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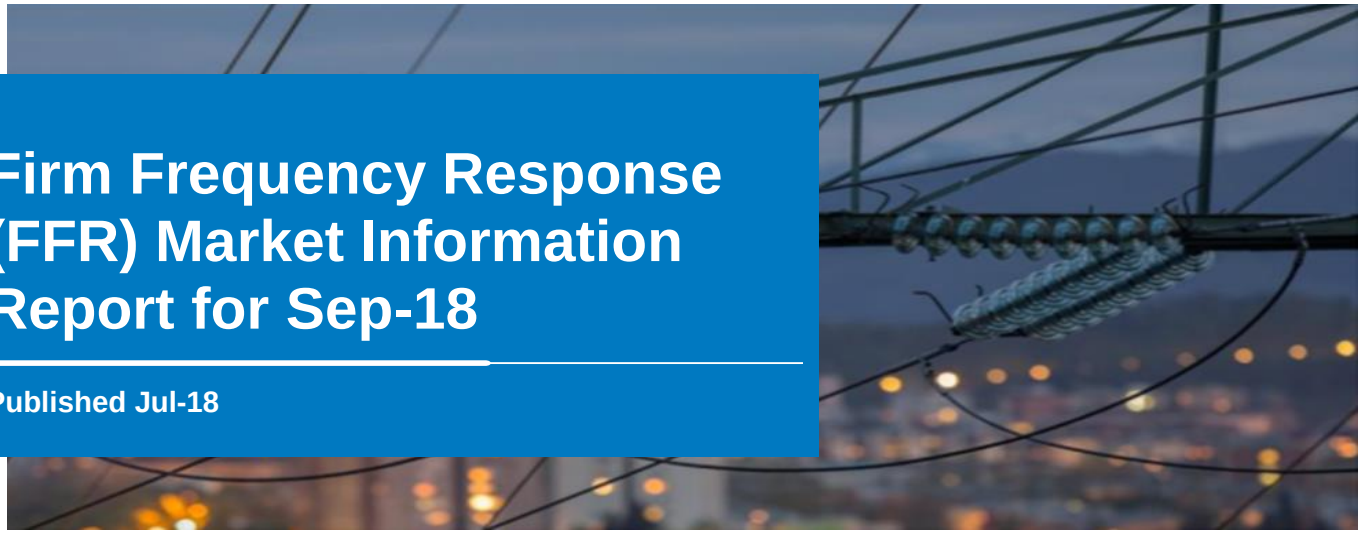

# Firm Frequency Response (FFR) Market Information Report for Sep-18

**Published Jul-18**

## Key Points

This Market Information Report is relevant for tenders submitted in Aug-18 for delivery in **Sep-18**.

Tenders from eligible service providers for Firm Frequency Response should be submitted on **Wed 01-Aug-18** (1st business day) for all tenders.

National Grid will notify service providers of the outcome of the tender assessment, and preliminary nominations, by **Thu 16-Aug-18** (12th business day).

**From January 2018, non-compliant tenders will be rejected prior to assessment.**

Providers must use the template provided in the Ariba system to tender in for FFR. Use of any other template or submissions via e-mail will not be accepted.

Please note that this is a month ahead only tender. Tenders should therefore be submitted for **Sep-18** delivery.

The details regarding the dates, times and dial in details for the upcoming FFR Result WebEx can be found here.

For further information please contact your account manager or:

**Andrew Rice**
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This Market Information Report provides information to FFR providers on the requirement for the Aug-18 tender (TR 104) for delivery in Sep-18.

## Requirements for Sep-18 (TR 104)

**Primary Response:**
A primary dynamic requirement exists in EFA blocks 1 and 2. A non-dynamic requirement exists in EFA blocks 3 to 6. With no primary non-dynamic market in operation, procurement of this volume will instead be taken directly from the dynamic market.

