

# Firm Frequency Response (FFR)

## Market Information for Tenders for DECEMBER 2009

National Grid wishes to highlight to participants its requirement for Firm Frequency Response. Participants are invited to note the inclusion of Figures 7 and 8 for this purpose, as well as the enhancement to the Price breakdown table on page 7.

### Total Frequency Response Requirements

Our indicative daily Total Requirement for Frequency Response for the above month is shown by Settlement Period for weekdays, in Figure 1 and for Saturdays, Sundays and Bank Holidays, in Figure 2. The graphs show the requirement to a maximum frequency deviation of 0.5Hz for Primary for a 1000MW loss and 0.5Hz for Secondary for a 1320MW loss and 0.5Hz for High Response for an 840MW demand loss.

*Indicative Total Response Requirement - Weekday*

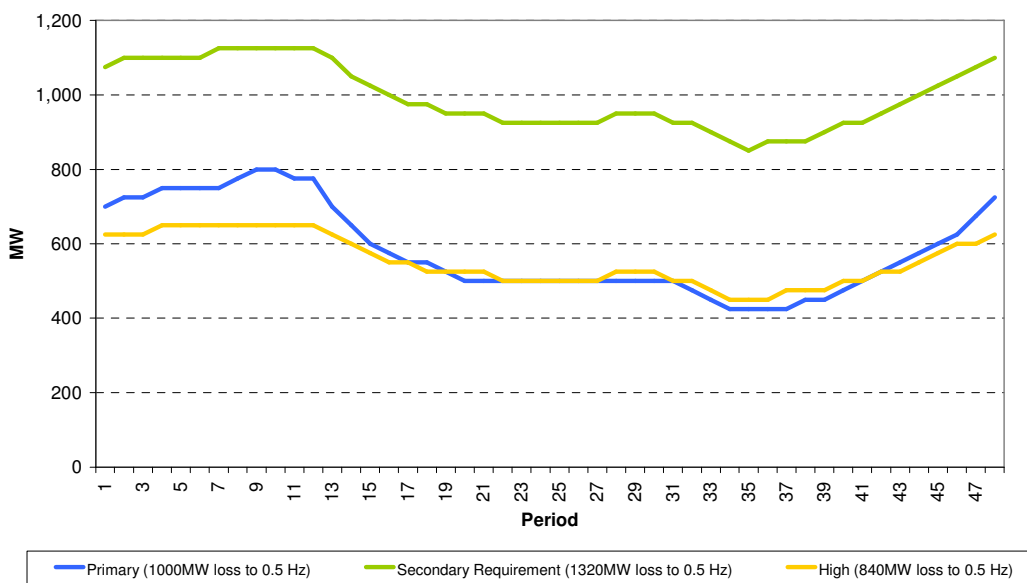


Figure 1

*Indicative Total Response Requirement - Weekend*

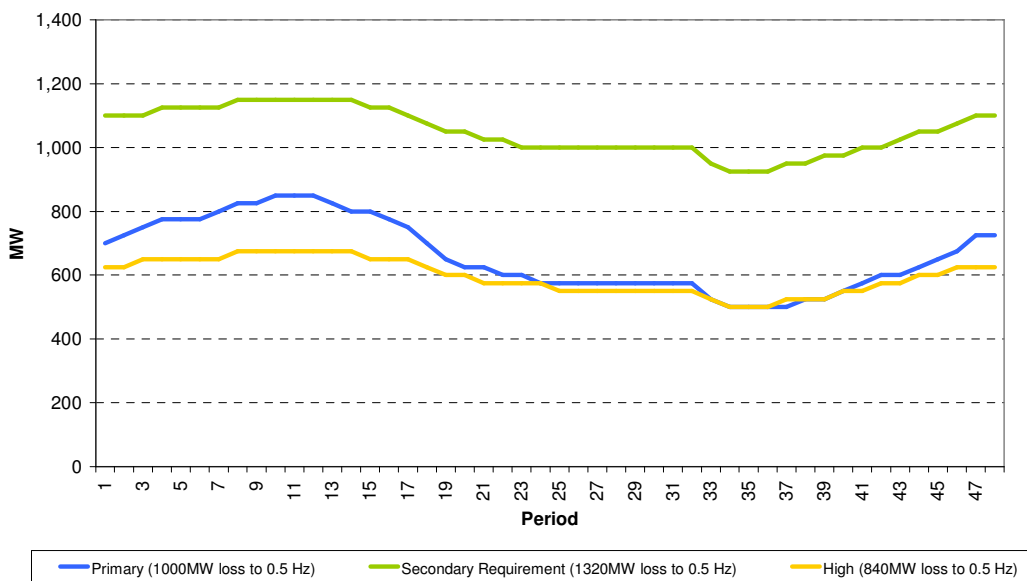


Figure 2

**Minimum Dynamic Response Requirement**

The indicative minimum required levels for Dynamic response are shown for Weekdays, Figure 3, and Saturdays, Sundays and Bank Holidays, Figure 4. The levels are shown for delivery at 0.5 Hz deviation, although 0.2 Hz is the largest frequency deviation within normal operational range. The total amount of response delivered by Dynamic providers contributes to meeting the Total Response Requirement, Figures 1 and 2, above.

