ISG197/03 - DATA REVIEW FOR THE MARKET INDEX DEFINITION STATEMENT 2017

MEETING NAME	ISG 197
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Owner/author	Nick Baker
Purpose of paper	For Decision
Classification	Public
Summary	The Market Index Definition Statement (MIDS) defines the way the Market Index Price (MIP) is calculated. We review the MIDS annually, as required by the Balancing Settlement Code (BSC). Our analysis shows that the current Individual Liquidity Threshold (ILT), timeband weightings and product weightings remain suitable for 2017/18. This paper also looks at the frequency with which the MIP sets the price. We invite the Imbalance Settlement Group (ISG) to note the analysis and to approve the consultation questions provided in the attachment to this paper.

1. Executive Summary

1.1 ELEXON reviews the Market Index Definition Statement (MIDS)[1] annually on behalf of the BSC Panel in accordance with BSC Section T1.5.4. In this review, the analysis covers the period 1 August 2016 to 31 July 2017. The review is undertaken to ensure that parameters used in the MIDS calculations (i.e. the Individual Liquidity Threshold (ILT), timeband weightings and product weightings) remain fit for purpose and through the parameters, checking the MIDS principles (BSC Section T1.5.3) are being met. The current review period covers 1 August 2016 to 31 July 2017.

1.2 The 2017 MIDS review indicates that the current ILT, timeband weightings and product weightings remain suitable. Therefore our preliminary recommendations are not to change the parameters.

1.3 We use Market Index Base Data (MIBD) to review the performance of the parameters in accordance with the principles defined in the MIDS. The data details individual trades on the two power exchanges[2] which act as Market Index Data Providers (MIDPs).

1.4 Our detailed analysis is provided in Appendix 1 to this paper. In summary, our key findings are:

- **Volume**: The daily average Market Index Volume (the traded volume across weighted timebands and products[3]) was 681MWh during the review period, which has increased by 15MWh from the previous year (666MWh). See Appendix 1, Section 3 for more information.

[1] The MIDS can be found on the Imbalance Pricing page on the ELEXON website https://www.elexon.co.uk/reference/credit-pricing/imbalance-pricing/
[2] EPEX SPOT and N2EX
[3] A qualifying product is a product which is traded on the spot market in the short term and which is eligible for inclusion in the Market Index Data calculation

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- **Individual Liquidity Threshold (ILT)**: Over this review period, the traded volume was below the ILT in 14 out of 17,520 Settlement Periods. This small number of defaulting periods demonstrates that the current 25MWh threshold remains suitable. See Appendix 1, Section 4 for more information.
- **Weighting values**: The weightings are applied to determine which products and timebands are (and the extent to which they are) included in the Market Price calculation. Currently, the MIDS defines the use of either '1' or '0' weights, where '1' results in the data being fully included and '0' excluded.
    - **Timebands**: The current '1' weighting of timebands 1 to 6 includes all trades within 12 hours of Gate Closure. The analysis indicates that the current timeband weighting is suitable.
    - **Products**: The weighted products are those of half hour, 1 hour, 2 hour and 4 hour duration. The analysis indicates that the current timeband weighting remain suitable in accordance with the MIDS principles.

1.5 The detail of our review is set out in Appendix 1 – Market Index Base Data Analysis.

2. Additional Information

2.1 Following the implementation of Approved BSC Modification P305 'Electricity Balancing Significant Code Review Developments' in November 2015, the calculation of Energy Imbalance Prices only uses the Market Index Price (MIP) in two defaulting scenarios. When the Net Imbalance Volume (NIV) is zero, then the Energy Imbalance Price will default to the MIP. Alternatively, if all of the actions in the price stack are unpriced, then the Replacement Price will be set by the MIP and the Energy Imbalance Price will consequently be set by the MIP. See Appendix 1, Section 2 for more detailed analysis on this.

2.2 Article 55 of the European Electricity Balancing Guideline (EB GL) will introduce a number of requirements to the imbalance price calculations. One requirement will be around a defaulting price, the MIP is currently used in defaulting scenarios. Article 55 is expected to become part of UK law by the end of 2018. This review is focusing on the MIDS principles and not the use of the MIP. Article 55 is being addressed separately. A Paper was taken to the BSC Panel at its August 2017 meeting with ELEXON's view of the BSC compliance of Article 55. As a result a Modification will likely be raised in September to ensure compliance. This Modification will determine whether the MIP will continue to be used.

3. Next steps

3.1 The ISG reviews, consults and makes recommendations to the Panel on the MIDS at least annually in accordance with the BSC. Following the ISG meeting we will publish a consultation on this review. The draft consultation proforma included in Attachment A will be sent out along with the analysis included in Appendix 1. We invite you to agree on the questions, suggest any additional questions and provide comments on the analysis in this paper which we will include in our consultation. Should the ISG agree, the consultation will be sent to industry for two weeks and the responses will be presented to the ISG at its September 2017 meeting. We will then invite you to consider the responses and make a final recommendation to the BSC Panel for its October 2017 meeting.

4. Recommendations

4.1 We invite you to:

a) **NOTE** the analysis presented in this paper;

b) **APPROVE** the consultation questions provided in Attachment A of this paper, suggest any additional questions; and

c) **COMMENT** on the analysis in this paper which we will present in our industry consultation.