**Secondary Response:**
A secondary dynamic requirement exists in EFA blocks 1 and 2. For the remaining EFA blocks in the day, the dynamic requirement for secondary response has been satisfied.

A non-dynamic requirement exists across all 6 EFA blocks. More recently, the dynamic and non-dynamic prices have begun to convergence. As this requirement sits outside of the minimum dynamic requirement, this non-dynamic requirement will be taken from either the dynamic or non-dynamic market dependant on the economics of each solution.

**High Response:**
A high response requirement is present across EFA blocks 3 to 6.

A breakdown of the outstanding requirement for this tender round can be found in Appendix 1. A full breakdown of the long-term requirements can be found in Appendix 1 in the excel file.

*Please note that submitted tenders must have a minimum window availability of 4 hours in line with EFA blocks.*

## Market Updates

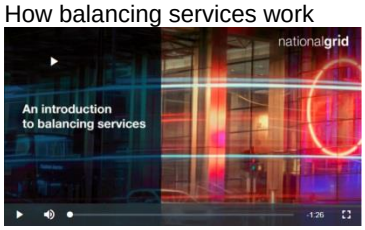
*Real Time and Historic Frequency Data*
Real-time data i.e. demand and frequency data, over the last 60 minutes can now be found on the Realtime Extranet section on the National Grid website. Historic frequency data as far back as 2014 can also be accessed for GB data at 1 second resolution.

# New

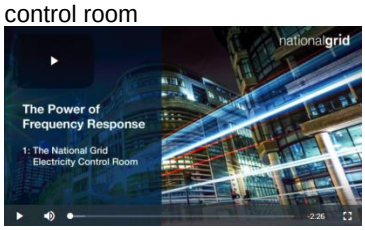
5 explanatory videos have been unloaded to the National Grid website. Each video focuses on a different element of Frequency response as a balancing service, how Electricity National Control Centre makes use of it and how the Firm Frequency Response assessment is undertaken.

To view the videos, click on the linked images below.

**Video 1**
How balancing services work




**Video 2**
The National Grid electricity control room




**Video 3**
Frequency response


**Video 4**
Firm frequency response


**Video 5**
The FFR assessment process


*Simplification of FFR*

*FFR Auction Trial*

Ahead of the FFR auction trial in which weekly FFR procurement will be undertaken, a portion of the dynamic and non-dynamic FFR requirement will be transferred from the monthly tenders to the weekly auction. Updates on this will be issued at the end of July/early August. Please look out for this on the Future of Balancing Services webpage.

*EFA Block Procurement*

In line with the standardisation outlined in the Product Road Map, procurement of FFR will only take place across the standard 6 EFA blocks. Tenders must therefore only start, and end, at the following times: 2300, 0300 0700 1100 1500 1900.

The minimum requirement across each specific EFA block will determine how much volume will be procured for each of the 6 daily 4 hour blocks.

Any outstanding shape will be satisfied, where necessary, closer to real time by the Electricity National Control Centre.

*Testing*

Providers are required to have successfully passed FFR testing of their asset by the National Grid Generator Compliance Team prior to tendering in for month ahead requirements. E.g. If tendering to provide a FFR service starting on 1st September, the unit must have passed testing prior to the tender submission window closing on the 1st business day in August. Tenders that do not meet this requirement will be deemed non-compliant and will be automatically rejected.