*Indicative Minimum Dynamic Response Requirement - Weekday*

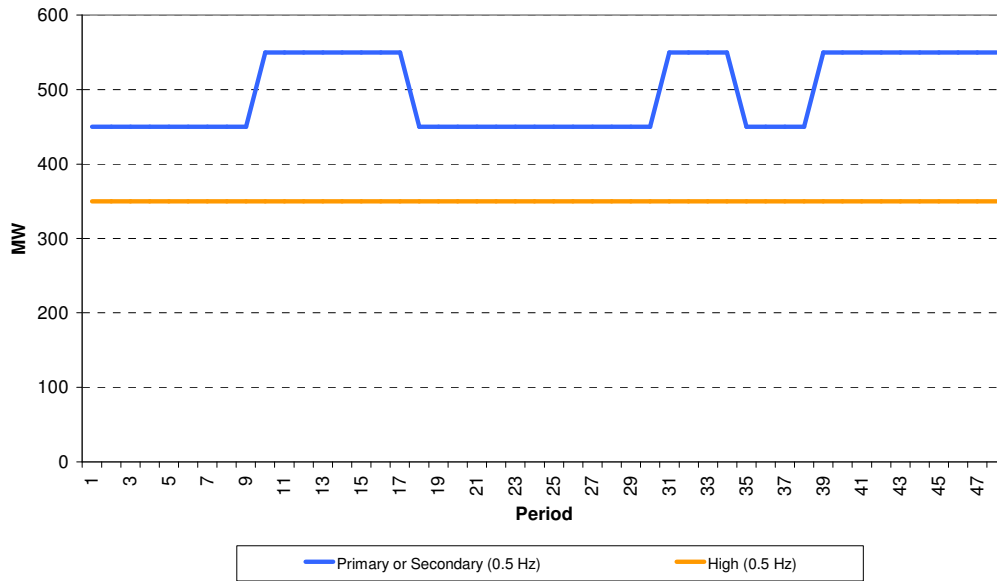


Figure 3

*Indicative Minimum Dynamic Response Requirement - Weekend*

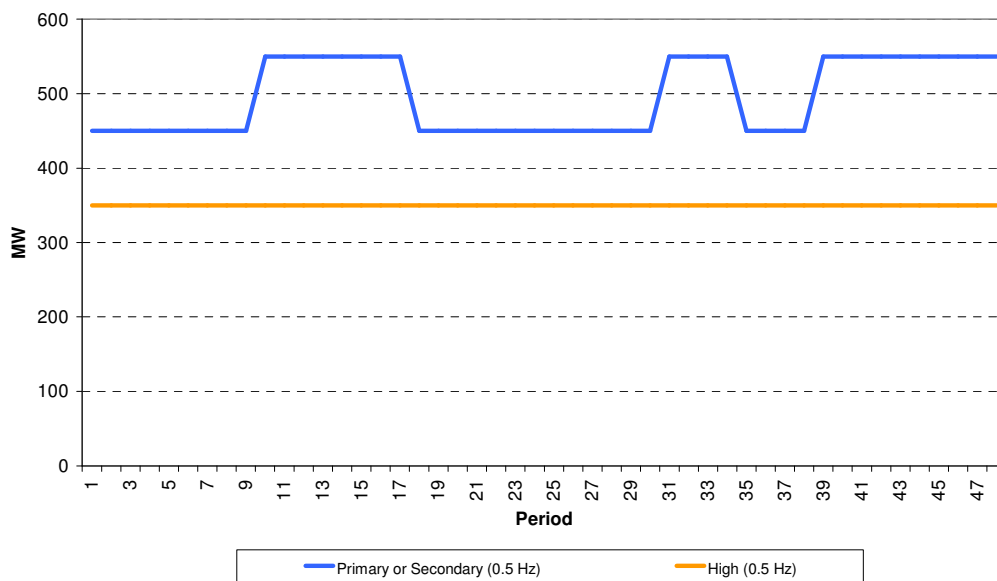


Figure 4

**Maximum Non-Dynamic Response Level**

The expected maximum level of Non-Dynamic Response is shown below for Weekdays, Figure 5, and for Saturdays, Sundays and Bank Holidays, Figure 6. The maximum level of Non-Dynamic Response achievable is the Total Response Requirement (at 0.5Hz) less the Minimum Dynamic Response Requirement delivery (at 0.5Hz as appropriate).

