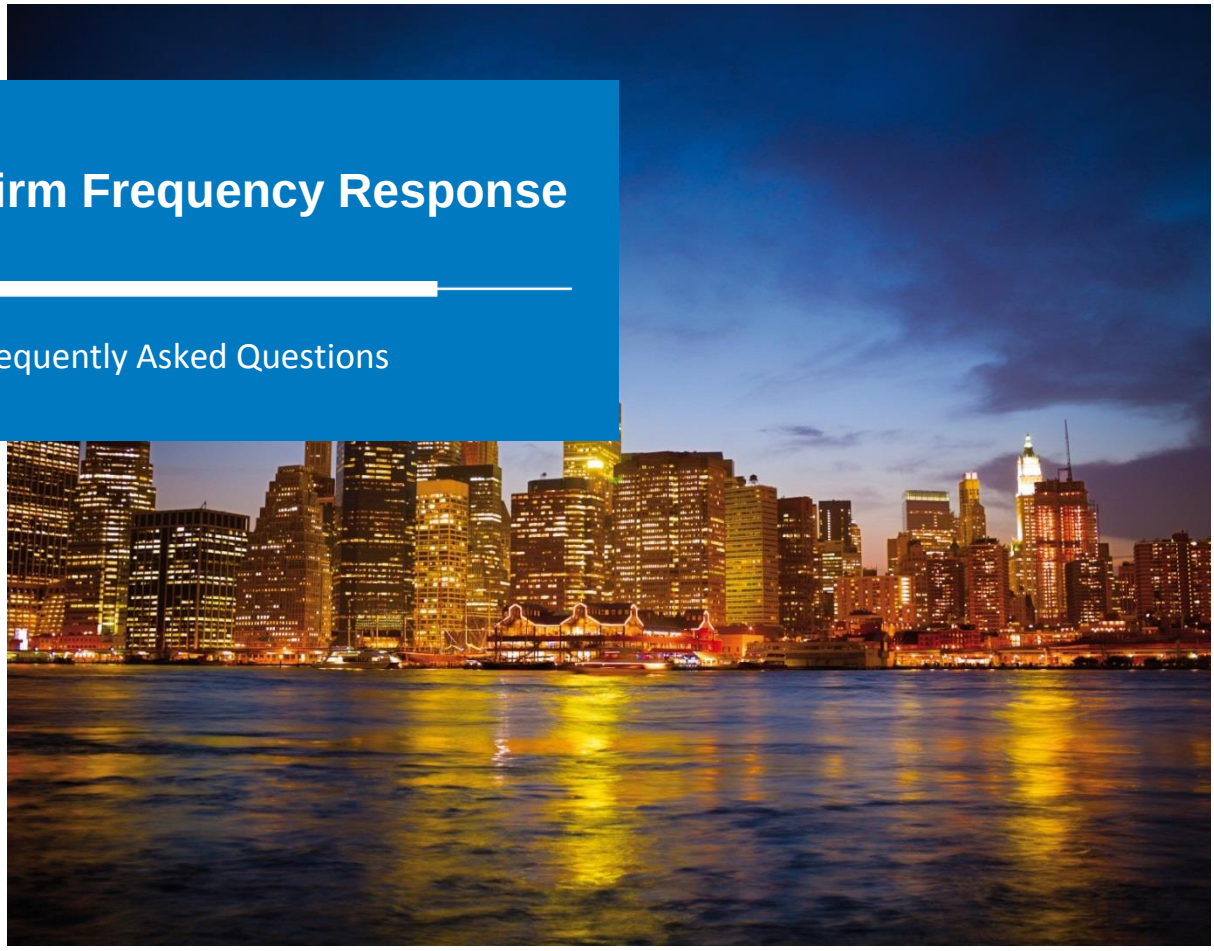
nationalgrid

Firm Frequency Response

Frequently Asked Questions



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INTRODUCTION

This document has been written for all existing and new providers of Frequency Response. The document assumes a basic level of understanding of Frequency Response and how this links with the operation of the electricity transmission system. If you are looking for an overview of Frequency Response, this can be found on a separate FAQ document on the following link:

http://www2.nationalgrid.com/UK/Services/Balancing-services/Frequency-response/Mandatory-Frequency-Response/

Alternatively, a basic service guide for commercial Frequency Response i.e. Firm Frequency Response (FFR) can be found on the link below:

http://www2.nationalgrid.com/uk/services/balancing-services/service-guides/

REQUIREMENTS

What is the minimum number of MW for the tendered service?

The minimum level is 1MW. This may be from a single unit or aggregated from several smaller units. Please contact your account manager for more information or alternatively, send an email to commercial.operation@nationalgrid.com where we can put you in touch with an account manager.