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Appendices

Appendix 1 – Market Index Base Data Analysis

Attachments

Attachment A – Consultation Proforma

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APPENDIX 1 - MARKET INDEX BASE DATA ANALYSIS

Section 1 - Background Information

- Definitions for the terms used in the review

Section 2 – Use of the Market Index Price (MIP)

- Analysis of the use of the MIP

Section 3 - Analysis of the Market Index Volume (MIV)

- An overview of average MIV by Settlement Date
- An overview of average MIV by timebands/products across Settlement Periods

Section 4 - Analysis of the Individual Liquidity Threshold (ILT)

- Principles to be applied to ILT
- Number of defaults in the review period
- Analysis of suitability for the current ILT

Section 5 - Analysis of the timeband and product Weightings

- Principles to be applied to timeband and product weightings
- Analysis of the current product and timeband weightings

Section 6 - Analysis All Products and timebands

- Analysis of all timebands and products for potential changes on the current weightings
- Analysis of the Day Ahead Auction Product

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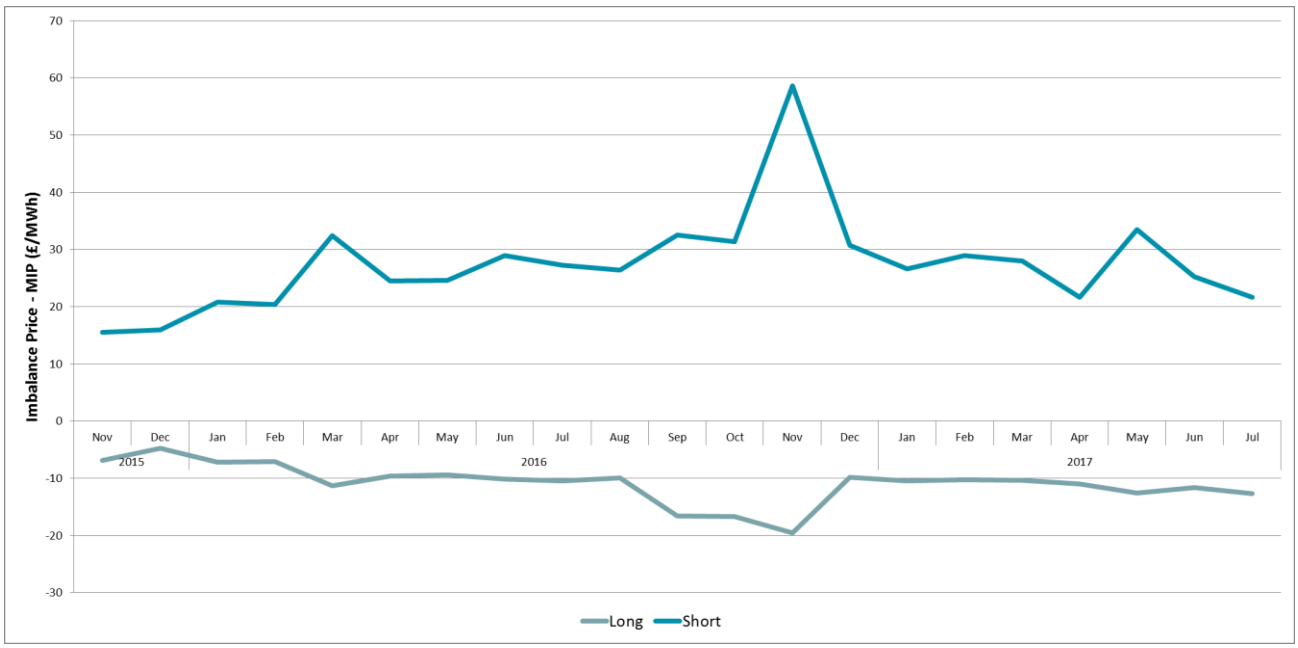
1. Background Information

1.1 Each year, ELEXON reviews the Market Index Definition Statement (MIDS) on behalf of the BSC Panel in accordance with BSC Section T1.5.4. In this review, the analysis covers the period 1 August 2016 to 31 July 2017. The review consists of checking that parameters used in the Market Index Price (MIP) calculation defined in the MIDS (i.e. the Individual Liquidity Threshold (ILT), timeband weightings and product weightings) remain fit for purpose and through the parameters, checking the MIDS principles are being met (BSC Section T1.5.3). The purpose of the MIDS being to reflect the price of wholesale electricity in Great Britain for delivery in respect of that Settlement Period in the short term market.

1.2 Parties trade wholesale energy on power exchanges where they can buy and sell power exchange products. The products vary by duration and start time. Approved Modification Proposal P78 introduced the MIP to reflect the price of wholesale electricity in the short term market for Great Britain. In this context, Section T of the BSC defines Short term as 'no more than three Business Days prior to Gate Closure for the relevant Settlement Period'.

1.3 **Graph 1.1** shows the average difference between the Imbalance Price and the MIP split by market length and month. A positive value denotes the Imbalance Price is larger than the MIP. When the market is long, the MIP tends around £10/MWh greater than the Imbalance Price. When the market is short the imbalance price is greater than the MIP. The average difference between the Imbalance Price and the MIP when the market was short was highest in November 2016, with an average difference of £58.59/MWh.



Graph 1.1 Average difference between Imbalance Price and the MIP since P305

1.4 A power exchange can provide data through its role as a Market Index Data Provider (MIDP). As a MIDP they calculate Market Index Data (MID), which consists of half hourly prices and volumes. The calculation process is defined in the MIDS. In particular, the Market Index Definition Statement defines:

- The overall price (Market Index Price) and volume (Market Index Volume) calculation process;

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- A volume threshold (Individual Liquidity Threshold), below which the default rules are applied;
- A list of power exchange products that are included in the calculation;
- A list of timebands which group trades according to how long before Gate Closure they are made;
- Weightings which reflect the importance of the products and timebands; and
- Principles by which the weightings, products and thresholds are determined.

1.5 The Individual Liquidity Threshold (ILT) is a volume threshold that is set to apply default rules (see 1.6) when there is insufficient trading on the power exchange to provide a suitable price. The aim is to avoid the price being set by a single trade – i.e. not having the ILT too low – but also to minimise the number of Settlement Periods where the default rule is applied – not having the ILT too high.