*Indicative Maximum Non-Dynamic Response Level - Weekday*

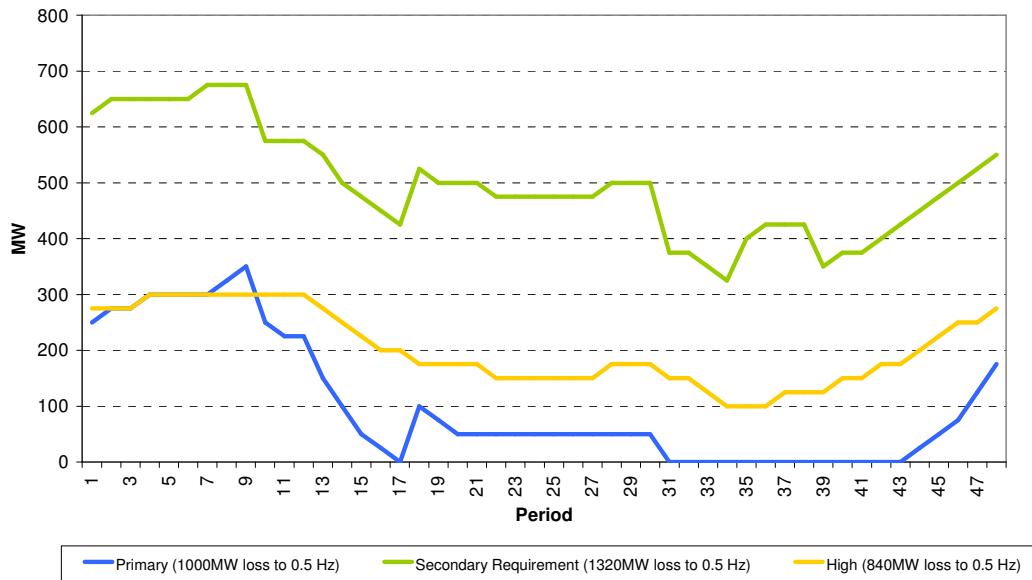


Figure 5

*Indicative Maximum Non-Dynamic Response Level - Weekend*

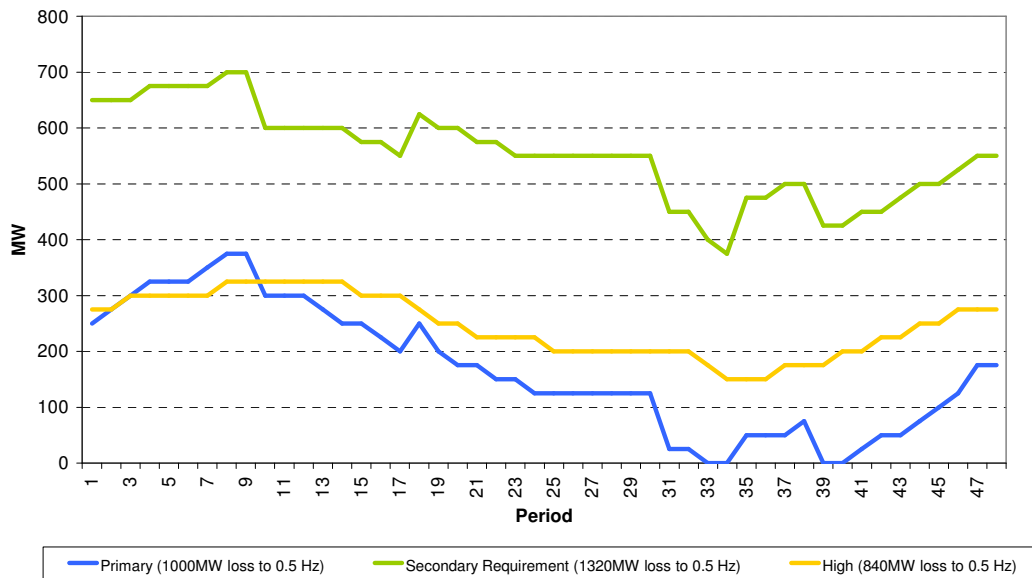


Figure 6

**Balancing Mechanism instructions on Frequency Responsive plant**

Figure 7, below, shows a post-event analysis of the volume of Bid Offer Acceptances instructed on Balancing Mechanism Units that were, in conjunction with the delivery of the BOA energy, also providing Frequency Response. This analysis covers **September 2009 and October 2009** on a daily basis. This data gives an indication of periods during which National Grid takes balancing actions which also contribute to the optimisation of the response holding across the system. However, readers should be aware that this is only indicative and actions may have been required for other reasons apart from (or as well as) Frequency Response optimisation (such as resolving energy imbalance or transmission system constraints).

**Response BOA Summary for September 2009**

Total Response Bid Cost	= £1,568,733
Total Response Bid Volume	= -153,842 MWh
Total Response Offer Cost	= £ 2,009,036
Total Response Offer Volume	= 88,274 MWh

*Where*

Response Offer Cost = Volume\_Offers x (Offer\_Price – Energy Reference Price)

Response Bid Cost = Volume\_Bid x (Bid\_Price – Energy Reference Price)

Note: To produce the above numbers for publication by business day 18 the last few days of the month have been calculated using estimates.

**Energy Reference Price**

The Energy Reference Price is the volume weighted average of the submitted bids or offers available to resolve NIV ignoring plant dynamics. This also does not include non-BM standing reserve prices, trades, PGBTS or SO-SO trades. The Energy reference Price is calculated for each settlement period individually as follows:

Short Market: All submitted Offers up to the value of NIV, Capped by MEL, unconstrained by dynamic parameters

Long Market: All submitted Bids on synchronised plant down to zero, includes Demand Side Bidders and unsynchronised units (e.g. DINO/FFES pumps), unconstrained by dynamic parameters