What equipment needs to be installed?

A frequency sensitive relay needs to be installed and supplied by the service provider. No specific provider is recommended, although the minimum requirement is that the relay needs to be within a 0.01Hz tolerance.

Communications – in order to demonstrate that the service is being provided, data needs to be sent to National Grid, either second by second or at National Grid's discretion, minute by minute. If minute by minute, this may be provided through the STOR SRD system (if the provider participates in STOR). For minute by minute data, additional post event second by second data needs to be sent to National Grid so that the provider's performance can be verified.

What is the speed and duration in which I need to respond?

In accordance with the Grid Code, for a Low Frequency (LF) service i.e. an increase in output, this can be either primary (full output within 10s sustained for further 20s) or secondary (full output within 30s, sustained for 30min). For a High Frequency (HF) service, this needs to be achieved within 10 seconds and sustained indefinitely.

There is a deadband of +/-0.015Hz where response does not need to be provided.

For a static service, is there a minimum and maximum run time?

At the moment, we do not stipulate a minimum run time. There are maximum run times depending on the system frequency i.e. we require a generator to auto stop once the frequency has recovered. All of these options allow for a short or instant recovery period after an event. Our preferences are below:

1. The MW delivered is proportional to the system frequency i.e. max MW delivery at 49.5Hz and less MW at 49.8Hz. This drops to 0MW when the system frequency returns to 50Hz but should continue responding up to 30 minutes.
2. As above except the proportional response ceases after frequency returns to 50Hz
3. Full output at the trigger frequency. This reduces to zero at 49.95Hz or 50Hz. The current system requirement is 50% of static providers need to be at 49.95Hz and 50% at 50Hz.

What is the frequency trigger point for a static service?

Low Frequency (LF) triggers need to be set to a range of frequencies, 49.5Hz to 49.7Hz (23:00 to 07:00) overnight, and a range 49.5Hz to 49.8Hz (07:00 to 23:00) during the day. We are looking to spread the static response equally across these ranges. So if you are providing a 10MW primary service, you would have to start delivering 10MW within 10 seconds if the frequency reached these trigger points.

Can I provide a combined Primary and Secondary static service?

Yes, this is possible, although we will not value this any differently to a provider just having a secondary only service. This is due to our main requirement for secondary response.

Is there a testing procedure for demand side providers?

Tests must be carried out by the service providers rather than National Grid. However, National Grid may witness some of the tests. For further detail on the procedure to be followed, a guidance document can be found on the following link:

http://www2.nationalgrid.com/UK/Services/Balancing-services/Service-Guides/

SMALL GENERATORS AND DEMAND SIDE

Can non Balancing Mechanism providers provide response?

Yes. This can be either generation increase or decrease based on the system frequency (dynamic) or a static trigger level. For example, a service could be provided whereby a generator would increase its output if the system frequency fell to 49.8Hz. Alternatively, the reverse could be provided whereby a generator would decrease its output if the system frequency rose to 50.4Hz. However, National Grid places more value on a generation increase service rather than decrease and there is no current value to only contract for generation decrease.

I am a small generator and would like to provide a service. What is possible?

As above, you can provide either a static or dynamic service. Static is where an agreed amount of energy is delivered if the system frequency hits a certain trigger point e.g. 49.7Hz.
Dynamic is where your generator output will rise and fall automatically in line with the system frequency.

I'm an energy storage provider – can I participate?

Yes, this is possible as long as you can meet the minimum requirements for the service. Energy storage providers may have unique characteristics which may be different to the current providers. Please contact your account manager to discuss further.

Can I provide a generation turn down service only?

This is termed as a static high frequency service. Currently, National Grid does not have a value such a service. Overnight, the High requirement is small and the minimum dynamic requirement is equal to this so this means that static high will already be met by the dynamic service. There may be periods where a greater requirement is identified but this occurs relatively infrequently.

Can I provide this from combining multiple loads/generation?

This can be done with the proviso that these aggregated loads, when summated are equal to or more than 1MW. There also needs to be a single point of despatch or a method in which the total output of the combined loads can be monitored to demonstrate to National Grid that the service is available.

PROCUREMENT PROCESS

How is FFR procured?

This is via a competitive tender process which runs once a month. The first business day of each month is the deadline for services starting on the following month i.e. 1 January for service start on 1 February. The tender documents can be found on the following link:

http://www2.nationalgrid.com/UK/Services/Balancing-services/Frequency-response/Firm-Frequency-Response/

Can I submit a tender longer than 12 months?

