nationalgrid

Firm Frequency Response Market Information

Monthly Report   Nov-2014

Introduction

Firm Frequency Response (FFR) is a service through which balancing mechanism (BM) and non-BM participants commit to providing a given measure of response for a fee. The service is procured through a tender process ahead of BM timescales and competes with the mandatory response service offered by BM participants.

This report is intended to provide useful information to current and potential providers about the volume of response required, the likely periods over which it is required and the recent costs of obtaining frequency response through the mandatory market.

In Oct-2014, National Grid will procure frequency response in line with the principles laid out in the Assessment Principles. In principle, tendered prices are compared to the alternative costs buying mandatory response through the BM. Mandatory costs include the response holding costs, the bid and offer acceptance costs and the margin costs. More details on how these costs are considered during tender assessments are contained in our assessment principles.
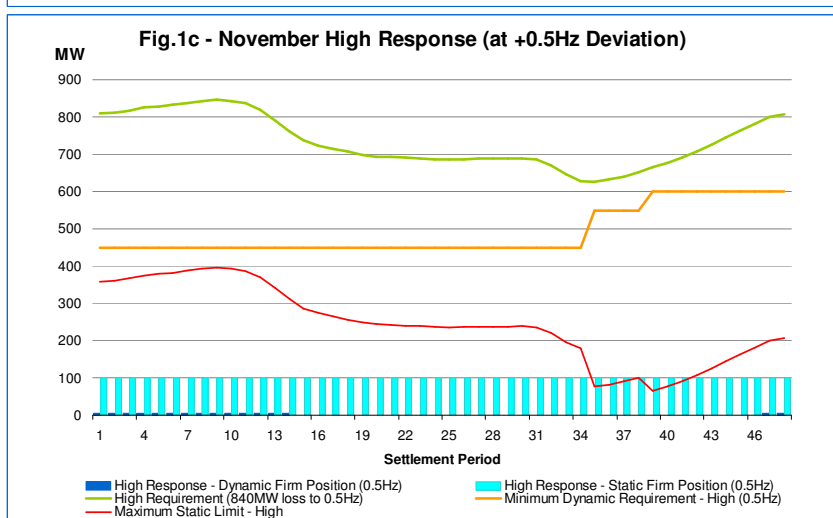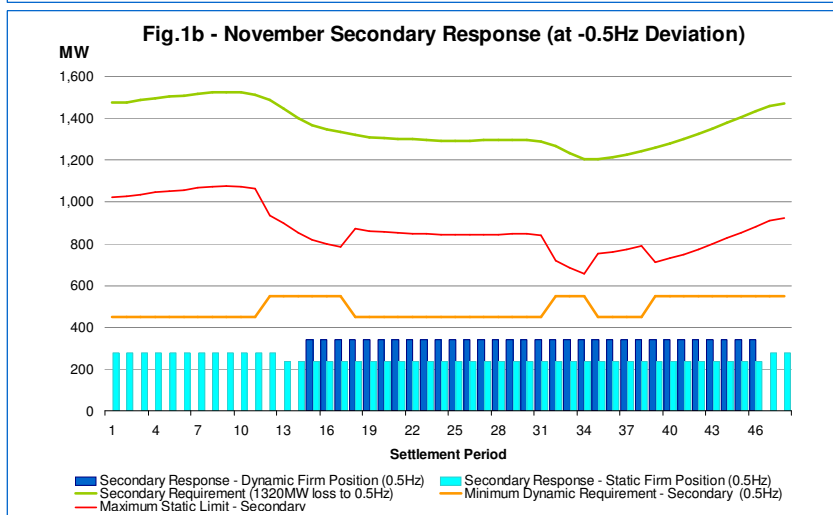
The next three pages of the report show the volumes of frequency response holding required. While the subsequent pages show the recent volumes and costs of response holding and bid and offer acceptances in the mandatory market.

Highlights

In September 2014, ten tenders were received offering frequency response from seven BM units. More details on the tenders accepted/rejected are available from the post-assessment tender report.