*Average volume of BOAs on Frequency Responsive BM Units*

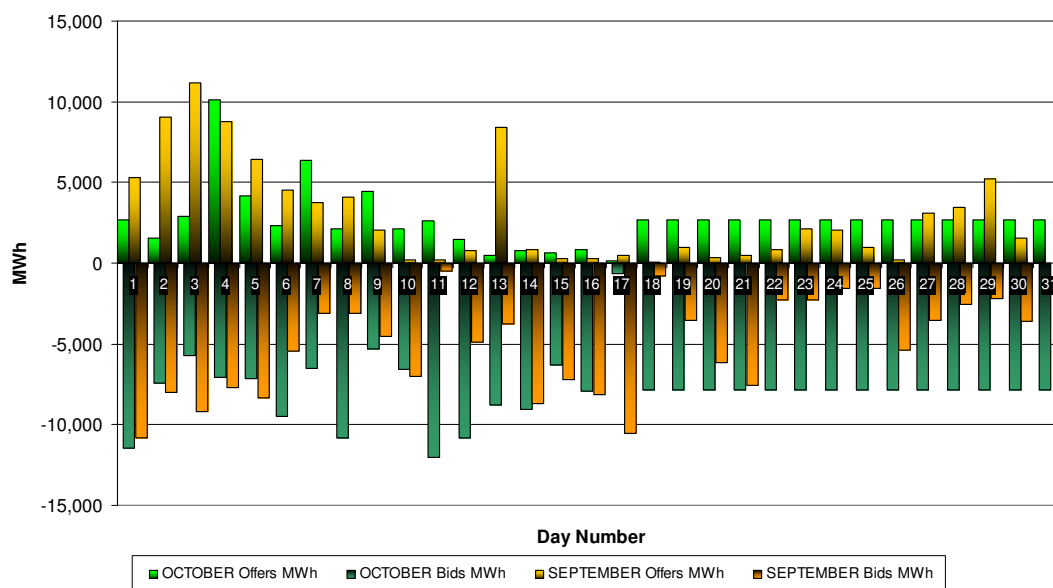


Figure 7

Figure 8 represents this data on a settlement period basis.

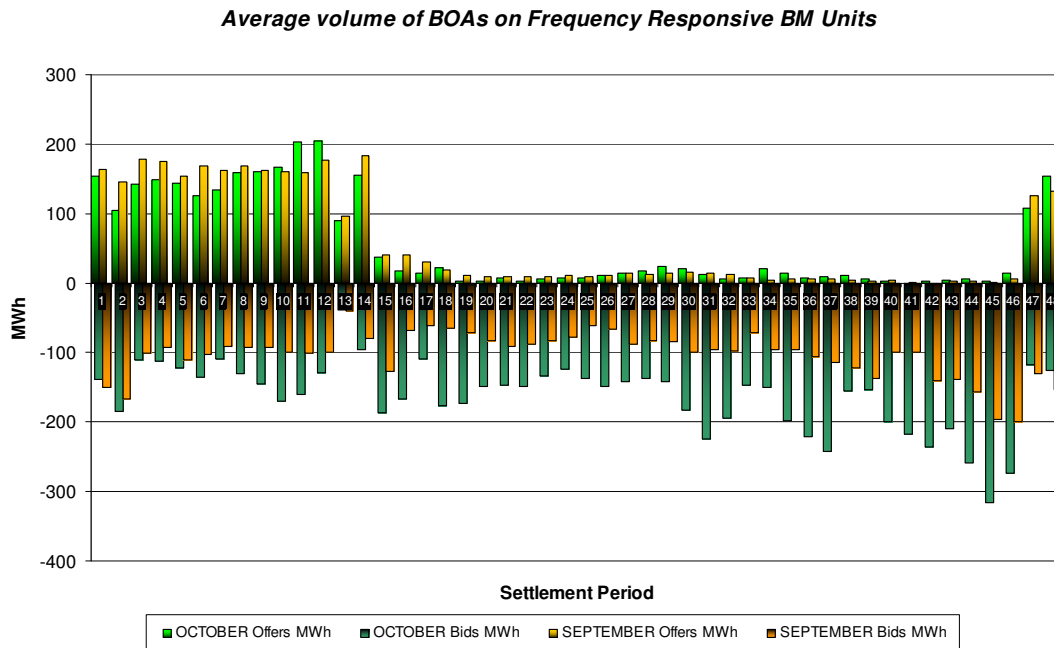


Figure 8

Note: To produce the above charts for publication by business day 18 the last few days of the month have been calculated using estimates.

**Indication of Firm Contract Position**

Figure 9a below shows the aggregated firm position that National Grid has already procured, and expects to be available, for weekdays for the month ahead through a combination of static and dynamic providers. Figure 9b shows the same for the year ahead.