This is possible although there is a higher risk of being unsuccessful as prices are more uncertain if the forecasts are done further ahead.

Can I withdraw my tender?

Providing that the tender has not yet been accepted, a provider may withdraw their tender via written confirmation or via fax. This needs to be received by 11:00 on the business day that the withdrawal goes live. If the notice is received after 11:00, it will be effective at 09:00 the following day.

What is the minimum number of hours that I can tender in for?

Tenders that provide longer consecutive hours are more favourable than those which are shorter. We recommend that tenders should be at least 2 hours in duration.

What hours or windows does National Grid value?

The requirements for each service vary by time of day (demand profile) and plant on the system. There is a guide to general requirements in the Market Information Report. Response is required 24/7 so a tender that covers any time period could be valuable. In general Primary and Secondary or Secondary only services are more valuable during the daytime because they offset margin costs which are not typically incurred overnight.

Is there an optimum number of MW that National Grid requires?

The current assessment is calculated on a per MW basis, so a service with the same prices and parameters at 50MW or 100MW will have the same percentage benefit. Therefore we do not place additional value on greater MW size as long as the minimum requirement of 1MW is met.

What elements are National Grid looking for in an FFR service?

Generally, it is secondary response that is our largest requirement (this can vary depending on demand/inertia and wind along with outages which may increase primary or high requirements). In operational terms they are all important, but some requirements are easier to meet than others. Currently in order to meet the Secondary requirement, we end up holding more than we need to of Primary and High.

How are tenders assessed?

They are assessed on a cost/benefit basis. We look at the contract cost vs alternative costs. Within alternative costs we look at holding and positioning costs and also the cost of creating reserve for response. In general we assess the following points:

- The capability of Primary, Secondary and High. This data is used to work out how much holding cost, positioning BOA (Bid Offer Acceptance) costs and reserve for response costs the unit will offset.
- The hours for which the service will be provided. This data is used in forecasting the value for holding prices, BOA prices and margin value
- The price for service Availability/Nomination. This is used to forecast the contract cost.
- "Un-contracted" behaviour. Consideration is given to how the contract would change the expected market behaviour if the unit would normally be in the mandatory market.
- MEL, SEL and part-load point. The MEL SEL and part-load points for BM units are important in the calculation of how much headroom and footroom the service will offset.
- If it is more economic that the alternative.
- How reliable the service is.

What is margin?

Margin is our calculation for how much reserve is required on the system. For each 0.55MW of response, we hold 1MW of reserve on synchronised units. So a frequency response contract will lock in a proportion of reserve which will save on the cost of creating reserve.

What are the different prices that I can tender in?

Availability Fee (£/hr) – This is the main fee that all providers will tender in. It is the number of hours of availability from a provider.

Nomination Fee (£/hr) – Upon a tender being accepted, National Grid can choose to nominate all or part of the hours tendered in. This payment is made for each hour nominated. Historically, for all tenders that have been accepted, all of the available windows have been nominated.

Optional fees
Window Initiation Fee (£/window) – for each FFR window that the provider has been instructed under.