1.6 The Market Index Volume (MIV) is calculated as the sum of the traded volume across the selected products and timebands as defined in the MIDS. When the MIV traded in a half-hour is greater than the ILT the Market Index Price (MIP) is the volume weighted average price of the trades. Where the MIV does not meet the ILT, the MIP and MIV default to zero.

1.7 Trades are classified by a number of timebands which determine how long before Gate Closure the trade was made. These timebands cover a number of Settlement Periods. Timebands 1-6 are currently used to calculate the MIP. Timeband 6 begins 12 hours ahead of Gate Closure and ends eight hours before Gate Closure. Timeband 1 is the final hour up to Gate Closure. These timebands are shown in **Diagram 1.1** below.

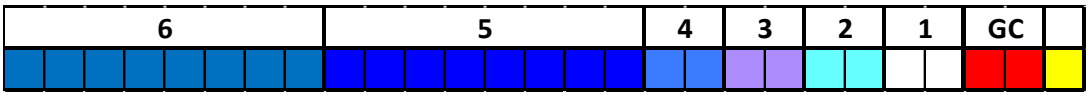

Diagram 1.1 Timeband 1 to 6. Each coloured block denotes a Settlement Period.

1.8 The current MIDS sets the products to be included in each half-hourly price and volume calculation as the half-hour, 1 hour, 2 hour and 4 hour products traded within 12 hours of Gate Closure.

1.9 Weightings are applied to reflect the importance of each product and timeband and are set to '1' or '0', which either completely include or exclude particular trades. The weightings applied to the different products and timebands used in the calculations are shown in **Table 1.1**.

Table 1.1 Product and Timeband Weightings

		Timeband											
	Product	1	2	3	4	5	6	7	8	9	10	11	12
Half-Hour	H	1	1	1	1	1	1	0	0	0	0	0	0
1 Hour Block	1	1	1	1	1	1	1	0	0	0	0	0	0
2 Hour Block	2	1	1	1	1	1	1	0	0	0	0	0	0
4 Hour Block	4	1	1	1	1	1	1	0	0	0	0	0	0
Overnight	O	0	0	0	0	0	0	0	0	0	0	0	0
Peak	P	0	0	0	0	0	0	0	0	0	0	0	0
Extended Peak	E	0	0	0	0	0	0	0	0	0	0	0	0
Day Ahead Auction	A	0	0	0	0	0	0	0	0	0	0	0	0

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2. Use of the Market Index Price (MIP)

2.1 Prior to the implementation of Approved BSC Modification P305 'Electricity Balancing Significant Code Review Developments' on 5 November 2015, the 'reverse' Energy Imbalance Price was calculated for every Settlement Period and used for Energy Imbalance Settlement. The aim was for this 'reverse' price to reflect the price of wholesale electricity in the short term market for Great Britain. The MIP was used to set this 'reverse' price.

2.2 Following the implementation of Modification P305, the 'reverse' price is equal to the main System Price and no longer set by the MIP. Nevertheless, the MIP is still used to set the imbalance price in two much less frequent scenarios:

a) When the Net Imbalance Volume (NIV) is zero, then the imbalance price will default to the MIP; or

b) If all of the actions in the price stack are unpriced, then the replacement price will be set by the MIP and the imbalance price will consequently be set by the MIP.

2.3 The imbalance price has not defaulted to the MIP due to a zero NIV since the implementation of BSC Modification P305. Since 2001, the NIV has equalled zero three times: 5 September 2007, Settlement Period 8; 22 September 2009, Settlement Period 10; and 10 May 2015; Settlement Period 7.

2.4 **Table 1.1** below shows the incidences where the Replacement Price has defaulted to the MIP over the past five review periods. The highest number of defaulting Settlement Periods occurred between 1 August 2015 and 31 July 2016.

Review Period (Aug-Jul)	Settlement Periods where Replacement Price set by MIP
2012/13	185
2013/14	123
2014/15	96
2015/16	270
2016/17	187

Table 2.1 Incidences where Replacement Price was set by MIP

2.5 **Graph 2.1** below shows the count of instances when the MIP was used to set the Replacement Price since November 2015. These instances are the only occasions of the MIP being used in the Price Calculation after the introduction of P305. In 429 Settlement Periods between November 2015 and July 2017 the Replacement Price was set by the MIP, this represents 1.4% of all Settlement Periods in this date range. The highest number of incidents occurred in December 2015 when 61 Settlement Periods had the Replacement Price set by the MIP. The average Replacement Price Set by the MIP was £31/MWh in December 2015.