*Limiting tenders*

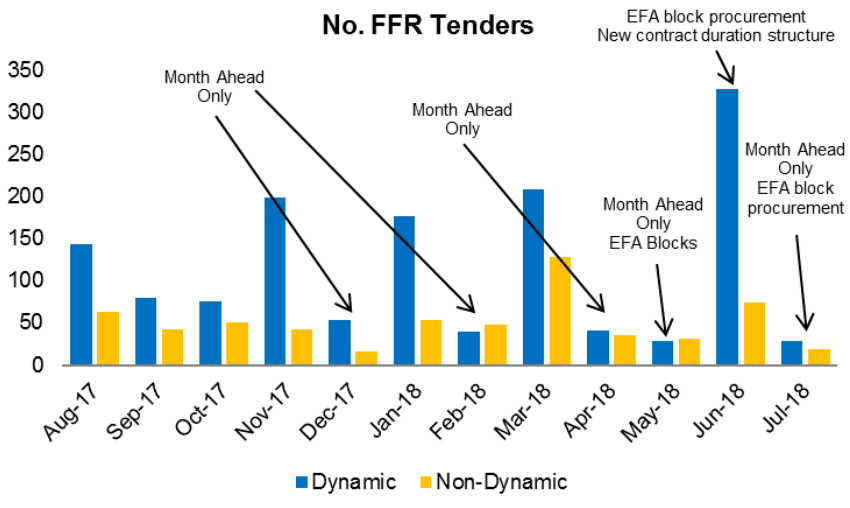
Providers are limited to submitting 2 tenders per unit, per tender period. A tender period is considered to be; month ahead, quarter ahead and per season. All-or-nothing bids will be considered as 1 tender submission.

## Aug-18 FFR Delivery

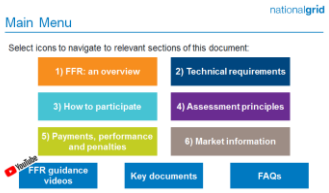
**51** active FFR contracts are due to provide FFR in Aug-18. These contracts are made up of:

- **25** dynamic contracts
- **26** non-dynamic contracts
- **1** contracts by BMU providers
- **50** contracts by NBMU providers

The chart below displays the number of tenders submitted in the FFR market for the last 12 months by service type.



***FFR service Overview***


Interactive guidance document

***Product Roadmap***


This document sets out the actions to be taken forward for frequency response and reserve markets and details the principles that will govern the way that balancing services are procured in future.

## Key messages

*Tender rejection codes*

The table below provides guidance as to the reasons why a tender has been rejected. They can be matched against the numbers in the 'Reason Code' section of the Post Tender Report. Please note that reason 1 has been updated. The new commentary will apply from TR 103 onwards.

| No. | FFR Reason Code | Comment |
|---|---|---|
| 1 | Beneficial | While the price submitted was considered beneficial, on this occasion this tender was not accepted for one of the following reasons:<br>**1.1.** The outstanding or desired procurement requirement has already been satisfied by more beneficial tenders<br>**1.2.** There was no outstanding requirement<br>**1.3.** The desired volume against the National Grid procurement strategy for future tender months had already been satisfied<br>**1.4.** This tender formed part of an all-or-nothing group which did not collectively deliver enough benefit to be considered |
| 2 | Price not beneficial across tendered period | The price submitted was too high and did not provide any contract benefit against alternative actions including the mandatory and optional market. |
| 3 | Does not meet tender prerequisites | Please refer to the 'Technical Parameters' section using the following link to determine the criteria necessary to participate in the FFR market https://www.nationalgrid.com/uk/electricity/balancing-services/frequency-response-services/firm-frequency-response |
| 4 | Multiple tenders received for the same unit | Only the most valuable tender(s) of the total group of submitted tenders was considered. |

*Enhanced Frequency Response (EFR)*

100% of EFR is included in the requirements from July 2018.

*Procured Volume*

When determining which tenders to accept, National Grid will take account of its planned procurement strategy. In general, a measured approach is taken to determine the appropriate volume to procure throughout the duration of the tender.