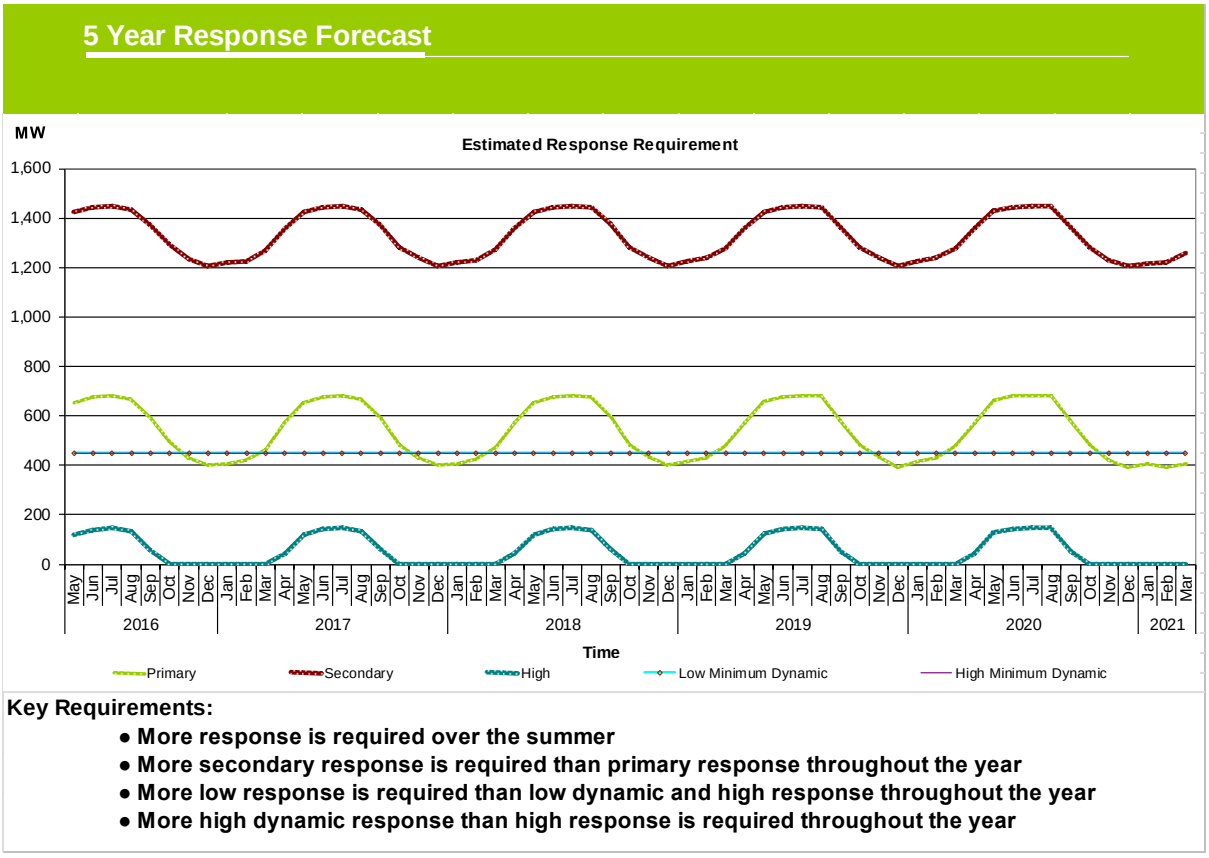
Tendered Window Revision fee (£/hr) - National Grid notifies providers of window nominations in advance and, if the provider allows, this payment is payable if National Grid subsequently revises this nomination.

Response Energy Fee (£/MWh) – this is for non-BM providers only and is based upon the actual response energy provided in the nominated window. Most static providers do not tender in this parameter as the energy volumes utilised will be small.

Can I tender in without having the equipment in place?

Yes. This is possible although a provider would need to sign up to a framework agreement first. This would contain the detail of the works required and the timescales for completion. Any site tendered must be able to provide the service within 6 months of the earliest start date of that tender round e.g Tender round submitted 1st July earliest start date 1st August, in addition to the completion date the provider would be expected to have tested their equipment ahead of their go live date. National Grid would need up to 4 weeks minimum to verify the tested data.

Do you have a long term forecast of response required?



Key Requirements:

- **More response is required over the summer**
- **More secondary response is required than primary response throughout the year**
- **More low response is required than low dynamic and high response throughout the year**
- **More high dynamic response than high response is required throughout the year**

This chart shows the two to five year response forecast. All requirements are calculated for the highest peak demand period of each month. The volume of response will vary over individual day time settlement periods. The figures show the base/minimum values expected during the day and assuming an optimum system inertia. All response levels are calculated for a 0.5Hz deviation.

Primary response is based on a generation loss of 1000MW, secondary response is based on a generation loss of 1260MW and high response is based on a demand loss of 560MW. The requirements would be higher than those indicated if the losses were increased. The indicative minimum dynamic levels are shown for peak demand periods. There is no rapid frequency response assumed for high frequency. 225MW of rapid frequency response has been assumed for low frequency.

PROVISION OF SERVICE

When can providers expect to provide the service?

National Grid will notify successful providers by the 12th business day of each month, the times that the service will be required. These are called the nomination windows.

How often will I be called to provide the service?

Currently, nomination for the service is close to 100% so if you are successful in your tender, then it is possible that you will be utilised for all of the hours that were tendered in. However, as the service is dependent on system frequency, your unit will not be actively providing energy until it reaches your contracted frequency trigger.

How are non BM providers despatched for the service?

This can be done via an automatic logging device. Or a provider may choose to have the service running in all nomination windows with agreement from National Grid, thereby not requiring an instruction to start/cease. So in this case, they would be immediately available for response if a frequency deviation occurred.

Can I substitute a similar generating unit if one is unavailable?

This is possible and must be specified in the Framework Agreement. The performance of the substituting unit needs to be at least equal to or better than the original contracted unit. i.e. it needs to provide the same MW level of response for each Primary, Secondary and High (if applicable). In order to substitute, a request needs to be sent to National Grid no less than 2 hours prior to gate closure for the start of the FFR window.