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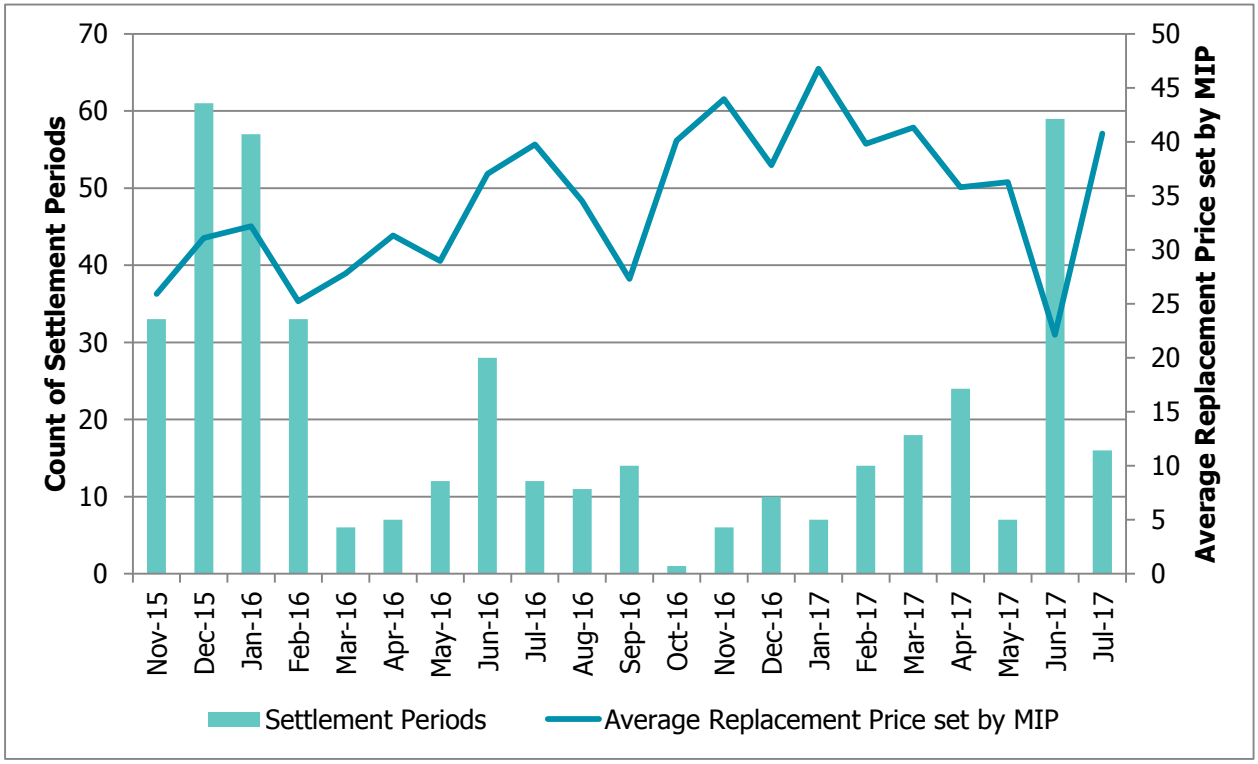

Graph 2.1 Incidences where the Replacement Price has been set by the MIP.

2.6 **Graph 2.2** shows the incidence where the Replacement Price has defaulted to the MIP by Settlement Period between November 2015 and July 2016. The Replacement Price has never been set by the MIP in Settlement Periods 35 and 36. The Replacement Price was set by the MIP on 24 days during Settlement Period 6 this represents 3.8% of days. The average Replacement Price set by the MIP in Settlement Period 6 was £26/MWh.

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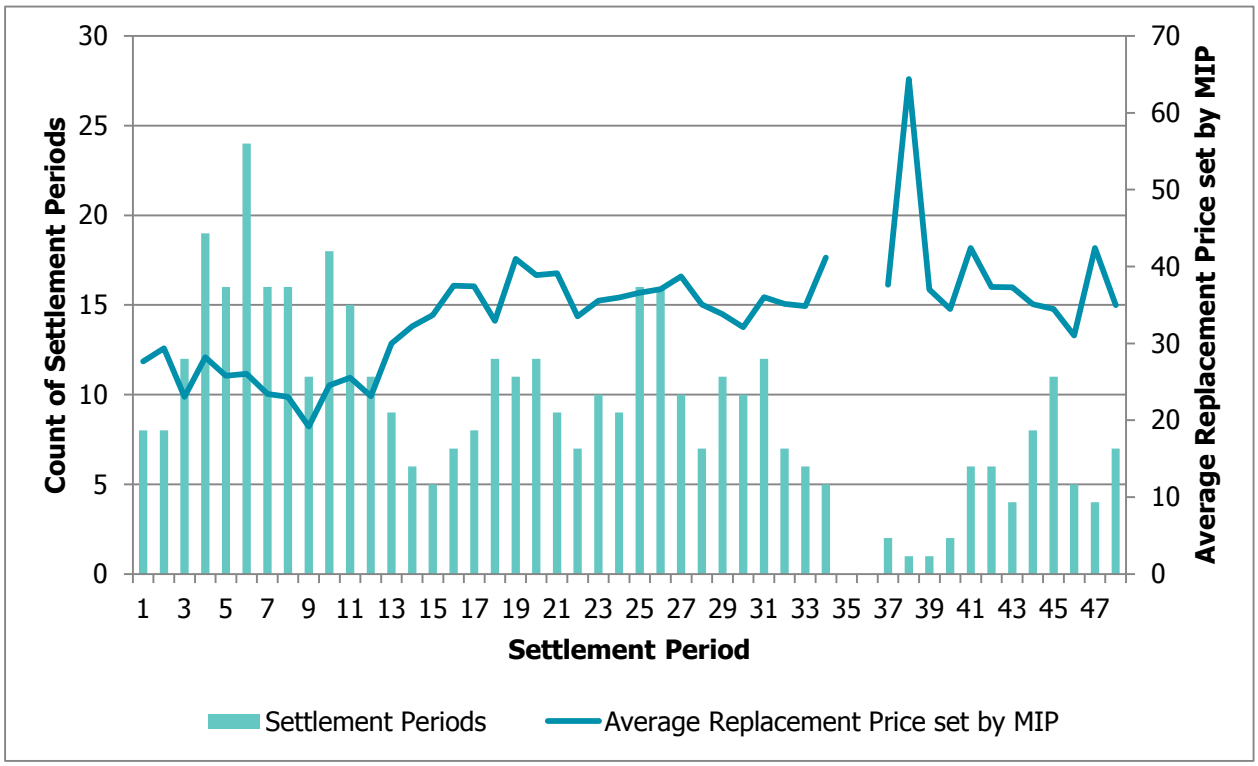
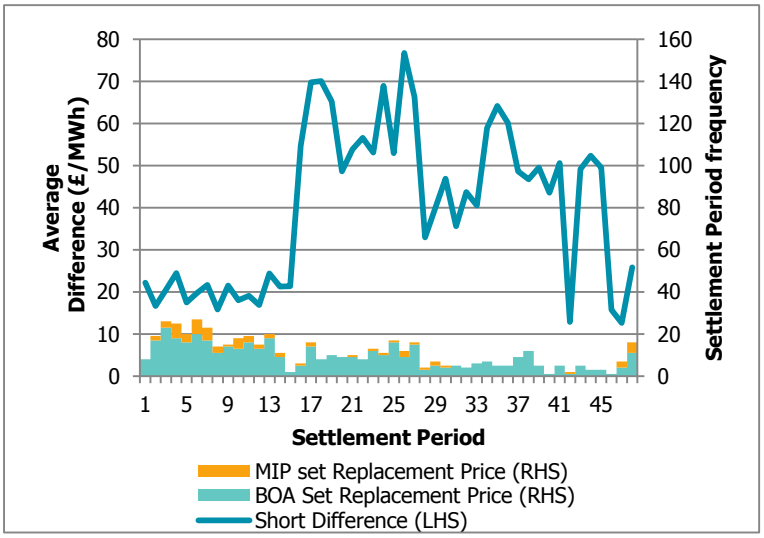


