

# Enhanced Frequency Response Market Information Report

Published 26<sup>th</sup> August 2016

## Introduction

National Grid Electricity Transmission (NGET) is the System Operator for the National Electricity Transmission System in Great Britain. As part of our responsibilities as System Operator, we are required to ensure that the National Electricity Transmission System is balanced on a moment by moment basis. In order to achieve this, NGET procures balancing services. In particular, NGET procures a service known as dynamic frequency response, whereby providers automatically vary their power consumption or production (technology dependent) to compensate for deviations in system frequency away from the nominal Great Britain frequency of 50Hz.

The changing generation mix in Great Britain is reducing the contribution that synchronous generation makes to the energy market, which in turn is reducing the level of system inertia, particularly on low demand days when there is a high penetration of renewable plant. Lower system inertia affects the ability of the System Operator (SO) to manage the system frequency within normal operating limits. This in turn will drive the procurement of larger volumes of the existing frequency response products. As an alternative to procuring increasing volumes of frequency response we have designed an enhanced frequency response (EFR) service which, by responding faster than existing frequency response services, will help reduce the increasing response required in times of low system inertia. The EFR design included the option of two service types which differ in the size of the frequency insensitive zone (also referred to as deadband) designed to enable storage technologies to manage state of charge. For the first tender round we set an initial requirement of 200MW of EFR with a maximum 50MW cap per provider. Further details of the service can be found on our website: <http://www2.nationalgrid.com/Enhanced-Frequency-Response.aspx>

We have been really encouraged by the level of participation and interest shown in the EFR procurement process and we recognise that this is a clear signal of the potential storage capability ready to participate in markets. Through our Power Responsive programme we are committed to working with non-traditional flexibility providers, including the storage community, to explore and determine the availability of suitable routes to market. We will be setting up a dedicated Storage Working Group, chaired by National Grid, which will include opportunities to feedback on the EFR process as well as exploring other revenue streams and practical steps to unlock barriers for storage providers.

If you would like to be part of the Power Responsive Storage Working Group, please register your details by sending an email via the following link:

[Register My Interest](#)

We will then be in touch with more details in the coming weeks.