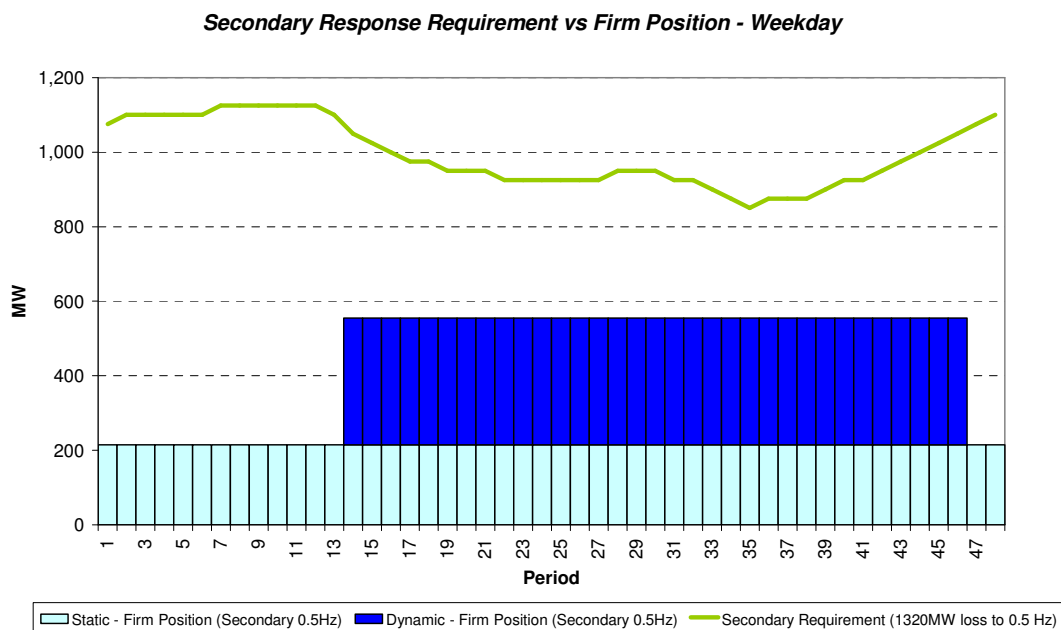


Figure 9a

\* Two FFR contracts shown in graphs 9a, 9b, 10a & 10b were agreed on bilateral terms. In line with the Procurement Guidelines if we consider that there is insufficient competition in the provision of a Balancing Service we shall contract for such provision on a negotiated bilateral basis. Full details are available on the National Grid website.