Graph 2.2 Incidences where the Replacement Price has been set by the MIP by Settlement Period.

2.7 **Graphs 2.3 and 2.4** are included to compare the Replacement Price with its proxy the MIP. The average absolute difference between the Replacement Price and MIP when the market is long and short is given in the graphs, incidences where the Replacement Price was set by the MIP has been removed from all average differences. The frequency of the use of the Replacement Price is also included. These graphs present data from Settlement Periods between 5 November 2015 and 31 July 2017.



Graph 2.3 Average absolute difference between the MIP and Replacement Price when the market is short. For comparison the frequency of incidences where the Replacement Price has been used and set by Bid Offer Acceptances (BOAs) and by MIP is shown.

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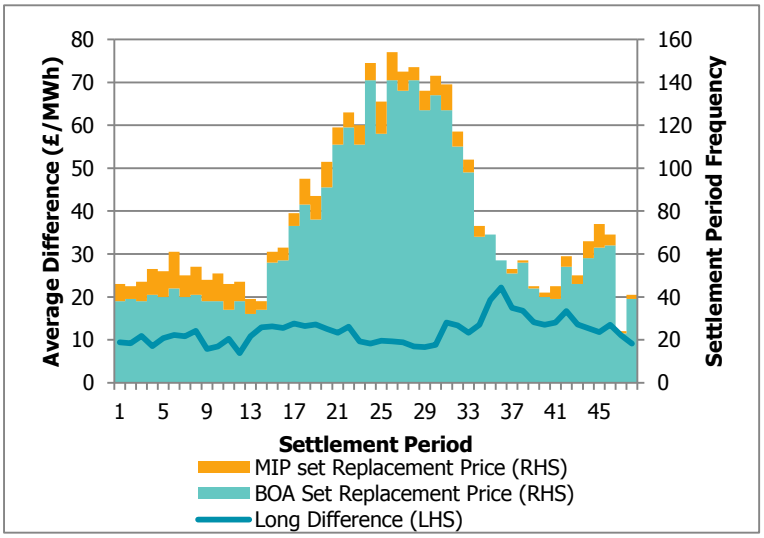

Graph 2.4 Average absolute difference between the MIP and Replacement Price when the market is long. For comparison the frequency of incidences where the Replacement Price has been used and set by Bid Offer Acceptances (BOAs) and by MIP is shown.

2.8 The Replacement Price is used in 14% of Settlement Periods regardless of market length; the MIP sets the Replacement Price in 10% of Settlement Periods where a Replacement Price is used. When the market is long the MIP is used to set 10% of Replacement Prices, when the market is short the MIP is used to set 14% of Replacement Prices.

2.9 When the market is short the MIP is on average £37/MWh less than the Replacement Price. The Replacement Price is used in 5.4% of short Settlement Periods, 0.7% of short Settlement Periods use a Replacement Price set by the MIP. Between Settlement Periods 1 and 15 the average absolute difference between the MIP and Replacement Price is £20/MWh. 51% of Settlement Periods where the Replacement Price is used occur between Settlement Periods 1 and 15.

2.10 While the market is long the MIP is on average £11/MWh higher than the Replacement Price. The Replacement Price is used in 18% of long Settlement Periods, 1.7% of long Settlement Periods use a Replacement Price set by the MIP.

2.11 Under the recommendation of the ISG after the 2015 MIDS review, Issue Group 64 was formed in autumn 2016 to consider whether the MIP is the appropriate defaulting price method. After considering analysis presented by ELEXON, the Issue Group recommended that the current arrangements were fit for purpose. Analysis performed on the effect of amending the MIP parameters highlighted little effect and increased the risk of the MIP defaulting to zero. Issue 64 final report was presented to the January 2017 Panel for approval and closed without change.

2.12 Article 55 of the provisional European Electricity Balancing Guideline (EB GL) will introduce a number of requirements to the Energy Imbalance Price calculations. Article 55 is expected to become part of UK law by the end of 2018. One of the requirements is that where no activation of balancing energy has occurred, the price for Energy Imbalance Volumes should be equal to the value of avoided activation of balancing energy from frequency restoration reserves or replacement reserves. A definition of the value of avoided activation of balancing reserves from frequency restoration reserves or replacement reserves would also need to be codified in order to comply with Article 55.