## Appendix 1: Sep-18 Requirement Volume Tables

*Dynamic FFR requirements for TR 104*

| EFA Block | Dynamic response required (MW) | | |
|---|---|---|---|
| | Primary | Secondary | High |
| 1 | 230 | 92 | 0 |
| 2 | 230 | 92 | 0 |
| 3 | 0 | 0 | 25 |
| 4 | 0 | 0 | 25 |
| 5 | 0 | 0 | 28 |
| 6 | 0 | 0 | 25 |

*Non-Dynamic FFR requirements for TR 104*

| EFA Block | Non-Dynamic response required (MW) | | |
|---|---|---|---|
| | Primary | Secondary | High |
| 1 | 0 | 70 | 0 |
| 2 | 0 | 53 | 0 |
| 3 | 101 | 128 | 0 |
| 4 | 166 | 139 | 0 |
| 5 | 0 | 94 | 0 |
| 6 | 0 | 79 | 0 |

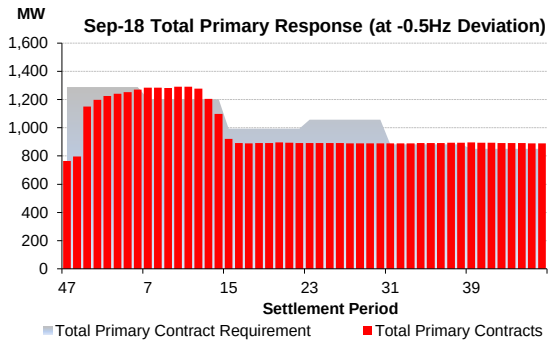
## Appendix 2: Sep-18 Requirements

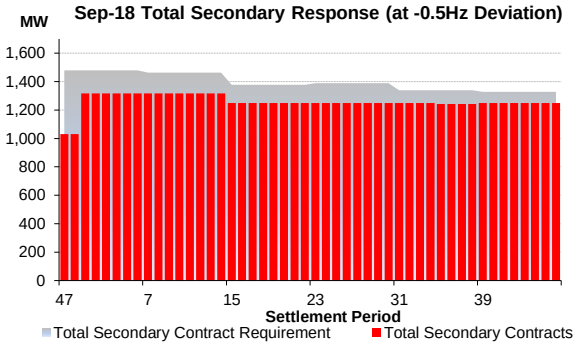
The three charts below display the volume of frequency response left to contract for the month ahead against the total response requirements. The red bars represent existing contracted service provision (both dynamic and non-dynamic) including any optional non-FFR services routinely used that NG forecast to be cost effective for the month ahead. The grey shaded area is the remaining volume to contract.

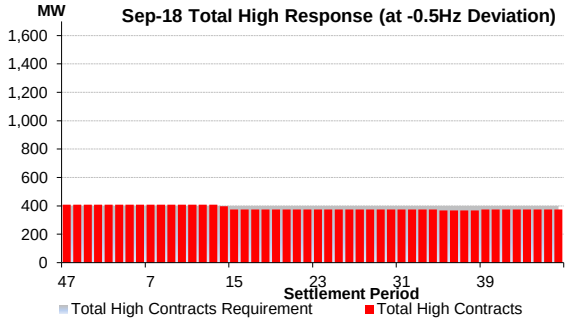
**For month ahead, the requirement will be taken from either dynamic or non-dynamic providers where deemed economic to do so. This means that any requirement found in the non-dynamic market may be procured in the dynamic market if considered more beneficial. With no primary non-dynamic market in existence, procurement of this volume across any EFA block will instead be taken from the dynamic market.**

The breakdown of the requirement against dynamic and non-dynamic response can be seen in the tables in appendix 1.

In the move to standard EFA block window durations, the minimum of the total requirement across each EFA block outlines the level to be procured. In light of this transition, the minimum dynamic requirement remains a key component to be satisfied and outstanding volume against this will continue to be procured for operational purposes. For Sep-18, this is highlighted in the table above.