The FFR assessment principles and post-assessment tender report are available at:
http://www.nationalgrid.com/uk/Electricity/Balancing/services/frequencyresponse/ffr/

FFR Market Information

Settlement Period Requirement

Fig.1a - November Primary Response (at -0.5Hz Deviation)

Fig.1b - November Secondary Response (at -0.5Hz Deviation)

Fig.1c - November High Response (at +0.5Hz Deviation)
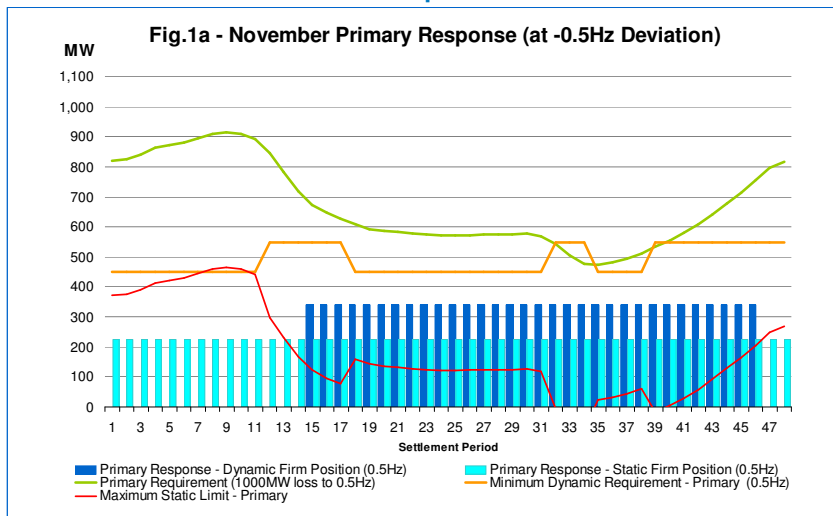
Figures 1a to 1c show the forecast frequency response requirement for each settlement period in Nov-2014.

The expected response requirements shown in the following graphs are averaged for each day of the month, assuming low wind generation. The requirements are estimated based on forecast demand for individual settlement periods. It should be noted that the volume of frequency response required at weekends is slightly higher than during the week, and when there is higher wind generation. This is because lower demands experienced at weekends, and higher wind generation, both will cause the system inertia to be lower.

The green lines show the total forecast response capability required at 0.5Hz deviation to contain frequency fluctuation within security standard. The primary response requirements are set for a 1000MW loss, secondary response for a 1320MW loss and high response for an 840MW demand loss.

The orange lines show the indicative minimum dynamic response required at 0.5Hz deviation.

The blue line gives the indicative maximum static response that can be accommodated and is calculated as the difference between the total response requirement and minimum dynamic requirement.