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2.13 The MIP is currently used in defaulting scenarios. Issue Group 64 discussed whether the MIP could continue to be used when EB GL becomes part of UK law. One member responded that the MIP could be seen as the value of avoided activation of balancing energy. A paper was taken to the August 2017 Panel to discuss ELEXON's view on compliance with Article 55. The outcome of this is that a Modification will be raised to make the necessary changes to the BSC, and look into whether the MIP can be used as the defaulting price.

3. Analysis of the Market Index Volume (MIV)

3.1 Market Index Volume (MIV) is the total traded volume across the '1' weighted products and within '1' weighted timebands. The weightings are displayed in **Table 1.1.**

3.2 The daily average MIV was 680MWh over the review period, which has increased by 14MWh from the previous annual review which had an average of 666MWh. Historical daily average MIV data can be found in **Table 3.1**.

Table 3.1 Daily Average MIV in MIDS Reviews since 2012

Review Period (Aug-Jul)	Daily Average MIV (MWh)
2012/13	603
2013/14	620
2014/15	693
2015/16	666
2016/17	680

3.3 **Graph 3.1** displays the daily average MIV throughout the review period. The MIV reached a peak on 31 March 2017 at 1,140MWh, compared with last year's peak of 1,100MWh in February 2016. The February 2017 monthly average was 786MWh; this was the highest monthly average in this year's review period. December 2016 had an average of 649MWh in 2016, which was lower than the 779MWh in December 2015.

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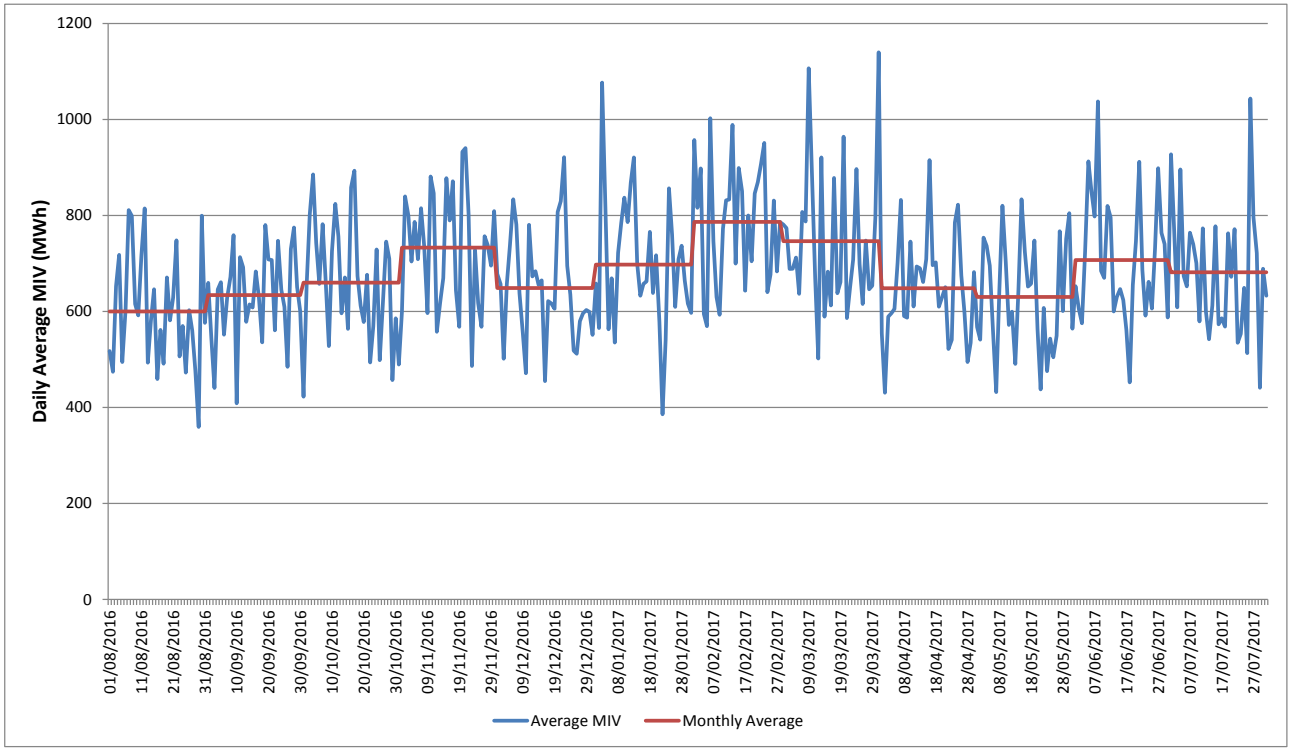

Graph 3.1 Daily and Monthly Average Market Index Volume by Settlement Date

3.4 **Graph 3.2** shows the average MIV and average volume traded on each product weighted '1' by Settlement Period. Similar to the previous review, the Settlement Period average MIV increased through the day with products H peaking in Settlement Periods 14 and 46.

3.5 During review period, the 1-Hour Product was primarily traded between Settlement Periods 35 and 40. In last year's review, there was no 1-Hour Product traded during these Settlement Periods. **Graph 3.2** shows that the 1-hour Product had the least traded volume in comparison to the other products.