## Appendix 4: Historical Profile of Firm Frequency Response (FFR) Value

The following information provides a historical overview of FFR value variation during the last two years. A breakdown of the relative values of Primary, Secondary and High Response over the same two years is also provided. This study is based on historical data taken from **1 October 2015** to **30 September 2017**. It is the same data used to calculate the costs reported within the Monthly Balancing Services Summary and for the avoidance of doubt is not a forecast of future value variation.
The FFR assessment principles document highlights that the main economical assessment of the value of individual FFR tenders is based upon the following costs:

- Cost of alternative service holding fees
- Cost of alternative utilisation (Bid Offer Acceptances)
- Cost of alternative margin services (BM Offers)

As the profile across the day is different across these three alternative actions, the costs have been combined for reasons of simplicity. It is important however, to note that the assessment has to use forecasts for some of these alternative costs. The assessment therefore has to take account of the associated uncertainty with using forecasts when considering the value of any tender for any time period. From this point, the document will refer to the value of FFR.

The relative values shown in Figures 1 and 2 provide a comparison of every settlement period relative to each other.

The lower, average and upper relative values for each of the 48 settlement periods that make up daily cost have been calculated and plotted in Figure 1 (summer) and Figure 2 (winter). Periods of low and high value are highlighted in Figure 1. Higher value periods are typically a result of the use of alternative margin services, especially notable in the winter during Settlement Periods **33-39**.

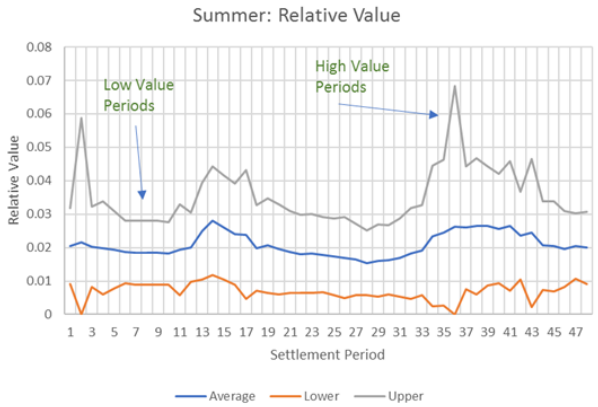



Figure 1: Proportional Value of FFR by Settlement Period (Summer)

The following is an example of how FFR values are assessed. In Figure 2, for Settlement Period 17, the average relative value is approximately **2%** while for Period 35, the proportional value is approximately **4%**. The interpretation is therefore that period 35 is **2** times more valuable than Period 17.

The breakdown of the Primary, Secondary and High Response values over the same time period are included in the Appendix in Table 1 (summer) and Table 2 (winter).

This breakdown shows that during the winter overnight settlement periods (33-41) there is a larger share of value in Secondary Response with 70-75% which reflects the value provided from margin.

Contrast this to the summer, during overnight settlement periods (3-12) there is a significant proportion of value in High Response (40-45%). This is because demand is likely to be low, resulting in a greater requirement and hence value of high response.

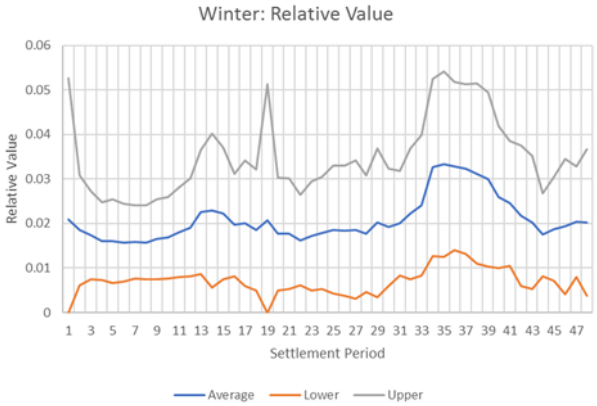



Figure 2: Relative Value of FFR by Settlement Period (Winter)

## Appendix 5: Proportional Value of FFR by Settlement Period

The tables below provide the background data to figures 1 and 2 above. This data is also contained in Appendix 5 of the excel file.