The bars in the graphs show the expected contracted responses to be available during the periods shown on the graph. The orange bars indicate the firm dynamic response and blue bars represent firm static response. Both dynamic and those static responses below the static maximum limit will contribute to meet the total
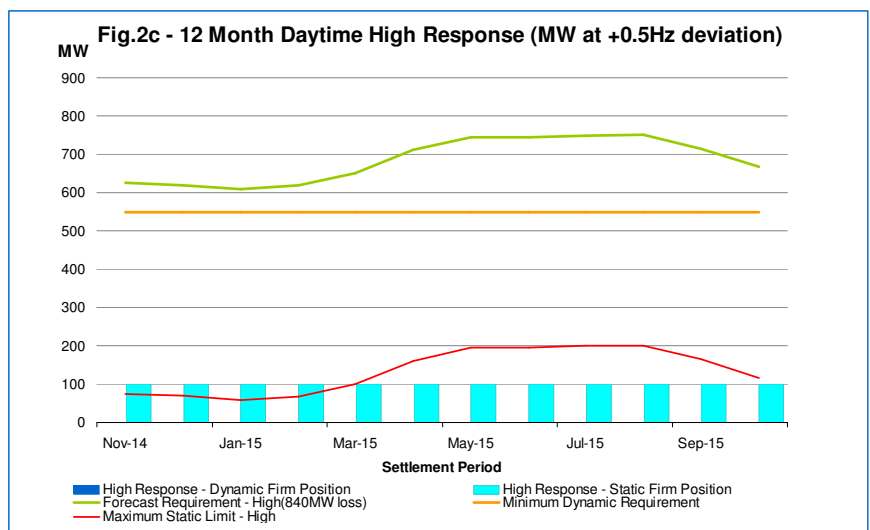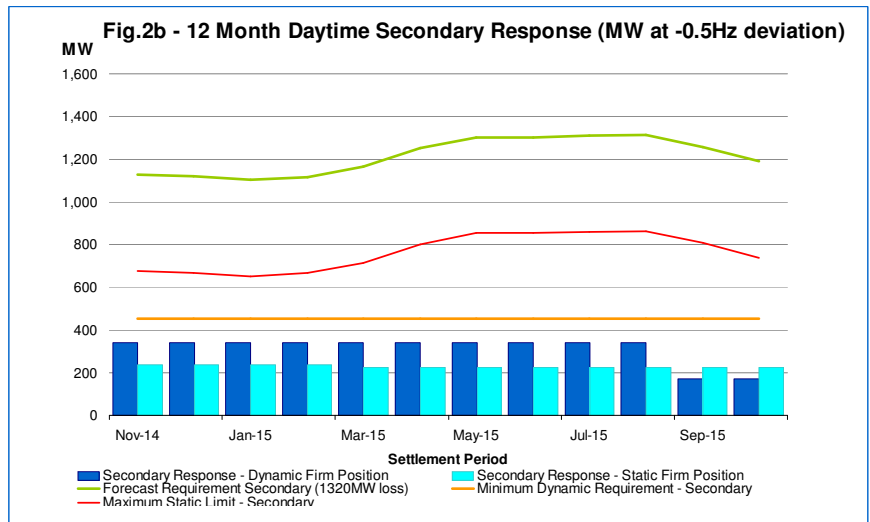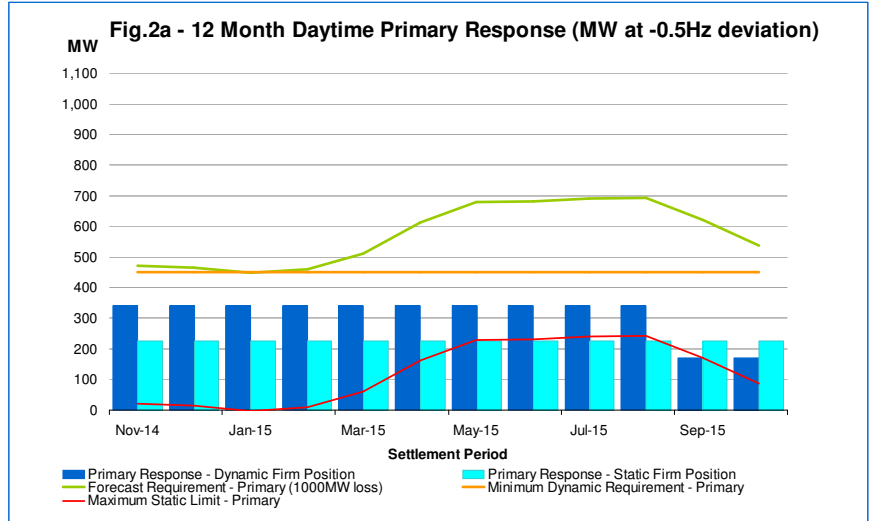
Daytime 12-Month Requirement