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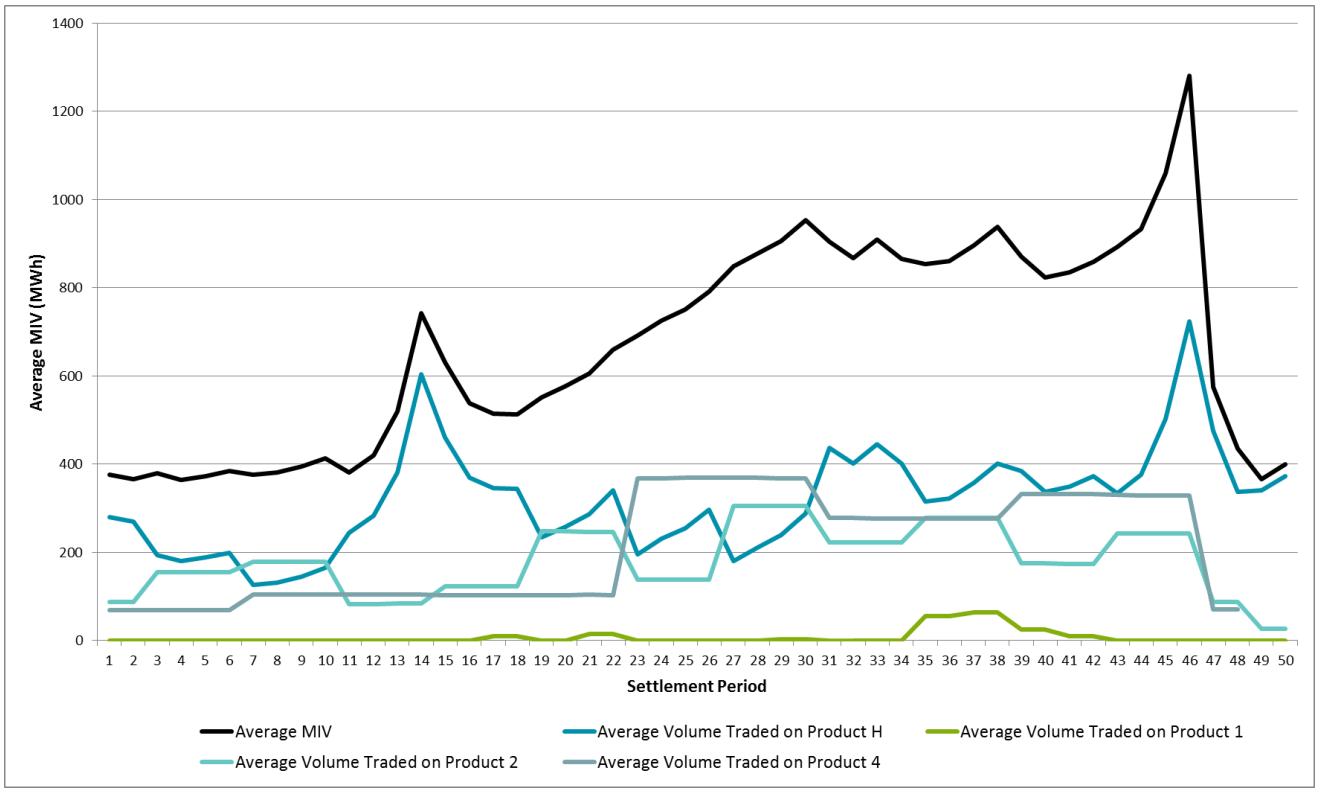

Graph 3.2 Average Market Index Volume by Settlement Period

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4. Analysis of the Individual Liquidity Threshold (ILT)

4.1 Analysis has been carried out using the live products and timeband weightings specified in **Table 1.1**.

4.2 The ILT is currently set to 25MWh and triggers a default rule when there is a low liquidity of trades in a Settlement Period. When the MIV is not greater than the threshold, both the MIP and MIV are defaulted to zero.

4.3 The ILT must be set in accordance with the MIDS principles. We have analysed historical data to consider each of the principles and the results confirm that 25MWh is a suitable value. The principles that are applied in setting the ILT are:

a) Individual Liquidity Thresholds should be set to the same value(s) for every Market Index Data Provider (MIDP);

b) Individual Liquidity Thresholds may be set to zero;

c) Individual Liquidity Thresholds may be set to different values for different Settlement Periods in the day and may vary by Season or Day Type;

d) Individual Liquidity Thresholds should be set based on the analysis of historical data;

e) Individual Liquidity Thresholds should be set at a level that minimises the likelihood that the Market Index Price will be set by a single trade; and

f) Individual Liquidity Thresholds should be set to ensure that the Market Index Price is defaulted in the minimum number of Settlement Periods, subject to the previous principle.

4.4 Currently both MIDPs have the value of 25MWh set, so principle **a)** is met.

4.5 The analysis shows that the ILT could be set to zero as per principle **b)** which would also meet principle **f)**. However, since only 14 Settlement Periods have defaulted throughout the year, reducing the ILT to zero would only change four of the 17,520 Settlement Periods as 10 had 0MWh MIV. Reducing the ILT to zero would also increase the likelihood that the MIP is set on a single trade **e)**.

4.6 In the current review period, two Settlement Periods had set the MIP based on a single trade. This was Settlement Periods 11 and 12 on 2 September 2016. Increasing the ILT increases the chances of the MIP defaulting **f)**. Principle **c)** allows the ILT to change across different periods, however, as mentioned, could result in principle **e)** and **f)** being compromised.

4.7 **Graph 4.1** shows the count of trades for Settlement Periods where the Traded Volume of qualifying products was below 60MWh, this occurred in 45 Settlement Periods. Three Settlement Periods had one trade from qualifying contracts and one of them defaulted to zero. The other two Settlement Periods has a MIV of 25MWh and therefore met the liquidity threshold and did not default. Although the principles aim to avoid the price being set on a single trade, and two instances have occurred within the last year, both of these were on the ILT boundary. Hence, we believe there is no strong case to change away from 25MWh.