*Table 1: Summer (Apr – Oct)*

| Settlement Period | Summer | | |
|---|---|---|---|
| | Proportional Value | | |
| | Average | Lower | Upper |
| 1 | 0.020433 | 0.0090568 | 0.03181 |
| 2 | 0.021533 | 0 | 0.058754 |
| 3 | 0.02018 | 0.0081317 | 0.032229 |
| 4 | 0.019801 | 0.0058907 | 0.033711 |
| 5 | 0.019361 | 0.0078785 | 0.030843 |
| 6 | 0.018686 | 0.0094367 | 0.027936 |
| 7 | 0.018457 | 0.0088851 | 0.028029 |
| 8 | 0.018504 | 0.0089619 | 0.028047 |
| 9 | 0.018507 | 0.0089062 | 0.028107 |
| 10 | 0.018245 | 0.0088284 | 0.027662 |
| 11 | 0.019289 | 0.0056872 | 0.032892 |
| 12 | 0.020073 | 0.009725 | 0.030422 |
| 13 | 0.025019 | 0.0105523 | 0.039486 |
| 14 | 0.02808 | 0.0118922 | 0.044268 |
| 15 | 0.026033 | 0.0104737 | 0.041593 |
| 16 | 0.023951 | 0.0088068 | 0.039096 |
| 17 | 0.023892 | 0.0046278 | 0.043156 |
| 18 | 0.019869 | 0.0070425 | 0.032696 |
| 19 | 0.020594 | 0.0063904 | 0.034798 |
| 20 | 0.019489 | 0.006019 | 0.032959 |
| 21 | 0.018779 | 0.00655 | 0.031007 |
| 22 | 0.018075 | 0.0063674 | 0.029783 |
| 23 | 0.018244 | 0.0063993 | 0.030089 |
| 24 | 0.017886 | 0.0066154 | 0.029157 |
| 25 | 0.017239 | 0.0056884 | 0.02879 |
| 26 | 0.017 | 0.0048734 | 0.029127 |
| 27 | 0.016449 | 0.0058103 | 0.027087 |
| 28 | 0.015408 | 0.0056937 | 0.025122 |
| 29 | 0.01612 | 0.0052163 | 0.027023 |
| 30 | 0.016342 | 0.0059913 | 0.026693 |
| 31 | 0.016994 | 0.0052611 | 0.028727 |
| 32 | 0.018199 | 0.0046871 | 0.031711 |
| 33 | 0.019186 | 0.0056874 | 0.032684 |
| 34 | 0.023452 | 0.0024111 | 0.044493 |
| 35 | 0.024541 | 0.0027122 | 0.046369 |
| 36 | 0.02634 | 0 | 0.068389 |
| 37 | 0.025958 | 0.0075351 | 0.04438 |
| 38 | 0.026383 | 0.0060569 | 0.046709 |
| 39 | 0.026555 | 0.0087153 | 0.044395 |
| 40 | 0.025606 | 0.0092317 | 0.041981 |
| 41 | 0.026448 | 0.0070774 | 0.045819 |
| 42 | 0.023572 | 0.0103709 | 0.036773 |
| 43 | 0.024375 | 0.0022737 | 0.046476 |
| 44 | 0.02059 | 0.0073474 | 0.033834 |
| 45 | 0.020356 | 0.0068297 | 0.033882 |
| 46 | 0.019532 | 0.0082147 | 0.03085 |
| 47 | 0.020451 | 0.0106712 | 0.03023 |
| 48 | 0.019923 | 0.0091385 | 0.030707 |