Figures 2a to 2c show the indicative daytime (07:00hrs - 23:00hrs) frequency response requirement for twelve months beginning Nov-2014.
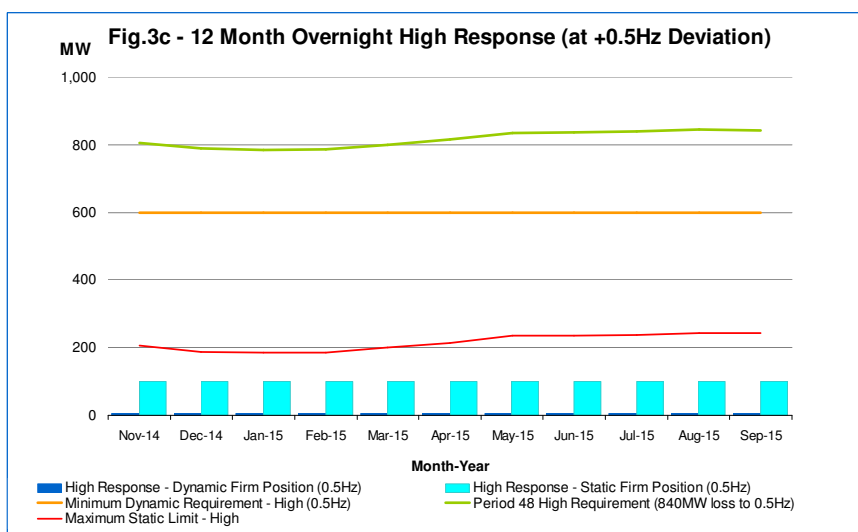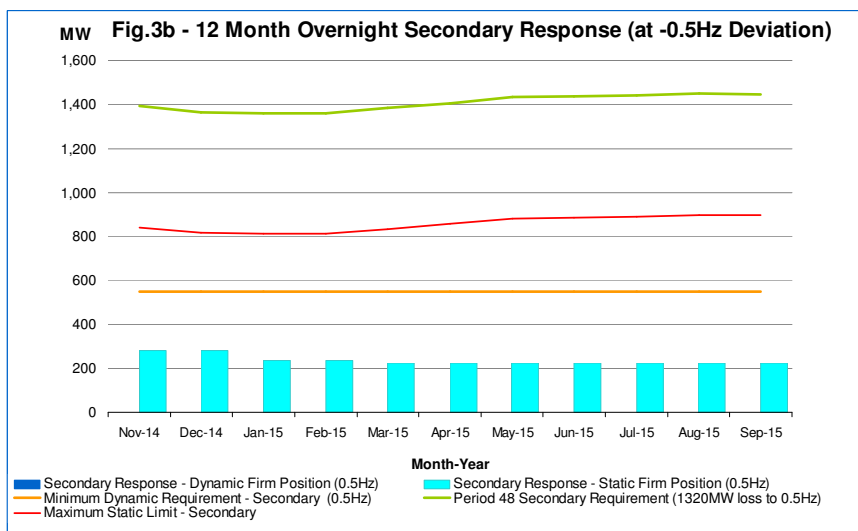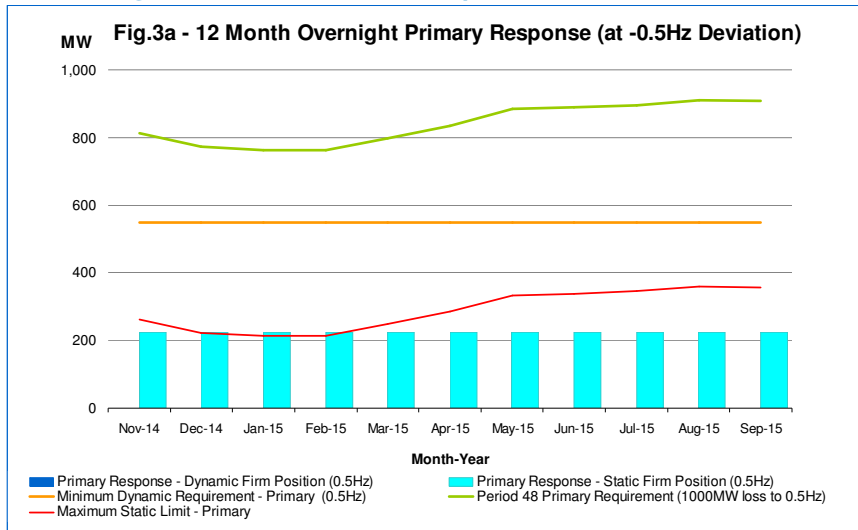The forecast response requirements shown in the following graphs are averaged for each day of the month and are calculated based on the forecast demand during settlement period 36. The volume of response required will vary over individual daytime settlement periods. The figures show the base/minimum values expected during the day and assuming low wind generation. The green lines show the total response capability required at 0.5Hz deviation to contain frequency fluctuation within security standard.   The primary response requirements are set for a 1000MW loss, secondary response for a 1320MW loss and high response for an 840MW demand loss.
The orange lines show the indicative minimum dynamic response required at 0.5Hz deviation for settlement period 36. The blue line is the indicative maximum static response that can be accommodated and is calculated as the difference between the total response requirement and minimum dynamic requirement.
The bars in the graphs show the expected contracted responses to be available during the periods shown on the graph. The orange bars indicate the firm dynamic response and blue bars represent firm static response. Both dynamic and those static responses below the static maximum limit will contribute to meet the total requirements.