**Current 12 month forward contracted outlook - Weekday**

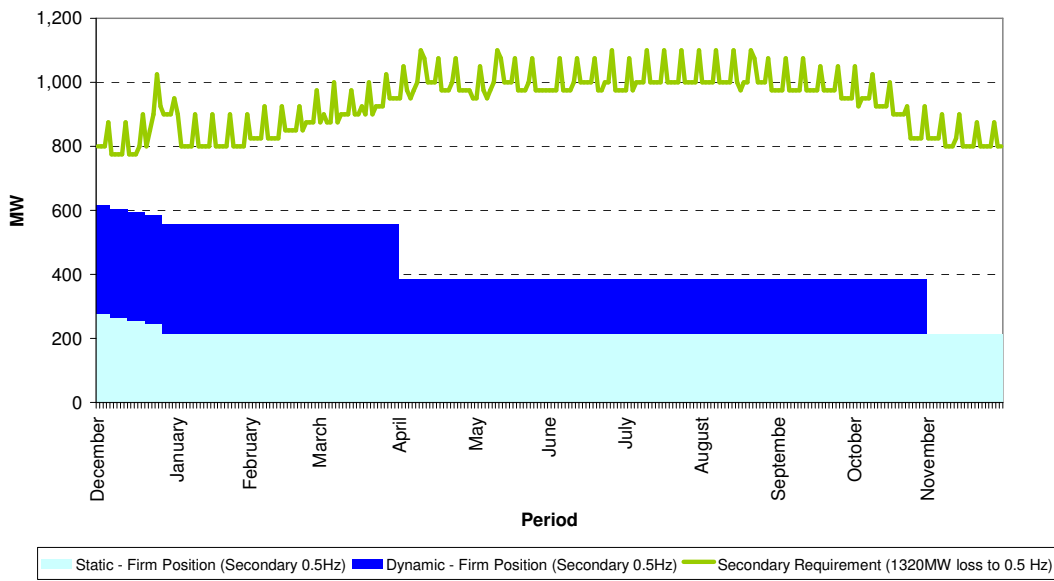


Figure 9b

Figure 10a below shows the aggregated firm position that National Grid has already procured, and expects to be available, for weekends for the month ahead through a combination of static and dynamic providers. Figure 10b shows the same for the year ahead.

