB regulations require any new services to include low-only and high-only instructions, although bi-direction instructions can also be made available.

Questions:

16. Are any assets you own or manage (which are currently providing MFR) capable of providing response in only one direction?

Market Provisions

7. Payment Structure

MFR prices are currently set at a monthly granularity, two weeks prior to the start of the month in question. This pricing schedule is not compliant with current regulation: in any new services, prices would have to be set at most at day-ahead, and at least as granular as daily. In principle, more granular pricing enables the service providers to match prices to the factors driving those prices, but it creates an additional administrative burden which may not be justified in practice.

Questions:

17. How granular would you prefer for pricing to be of a new MFR-like service (and why)?
18. How close to delivery would you prefer to submit and resubmit prices (and why)?

8. Response Energy Payments

MFR providers are paid for energy delivered as part of response duties; positive energy is purchased at 125% of the market index price, and negative energy is sold back at 75% of the market index price. Dynamic Response, by contrast, has no explicit response energy pricing and instead expects providers to build in the expected value of delivered energy to their contract pricing.

NESO's preference is to align response energy payment arrangements across all services to promote a level playing field.

Questions:

19. Is a market index price a good indicator of the cost or value of response energy to assets or portfolios you own or operate?
20. How (and how significantly) would the presence or absence of an ex-post response energy price calculation impact the ability of providers to set cost-reflective availability prices?



9. Changes to DR parameters

NESO intends to change the DR service to better align with DC and DM. Currently, there are two sets of rules for DR: one that applies when DR is provided stacked with DC and/or DM, and one that applies when it is not. The planned change would remove the set of rules for DR provision when it is not stacked with DC or DM; the rules for providing DR when it is stacked (split) with another service would then apply to both scenarios.

- Performance monitoring to be conducted at 20Hz (currently 2Hz for un-stacked DR)
- Delivery to start at 0.5 seconds, and complete by 1 second (currently 2 and 10 seconds for un-stacked DR)
- Error band to start at $\pm 3\%$ and finish at $\pm 7\%$ (currently $\pm 5\%$ and $\pm 25\%$ for un-stacked DR)
- Grace period of 0.55 seconds for starting new delivery or returning from unavailability (currently 2 seconds for un-stacked DR) – this will no longer apply to starting new delivery once Continuous Transition Periods (CTP) go live, further details of the CTP proposal can be found in our [October](#) and [April](#) webinars.
- Grace period of 2 seconds when switching between contracts (currently 10 seconds for un-stacked DR) – this will no longer apply once Continuous Transition Periods go live.
- Rolling minimum error window of 0.2 seconds (currently 2 seconds for un-stacked DR)

Questions:

21. For assets you own or operate which currently provide the DR service, do you anticipate any difficulties in moving to parameters aligned with the DC and DM services?
22. Is there any other feedback or input you would like to provide to inform NESO's thinking on the potential design of a service to replace MFR?