Fig.2a - 12 Month Daytime Primary Response (MW at -0.5Hz deviation)

Primary Response - Dynamic Firm Position
Primary Response - Static Firm Position
Forecast Requirement - Primary (1000MW loss)
Minimum Dynamic Requirement - Primary
Maximum Static Limit - Primary

Fig.2b - 12 Month Daytime Secondary Response (MW at -0.5Hz deviation)

Secondary Response - Dynamic Firm Position
Secondary Response - Static Firm Position
Forecast Requirement Secondary (1320MW loss)
Minimum Dynamic Requirement - Secondary
Maximum Static Limit - Secondary

Fig.2c - 12 Month Daytime High Response (MW at +0.5Hz deviation)

High Response - Dynamic Firm Position
High Response - Static Firm Position
Forecast Requirement - High(840MW loss)
Minimum Dynamic Requirement
Maximum Static Limit - High

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Overnight 12-Month Requirement

Fig.3a - 12 Month Overnight Primary Response (at -0.5Hz Deviation)

MW

Legend:
- Primary Response - Dynamic Firm Position (0.5Hz)
- Primary Response - Static Firm Position (0.5Hz)
- Minimum Dynamic Requirement - Primary (0.5Hz)
- Period 48 Primary Requirement (1000MW loss to 0.5Hz)
- Maximum Static Limit - Primary

Fig.3b - 12 Month Overnight Secondary Response (at -0.5Hz Deviation)

MW

Legend:
- Secondary Response - Dynamic Firm Position (0.5Hz)
- Secondary Response - Static Firm Position (0.5Hz)
- Minimum Dynamic Requirement - Secondary (0.5Hz)
- Period 48 Secondary Requirement (1320MW loss to 0.5Hz)
- Maximum Static Limit - Secondary

Fig.3c - 12 Month Overnight High Response (at +0.5Hz Deviation)

MW

Legend:
- High Response - Dynamic Firm Position (0.5Hz)
- High Response - Static Firm Position (0.5Hz)
- Minimum Dynamic Requirement - High (0.5Hz)
- Period 48 High Requirement (840MW loss to 0.5Hz)
- Maximum Static Limit - High

Figures 3a to 3c show the indicative daytime (23:00hrs - 07:00hrs) frequency response requirement for twelve months beginning Nov-2014.

The expected response requirements shown in the following graphs are averaged for each day of the month and are calculated based on the forecast demand for settlement period 48. The volume of response required will vary over individual overnight settlement periods. The figures show the base/minimum values expected overnight and assuming low wind generation.

The green lines show the total response capability required at 0.5Hz deviation to contain frequency fluctuation within security standard. The primary response requirements are set for a 1000MW loss, secondary response for a 1320MW loss and high response for an 840MW demand loss.

The orange lines show the indicative minimum dynamic response required at 0.5Hz deviation for settlement period 48.

The blue line gives the indicative maximum static response that can be accommodated and is calculated as the difference between the total response requirement and minimum dynamic requirement.