**Secondary Response Requirement vs Firm Position - Weekend**

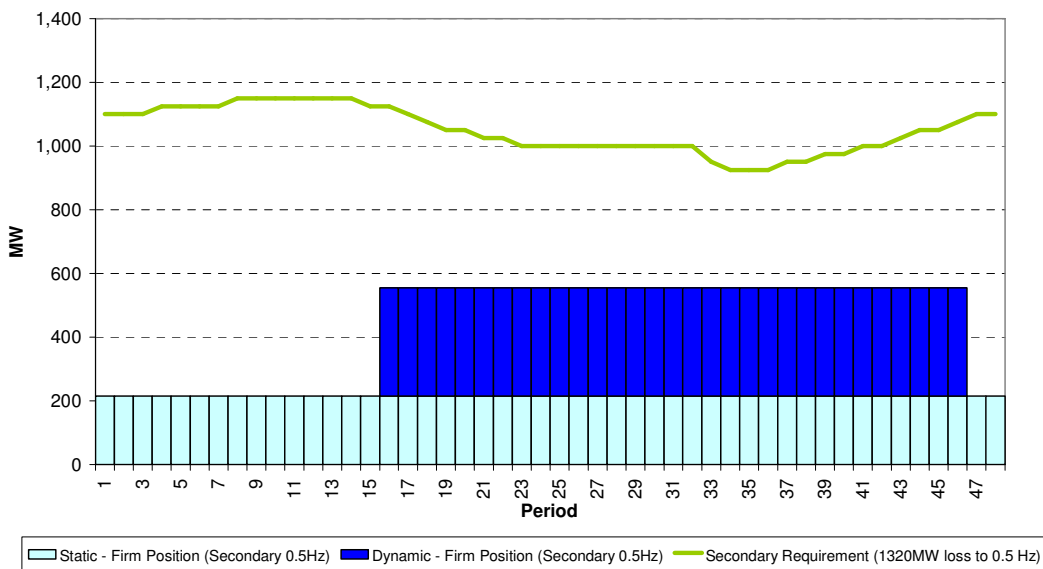


Figure 10a

Current 12 month forward contracted outlook - Weekend

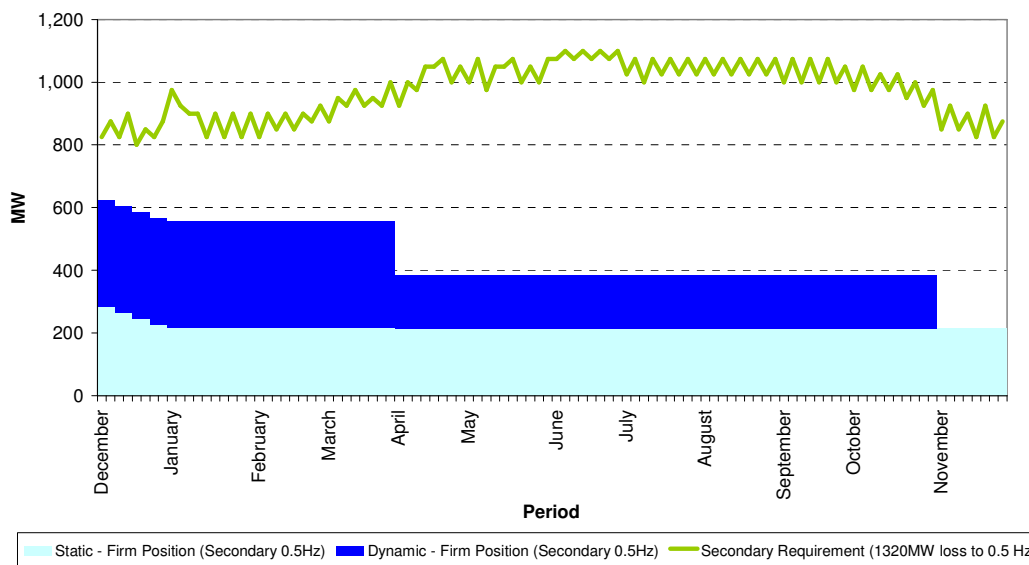


Figure 10b

The total volumes for Frequency Response holding on Mandatory service providers are **807 GWh** for **September 2009** and **1,161 GWh** for **October 2009**, and break down into price bands as follows:

sep 2009	Primary	Secondary	High
Price band (£/MW/h range)	Volume (MWh)	Volume (MWh)	Volume (MWh)
Greater than 8	301	0	56,789
6 to 8	7,624	4,823	264,321
4 to 6	17,369	2,322	139,633
2 to 4	157,883	77,031	0
0 to 2	20,842	57,594	132
<b>Totals</b>	<b>204.0 GWh</b>	<b>141.8 GWh</b>	<b>460.9 GWh</b>
<b>Costs</b>	<b>£0.62 m</b>	<b>£0.34 m</b>	<b>£3.19 m</b>
<b>Total Frequency Response Holding Volume</b>			<b>0,807 GWh</b>
<b>Total Frequency Response Holding Cost</b>			<b>4.15 £m</b>

oct 2009	Primary	Secondary	High
Price band (£/MW/h range)	Volume (MWh)	Volume (MWh)	Volume (MWh)
Greater than 8	9,937	1,018	70,642
6 to 8	20,763	3,259	373,322
4 to 6	30,573	1,192	70,559
2 to 4	322,311	108,691	0
0 to 2	35,794	112,393	714
<b>Totals</b>	<b>419.4 GWh</b>	<b>226.6 GWh</b>	<b>515.2 GWh</b>
<b>Costs</b>	<b>£2.29 m</b>	<b>£0.52 m</b>	<b>£3.28 m</b>
<b>Total Frequency Response Holding Volume</b>			<b>1,161 GWh</b>
<b>Total Frequency Response Holding Cost</b>			<b>6.09 £m</b>