What are the penalties for non delivery for non BMUs?

If a non BMU fails to arm the relay during the service period then National Grid reserves the right to set the availability and nomination fee to zero for the settlement periods in question AND may apply a deduction to the window initiation fee (if applicable). If this event of default occurs more than three times in any calendar month, then National Grid reserve the right to terminate the agreement.

What are the penalties for unavailability for non BMUs?

If the provider is persistently unavailable, fails to respond or is unavailable more than three times in any calendar month, then National Grid reserves the right to terminate the FFR contract.

What are the penalties for unavailability for BMUs?

If the BMU is unavailable or fails to respond then National Grid reserves the right to set the availability and nomination fee to zero for the settlement periods in question AND may apply a deduction to the window initiation fee (if applicable). If this event of default occurs more than three times in any calendar month, then National Grid reserve the right to terminate the agreement.

What about performance monitoring?

The amount of response delivered by a provider will be monitored from time to time during any sample period. If the unit is deemed to be underperforming, this will lead to a deduction in all nomination and availability fees, attributable to all settlement periods in the FFR nominated window in question. The formula for calculating this is below:

C/D * 100

C = highest level of generation

D = contracted response

Percentage Performance Measure	Percentage Deduction in Fees
<10%	100%
≥10%, <60%	50%
≥60%, <95%	25%
≥95%	0%

What is the payment structure?

Main fees:

Availability fee (£/hr) – for making the service available to National Grid

Nomination fee (£/hr) – for being called upon to provide the service

Optional fees:

Window initiation payment – for each nominated window in the tendered periods

Window revision payment – for any changes to the nominated window

Response Energy Payment (£/MW/hr. non BM only)

My plant has now become uneconomic to run, can I stop providing the service?

This is against the spirit of providing a firm contract, as we expect a high degree of availability for the service. If a provider declares unavailability for economic reasons, then we reserve the right to terminate their FFR agreement, which would also potentially impact their future tenders. The reason for this is that there may be alternative providers who may be more reliable and therefore pose less risk to National Grid.

FAQ update 2nd August 2017

Below are the commonly asked questions that have been asked by providers, the responses are National Grid's position going forward along with the existing Standard Contract Terms and framework agreements.

National Grid are continually reviewing the FFR service and as such all area are subject to change in the future

Existing provider agreements will be kept as they are, all new agreements will be in line with current Standard Contract terms, framework agreement and the points listed below

Can I use the dead band to manage the state of charge of my asset?

Going forward providers will not be allowed to manage their state of charge within the deadband. Providers will need to consider how they manage their state of charge when producing their tenders.

Can I have a 30 minute cap for high frequency at full output at 0.5 deviation?

Yes you can state if a 30 minute cap for high frequency at full output at 0.5 deviation is required in your tender submission.

Can I provide primary response only?

There is currently not an option for a dynamic primary response only service, however this is currently under the product simplification project and may potentially change in the future.

Can I provide an Asymmetrical proportional response for low and high frequency response?

Asymmetrical proportional response must be kept in line with percentage information (tolerance 3-5%) displayed in the Grid code ref CC.6.3.7

Asymmetrical Service Definitions detailed below.

- P&S – Primary and secondary
- P,S & H – Primary Secondary and High
- H only – High only

Is there a recovery period for assets after a frequency event?

There is no recovery period for assets after a frequency event occurs.

When do I need to test any additional volume that I am adding to my agreement?

The testing of additional volume (stacked assets) will remain as it is currently with every MW added being tested.

Can I deliver FFR service through multiple assets (e.g deliver through a battery and then through another asset which over delivers to compensate for battery charging)?

If you are considering delivering FFR in this way please contact your account manager in the first instance to discuss.

Can the 6 month cap between tendering and providing a service (new build) be extended?

The 6 month cap between tendering and starting to provide FFR services will continue until the Product Simplification project is completed.

Any service provider will now be allowed to forward tender as this no longer applies to new build only.

How does performance monitoring work ?

Performance monitoring will remain how it currently is within the existing contracts. As part of the product simplification project National Grid may review performance monitoring.

Current performance monitoring is stated in the SCT's and above on page 12 of this document. The amount of response delivered by a provider will be monitored from time to time during any sample period. If the unit is deemed to be underperforming, this will lead to a deduction in all nomination and availability fees, attributable to all settlement periods in the FFR nominated window in question. The formula for calculating this is below:
C/D * 100
C = highest level of generation
D = contracted response

Percentage Performance Measure Percentage Deduction in Fees
<10% 100%
≥10%, <60% 50%
≥60%, <95% 25%
≥95% 0%