The bars in the graphs show the expected contracted responses to be available during the periods shown on the graph. The orange bars indicate the firm dynamic response and blue bars represent firm static response. Both dynamic and those static responses below the static maximum limit will contribute to meet the total requirements.
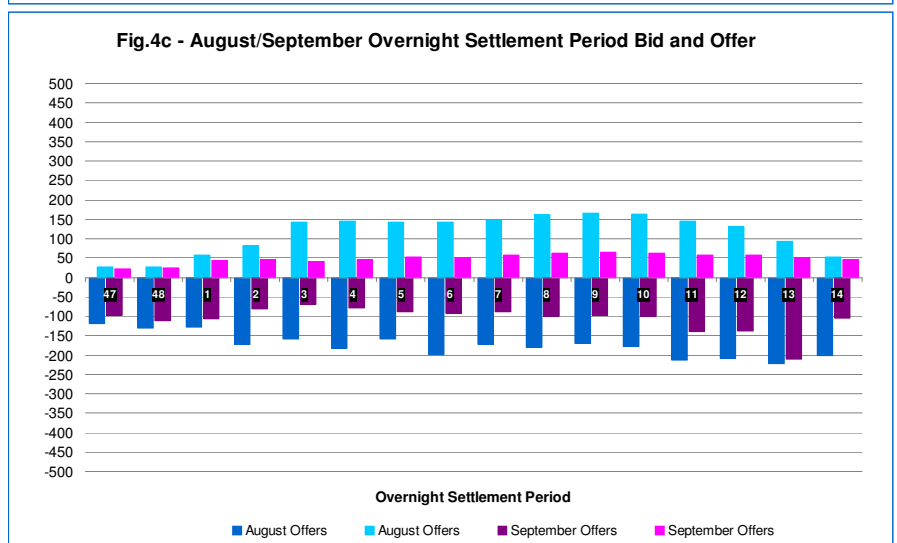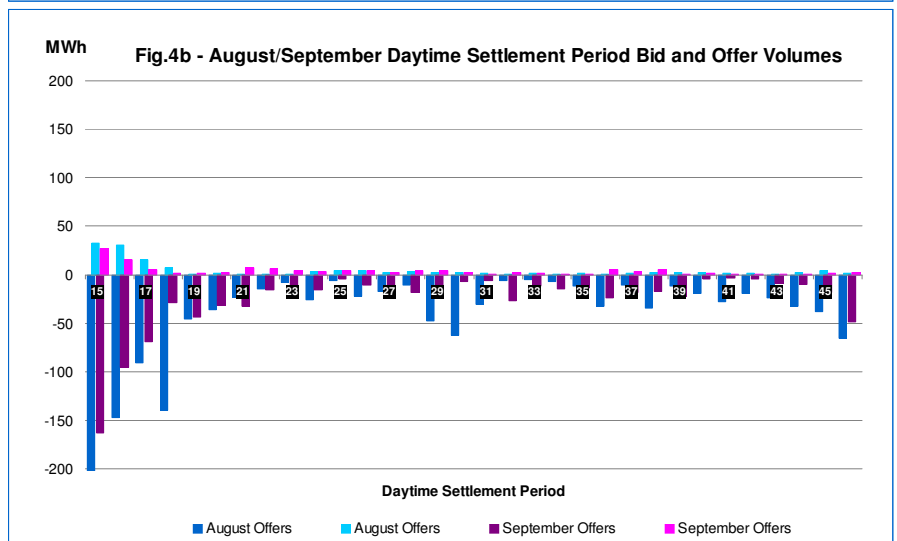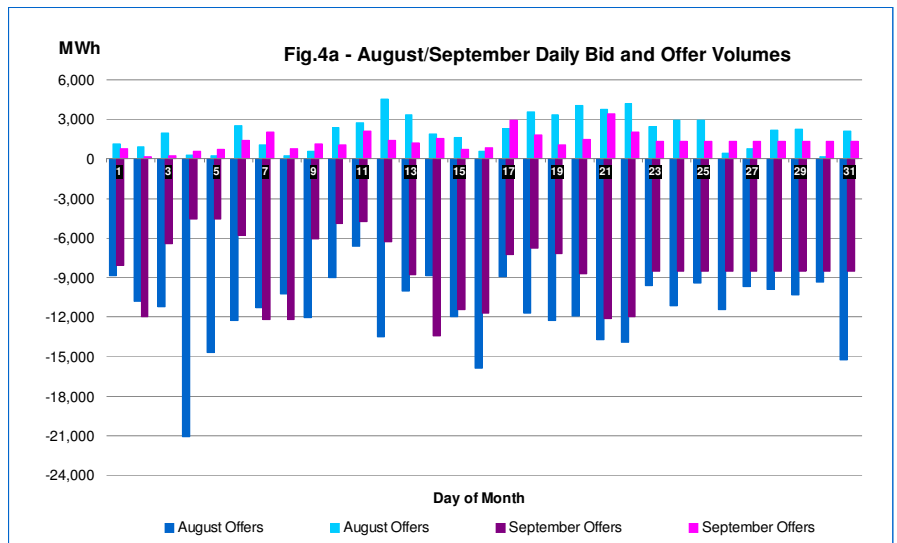
Historic Bids and Offers

Figures 4a to 4c show the volume of Bid and Offer (BOA) instructions accepted by BM units that were, in conjunction with the delivery of the BOA energy, also providing frequency response.