*Table 2: Winter (Nov – Mar)*

| Settlement Period | Winter | | |
|---|---|---|---|
| | Proportional Value | | |
| | Average | Lower | Upper |
| 1 | 0.02098886 | 0 | 0.052636 |
| 2 | 0.01847584 | 0.0061735 | 0.030778 |
| 3 | 0.01731116 | 0.0074099 | 0.027212 |
| 4 | 0.01609112 | 0.0073866 | 0.024796 |
| 5 | 0.01599554 | 0.0066316 | 0.025359 |
| 6 | 0.01570355 | 0.0069584 | 0.024449 |
| 7 | 0.01583563 | 0.0075677 | 0.024104 |
| 8 | 0.01574464 | 0.0074063 | 0.024083 |
| 9 | 0.01646762 | 0.0074777 | 0.025458 |
| 10 | 0.0167957 | 0.0077324 | 0.025859 |
| 11 | 0.0180945 | 0.007994 | 0.028195 |
| 12 | 0.01912494 | 0.0081814 | 0.030069 |
| 13 | 0.02252939 | 0.0085995 | 0.036459 |
| 14 | 0.02292868 | 0.005685 | 0.040172 |
| 15 | 0.02227854 | 0.0075098 | 0.037047 |
| 16 | 0.01969832 | 0.0081764 | 0.03122 |
| 17 | 0.02009697 | 0.0060541 | 0.03414 |
| 18 | 0.01854429 | 0.0049941 | 0.032094 |
| 19 | 0.02077347 | 0 | 0.051282 |
| 20 | 0.01763538 | 0.0049166 | 0.030354 |
| 21 | 0.01775842 | 0.005324 | 0.030193 |
| 22 | 0.01627084 | 0.0060666 | 0.026475 |
| 23 | 0.01726167 | 0.0050217 | 0.029502 |
| 24 | 0.01789986 | 0.0053639 | 0.030436 |
| 25 | 0.01862037 | 0.0042198 | 0.033021 |
| 26 | 0.01841293 | 0.0038142 | 0.033012 |
| 27 | 0.01863923 | 0.0031333 | 0.034145 |
| 28 | 0.01770455 | 0.0045913 | 0.030818 |
| 29 | 0.02020937 | 0.0034979 | 0.036921 |
| 30 | 0.01915349 | 0.0059967 | 0.03231 |
| 31 | 0.02006174 | 0.0083366 | 0.031787 |
| 32 | 0.0221834 | 0.0075234 | 0.036843 |
| 33 | 0.02410633 | 0.0083769 | 0.039836 |
| 34 | 0.032578 | 0.0127633 | 0.052393 |
| 35 | 0.03334998 | 0.0124873 | 0.054213 |
| 36 | 0.03288638 | 0.0140503 | 0.051722 |
| 37 | 0.03228603 | 0.0132391 | 0.051333 |
| 38 | 0.03121332 | 0.0109266 | 0.0515 |
| 39 | 0.02992614 | 0.0103686 | 0.049484 |
| 40 | 0.0259286 | 0.009995 | 0.041862 |
| 41 | 0.02453442 | 0.0104726 | 0.038596 |
| 42 | 0.02176889 | 0.0060094 | 0.037528 |
| 43 | 0.02023719 | 0.0052538 | 0.035221 |
| 44 | 0.0174795 | 0.0081903 | 0.026769 |
| 45 | 0.01873756 | 0.0070827 | 0.030392 |
| 46 | 0.01935592 | 0.0042082 | 0.034504 |
| 47 | 0.02039713 | 0.0079027 | 0.032892 |
| 48 | 0.02023475 | 0.0038269 | 0.036643 |

## Appendix 6: Proportional Response value by component

This data is also contained in Appendix 6 of the excel file.