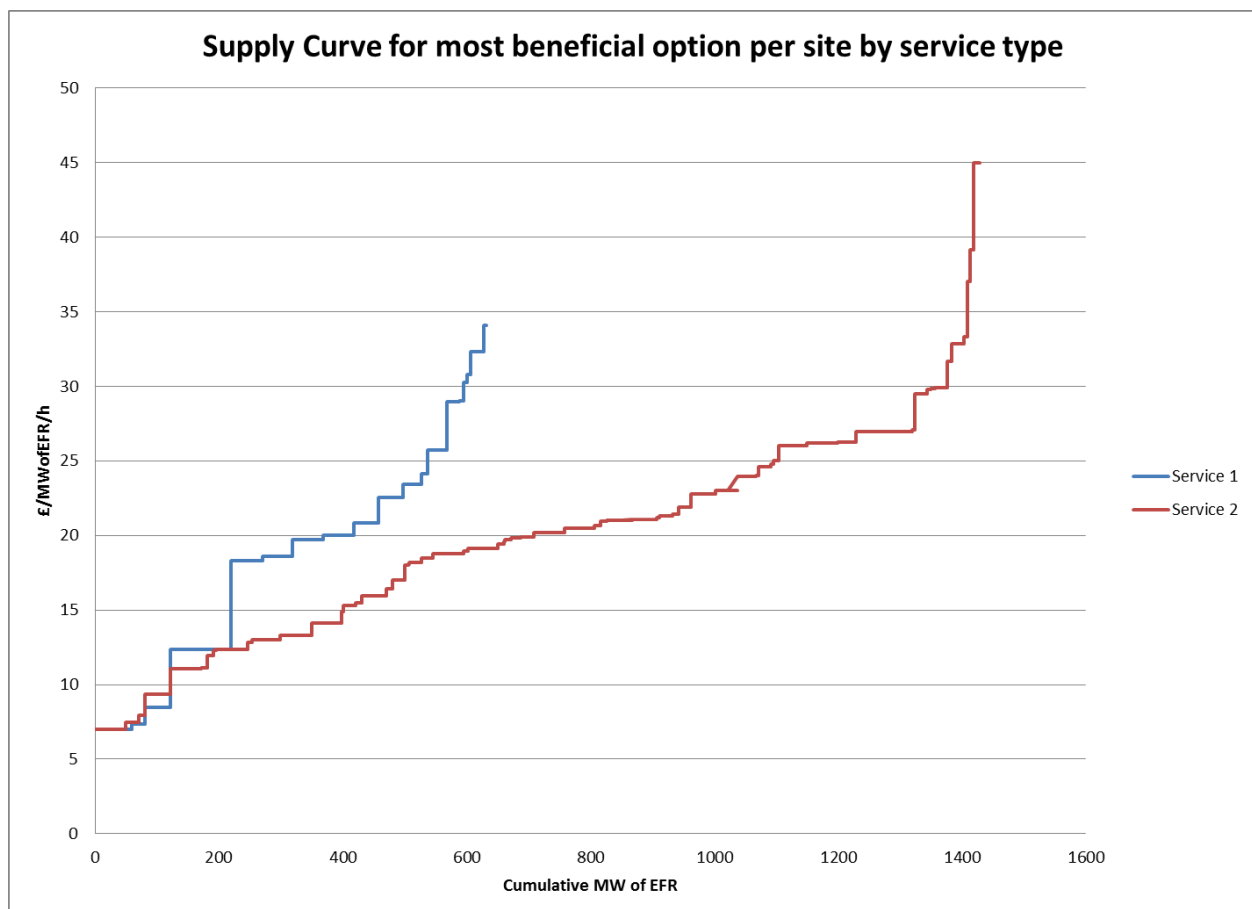
## Tender Summary

On the 15<sup>th</sup> July 2016 the first EFR tender round closed. We received tenders from 37 different Providers, across 64 “sites”. In total this represented 243 tendered options, 63 for the wide deadband service (service 1) and 180 for the narrow deadband service (service 2). This totalled 1596MW of options tendered for the wide service and 4034MW for the narrow service however some of these options are mutually exclusive. The maximum capability per site (regardless of service type and ignoring the 50MW cap per provider) was 1684MW. Of the 64 sites, 61 are classed as Storage, 2 are Demand aggregation and 1 is BMU generation.

Following Ofgem’s open letter on embedded benefits\* 6 companies chose to withdraw tendered options from 10 sites that opted out of the typical TRIAD times. These tenders are not represented in the following data or spreadsheet. One company did not pass the stage 1 assessment and is also excluded in the following report.

The following figure displays the supply curve for the two service types, to filter for mutually exclusive options only the most beneficial option per site is included in the chart. This chart also ignores the 50MW per provider cap. It should be noted that average price and benefit are not equivalent, this is due to benefit being dependent on the service type and the tendered service hours.

**Figure 1** Supply curves



The full table of tenders is available in excel format from the EFR website.

\* <https://www.ofgem.gov.uk/publications-and-updates/open-letter-charging-arrangements-embedded-generation>

## Assessment process

Tenders that passed the initial due diligence process, which looked at details of the projects to ensure that they met the service criteria and had the optimum chance of commissioning before the longstop date, were assessed on their price and hours of availability.

The assessment process for the EFR tenders is described in the ITT on the EFR webpage, however in brief, for each half hour of the tender the total cost of the tender are calculated along with the alternative response costs that the tender would offset. The benefits of each tender can be expressed as a percentage of the tender cost and units are ranked by percentage benefit and selected up to the requirement.

The alternative costs are derived from the cost of procuring standard frequency response, an exchange rate is calculated which describes how much of Primary Secondary and High response can be offset by each MW of EFR. Each tender can then be expressed as a volume of standard response and can be evaluated as a normal FFR tender. The exchange rates are different for service 1 and service 2 and are forecast for every half hour of the contract. The benefit of a tender is therefore dependent on the service type, the hours for which the service will be provided as well as the price of the tender.

## Successful Tenders

The table below summarises the 8 tenders that have been accepted giving 201MW of EFR at a total cost of £65.95m with an average price of £9.44/MW of EFR/h. The full table of tenders including accepted and rejected units is available from the EFR website in excel format.

<http://www2.nationalgrid.com/Enhanced-Frequency-Response.aspx>

Provider Name	Site Location/Name	Type of service	Provider Type	Enhanced Response (MW)	Estimated Start Date	Total Cost of tender £m	GWh of EFR holding	Service Hours	Average price of tender £/MW of EFR/ h	Does this tender exclude typical TRIAD hours
EDF Energy Renewables	T_WBURB-4	Service 2	Storage	49	Dec-17	£ 12.035	1719.312	35088	£ 7.00	FALSE
Vattenfall	Pen Y Cymoedd	Service 2	Storage	22	Apr-17	£ 5.749	771.936	35088	£ 7.45	FALSE
Low Carbon	Cleator	Service 2	Storage	10	Dec-17	£ 2.681	337.6	33760	£ 7.94	TRUE
Low Carbon	Glassenbury	Service 2	Storage	40	Mar-18	£ 12.668	1350.56	33764	£ 9.38	TRUE
E.ON UK	Sheffield	Service 2	Storage	10	Nov-17	£ 3.891	350.88	35088	£ 11.09	FALSE
Element Power	TESS	Service 2	Storage	25	Feb-18	£ 10.079	877.2	35088	£ 11.49	FALSE
RES	RESEFR7-PT	Service 2	Storage	35	Feb-18	£ 14.651	1228.08	35088	£ 11.93	FALSE
Belectric	Nevendon	Service 2	Storage	10	Oct-17	£ 4.200	350.88	35088	£ 11.97	FALSE
<b>Total</b>				<b>201</b>		<b>£ 65.954</b>			<b>£ 9.44</b>	