Figure 4a shows the volumes on a daily basis while figures 4b and 4c show the average daily volume for each settlement period. These figures are presented for August 2014 and September 2014.

In order to publish this report by the 18th business day of September, figures for the last few days of September have been estimated. The actual figures for September will be published in the next market information report.

The settlement period figures show a profile of bid and offer acceptances over the day. It indicated that more bids were taken in the daytime periods compared to the overnight periods.

The Bid and Offer volumes presented in Figures 4a to 4c are indicative only. Actions may have been required for other reasons apart from, or as well as, frequency response optimisation. For example, bid and offer instructions may have also been required to resolve energy imbalance or system constraints.

Fig.4a - August/September Daily Bid and Offer Volumes

Fig.4b - August/September Daytime Settlement Period Bid and Offer Volumes

Fig.4c - August/September Overnight Settlement Period Bid and Offer

FFR Market Information

Key dates in Oct-2014

In Oct-2014, National Grid will procure frequency response following the principles laid out in the Assessment Principles.

Tenders from eligible service providers for firm frequency response should be submitted by **Wednesday 01/10/2014**(1st business day) for all tenders.

National Grid will notify service providers of the outcome of the tender assessment by **Thursday 16/10/2014** (12th business day).

For successful tenders, National Grid will notify nominated windows, following assessment by **Monday 20/10/2014** (14th business day).

Mandatory Response Costs

Response Bid and Offer Volume and Cost		
	August 2014 (Actual)	September 2014 (Estimate)
Total Response Bid Cost	**2.53 £m**	**1.69 £m**
Total Response Bid Volume	357,077 MWh	255,601 MWh
Total Response Offer Cost	**1.26 £m**	**0.47 £m**
Total Response Offer Volume	63,827 MWh	40,570 MWh

Response Holding Volume and Cost			
01/08/2014 Price band (£/MW/h range)	Primary Volume (MWh)	Secondary Volume (MWh)	High Volume (MWh)
0 to 2	107,928	235,774	170,741
2 to 4	285,543	111,816	2,659
4 to 6	126,257	2,199	512,687
6 to 8	2,901	31	46,574
Greater than 8	2,130	155	39,698
Total Volume	**524.8 GWh**	**350.0 GWh**	**772.4 GWh**
Cost	**1.70 £m**	**0.53 £m**	**3.51 £m**
Total Frequency Response Holding Volume			**1647.1 GWh**
Total Frequency Response Holding Cost			**5.74 £m**
01/09/2014 Price band (£/MW/h range)	Primary Volume (MWh)	Secondary Volume (MWh)	High Volume (MWh)
0 to 2	53,152	122,562	125,609
2 to 4	222,603	89,149	3,306
4 to 6	44,475	1,185	360,297
6 to 8	4,726	0	37,871
Greater than 8	2,975	131	5,156
Total volume	**327.9 GWh**	**213.0 GWh**	**532.2 GWh**
Cost	**0.96 £m**	**0.35 £m**	**2.17 £m**
Total Frequency Response Holding Volume			**1073.2 GWh**
Total Frequency Response Holding Cost			**3.48 £m**

*This table is also provided in excel format on the website.

Calculation of Bid and Offer acceptance costs
Response offer cost = Volume Offers x (Offer Price – ERP)
Response bid cost = Volume Bid x (Bid Price – ERP)

ERP (Energy Reference Price) is the volume weighted average of the submitted bids or offers used to resolve net imbalance volume (NIV) ignoring plant dynamics. It does not include non-BM standing reserve prices, trades, PGBTS or SO-SO trades. The Energy reference Price is calculated for each settlement period.

For a short market, the price is calculated using all submitted offers up to the value of NIV, capped by MEL. For a long market, the price is calculated using all submitted bids on synchronised plant down to zero, including demand side bidders and unsynchronised units (e.g. DINO pumps). All prices do not factor in plant dynamics.