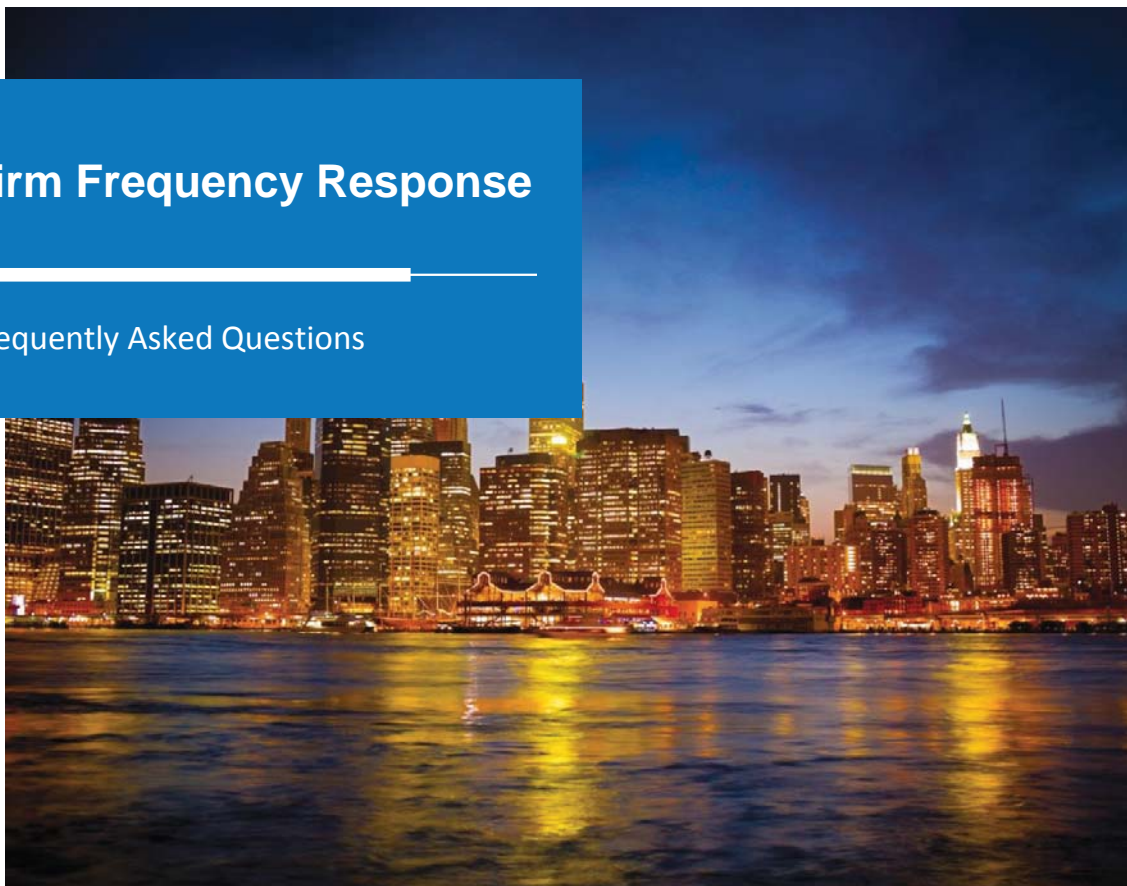


# Firm Frequency Response

## Frequently Asked Questions



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For Further Information please contact:

Contract Services  
National Grid House, Warwick Technology Park  
Gallows Hill  
Warwick  
CV34 6DA

T: +44 (0)1926 654611

E: [commercial.operation@nationalgrid.com](mailto:commercial.operation@nationalgrid.com)

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

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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 10MW. This may be from a single unit or aggregated from several smaller units. If you are less than 10MW but are planning to reach this threshold in the near future, you may be able to participate through a separate route. Please contact your account manager for more information or alternatively, send an email to [commercial.operation@nationalgrid.com](mailto: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 run time?

At the moment, we do not stipulate a minimum run time. However, if there is a limitation to your plant which requires a minimum run time, then this can be included in your tender. Please note that any limitations provided may impact the valuation of your tender i.e. make it less beneficial.

### 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 requirement to only contract for generation decrease.

### I am a small generator e.g. 10MW 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. 49.8Hz.

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 requirement for 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 10MW. 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 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 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 10MW 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 of Primary and High.

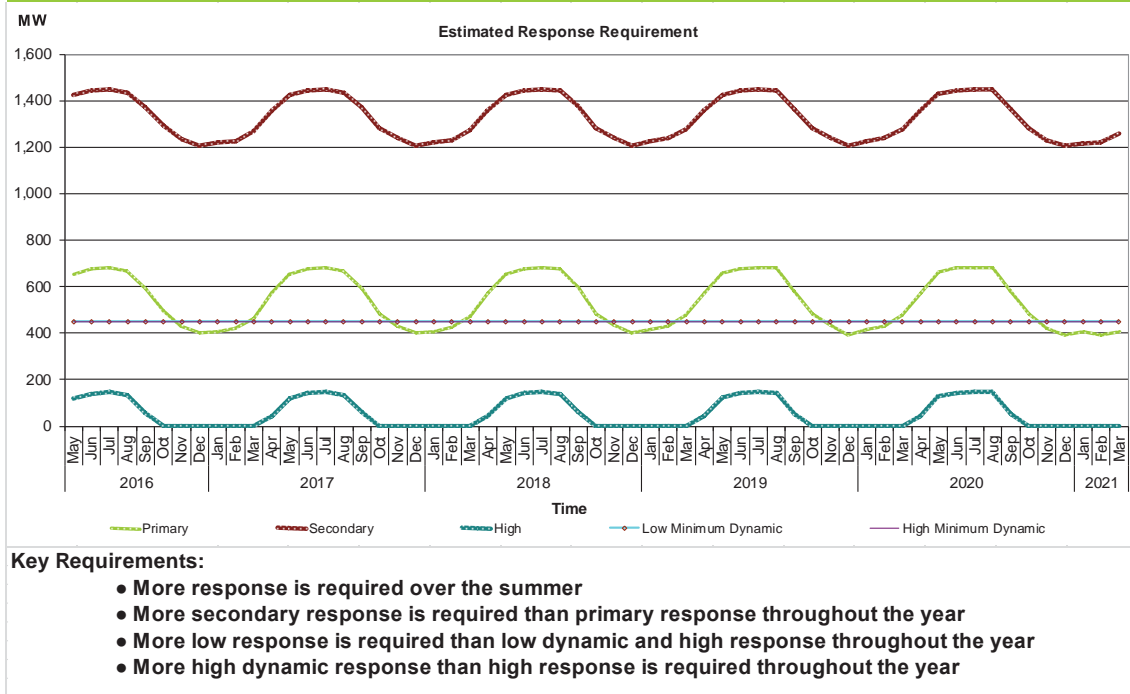
## How are tenders assessed?

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 than the alternative.
- How reliable the service is.

## Do you have a long term forecast of response required?

### 5 Year Response Forecast



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.

### What is Rapid Response?

This is the provision of primary frequency response within 5 seconds rather than 10 seconds. Currently, we do not have a specific requirement for this, although this may change in the future. Any notifications in requirements will be specified in the market information reports which can be found on the following link:

<http://www2.nationalgrid.com/UK/Industry-information/Electricity-transmission-operational-data/Report-explorer/Services-Reports/>



## PROVISION OF SERVICE

### When can providers expect to provide the service?

National Grid will notify successful providers by the 12<sup>th</sup> 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.