*Table 1: Summer (Apr – Oct)*

| Settlement Period | Summer | | |
|---|---|---|---|
| | Share of Value | | |
| | Primary | Secondary | High |
| 1 | 29% | 35% | 36% |
| 2 | 38% | 41% | 22% |
| 3 | 27% | 31% | 42% |
| 4 | 26% | 28% | 45% |
| 5 | 25% | 25% | 49% |
| 6 | 25% | 25% | 50% |
| 7 | 24% | 23% | 53% |
| 8 | 24% | 23% | 53% |
| 9 | 24% | 24% | 52% |
| 10 | 25% | 25% | 50% |
| 11 | 25% | 31% | 44% |
| 12 | 28% | 33% | 39% |
| 13 | 31% | 40% | 30% |
| 14 | 31% | 43% | 26% |
| 15 | 28% | 49% | 23% |
| 16 | 26% | 51% | 23% |
| 17 | 25% | 53% | 21% |
| 18 | 24% | 52% | 24% |
| 19 | 22% | 56% | 22% |
| 20 | 22% | 54% | 24% |
| 21 | 23% | 52% | 24% |
| 22 | 23% | 52% | 25% |
| 23 | 23% | 52% | 25% |
| 24 | 24% | 51% | 26% |
| 25 | 24% | 50% | 27% |
| 26 | 23% | 50% | 27% |
| 27 | 23% | 47% | 30% |
| 28 | 24% | 44% | 32% |
| 29 | 21% | 50% | 29% |
| 30 | 20% | 53% | 27% |
| 31 | 20% | 54% | 25% |
| 32 | 21% | 55% | 24% |
| 33 | 21% | 56% | 23% |
| 34 | 18% | 65% | 17% |
| 35 | 19% | 65% | 16% |
| 36 | 25% | 62% | 13% |
| 37 | 17% | 68% | 15% |
| 38 | 17% | 67% | 15% |
| 39 | 18% | 67% | 15% |
| 40 | 17% | 67% | 16% |
| 41 | 19% | 65% | 16% |
| 42 | 19% | 64% | 17% |
| 43 | 19% | 63% | 18% |
| 44 | 17% | 62% | 21% |
| 45 | 18% | 59% | 23% |
| 46 | 20% | 55% | 25% |
| 47 | 29% | 43% | 28% |
| 48 | 29% | 40% | 32% |

*Table 2: Winter (Nov – Mar)*

| Settlement Period | Winter | | |
|---|---|---|---|
| | Share of Value | | |
| | Primary | Secondary | High |
| 1 | 26% | 42% | 32% |
| 2 | 26% | 41% | 33% |
| 3 | 27% | 38% | 35% |
| 4 | 26% | 35% | 38% |
| 5 | 26% | 34% | 40% |
| 6 | 26% | 32% | 43% |
| 7 | 25% | 31% | 43% |
| 8 | 26% | 31% | 43% |
| 9 | 27% | 31% | 42% |
| 10 | 27% | 32% | 41% |
| 11 | 29% | 34% | 37% |
| 12 | 30% | 36% | 34% |
| 13 | 28% | 45% | 28% |
| 14 | 26% | 46% | 28% |
| 15 | 27% | 48% | 25% |
| 16 | 25% | 49% | 26% |
| 17 | 23% | 52% | 25% |
| 18 | 24% | 50% | 26% |
| 19 | 25% | 54% | 21% |
| 20 | 22% | 52% | 26% |
| 21 | 22% | 52% | 26% |
| 22 | 22% | 52% | 26% |
| 23 | 18% | 60% | 23% |
| 24 | 18% | 61% | 21% |
| 25 | 18% | 62% | 21% |
| 26 | 19% | 60% | 21% |
| 27 | 19% | 61% | 19% |
| 28 | 19% | 60% | 20% |
| 29 | 14% | 69% | 17% |
| 30 | 14% | 69% | 18% |
| 31 | 14% | 69% | 17% |
| 32 | 14% | 70% | 15% |
| 33 | 14% | 72% | 14% |
| 34 | 16% | 73% | 11% |
| 35 | 16% | 74% | 10% |
| 36 | 16% | 73% | 11% |
| 37 | 18% | 71% | 11% |
| 38 | 17% | 71% | 12% |
| 39 | 19% | 69% | 12% |
| 40 | 20% | 65% | 15% |
| 41 | 21% | 63% | 16% |
| 42 | 21% | 60% | 19% |
| 43 | 22% | 55% | 23% |
| 44 | 23% | 52% | 26% |
| 45 | 22% | 53% | 25% |
| 46 | 24% | 48% | 27% |
| 47 | 27% | 46% | 27% |
| 48 | 27% | 43% | 30% |