Note: To produce the above numbers for publication by business day 18 the last few days of the month have been calculated using estimates.

Please note that the MW/h units of payment are defined in the CUSC and do not relate to the units of 0.5Hz Primary, Secondary and High Response as quoted for the requirements, above.

For **December 2009**, Frequency Response Requirements are anticipated to be in line with the forecast Figures 1 – 6, above. National Grid will procure in line with the principles laid out in the Assessment Principles. Tenders from eligible Service Providers for Firm Frequency Response should be submitted by **2<sup>nd</sup> November 2009** (1<sup>st</sup> business day – for Multi-month tenders) or **4<sup>th</sup> November 2009** (3<sup>rd</sup> business day – for Single-month tenders). National Grid will notify Service Providers of the outcome of the tender assessment by **13<sup>th</sup> November 2009** (10<sup>th</sup> business day). For successful tenders, National Grid will notify nominated windows, following assessment, by the **20<sup>th</sup> November 2009** (15<sup>th</sup> business day).

Tenders should be sent for the attention of:

Bea Ennim  
Network Operations  
National Grid plc  
National Grid House  
Warwick Technology Park  
Gallows Hill  
Warwick  
CV34 6DA

Tenders can be sent by email to [Bea.Ennim@uk.ngrid.com](mailto:Bea.Ennim@uk.ngrid.com)