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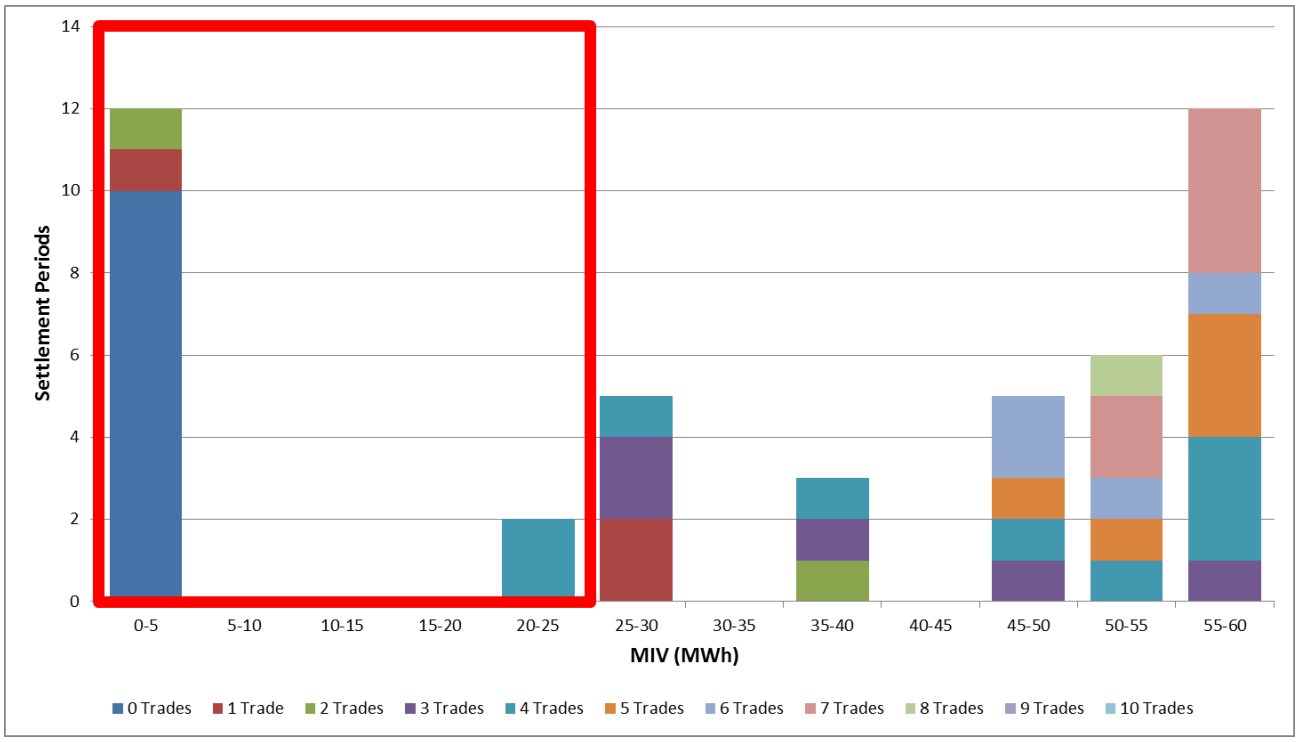

Graph 4.1 Count of Trades that the MIP was set by and their respective volumes. The red outlined box highlights Settlement Periods below the ILT.

4.8 **Table 4.1** Displays the number of Settlement Periods where the MIV was below 60MWh in the last three MIDS Reviews, along with whether there was greater than 1 trade. Review periods are 1 August to 31 July. The number of defaulted Settlement Periods where the MIV is below the ILT is 14 in this review, compared to seven in the last two reviews. As highlighted in section 4.7, the two Settlement Periods in which one trade did not default the MIP in this review had a MIV of 25 MWh. The same is true for the Settlement Period where a single trade did not default the MIV in 2015/16. The 2016/17 review had 45 Settlement Periods where the MIV was below 60 MWh, compared to nine in 2015/16 and seven in 2014/16.

Table 4.1 Breakdown of Settlement Periods with MIV <60MWh in the last three MIDS reviews

	No. of Defaulted Settlement Periods (MIV < 25 MWh)		No. of non-Defaulting Settlement Periods (MIV 25-60MWh)	
Count of Trades	**0 or 1**	**Greater Than 1**	**1**	**Greater Than 1**
2014/15	7	0	0	0
2015/16	3	4	1	1
2016/17	11	3	2	29

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5. Analysis of the Timeband and Product Weightings

5.1 The analysis was carried out using the '1' weighted products and timebands specified in the live version of the MIDS. This is shown in **Table 1.1**.

5.2 The timeband and product weightings determine which trades are included in the MIP and MIV calculation. Like the ILT, the timeband and product weightings are set in accordance with a set of principles detailed in the MIDS.

5.3 The principles are:

a) Weightings should be applied to the components that make up the Market Index Price;

b) Weightings should not be applied to the Market Index Volume and should not be used in determining whether the traded volume meets the Liquidity Threshold for the half hour;

c) Weightings may be applied to reflect how close to real time a trade was made (timeband weighting);

d) Weightings may be applied to the product or contract types which qualify in the index calculation (i.e. those which are traded in the short term as defined in the BSC);

e) The same weightings must be applied to equivalent qualifying products and timebands across all Market Index Data Providers;

f) Weightings may be set to ensure that the Market Index Price is reflective of the price of trades as close as possible to Gate Closure;

g) Weightings may be set to minimise the flattening effect on the Market Index Price of including traded products used in the methodology that have one price for a time period longer than one Settlement Period;

h) Weightings may take values from '0' to '1'; and

i) Where a weighting is set to '0', the weighting is effectively null, trades in the related product type and timeband will be excluded from the Market Index Volume (and Price) calculation.

5.4 A number of the principles - **a), b), c), d), e), h)** and **i) -** are already met under the current operation. The remaining principles **f)** and **g)** are considered below.

5.5 The MIDP calculates the MIP using the weighted products and timebands when the MIV is above the 25MWh ILT. The '1' weighting is currently applied to products H, 1, 2 and 4 in timebands 1 to 6 which results in trades relating to these product and timeband combinations being used to calculate the MIP and MIV.

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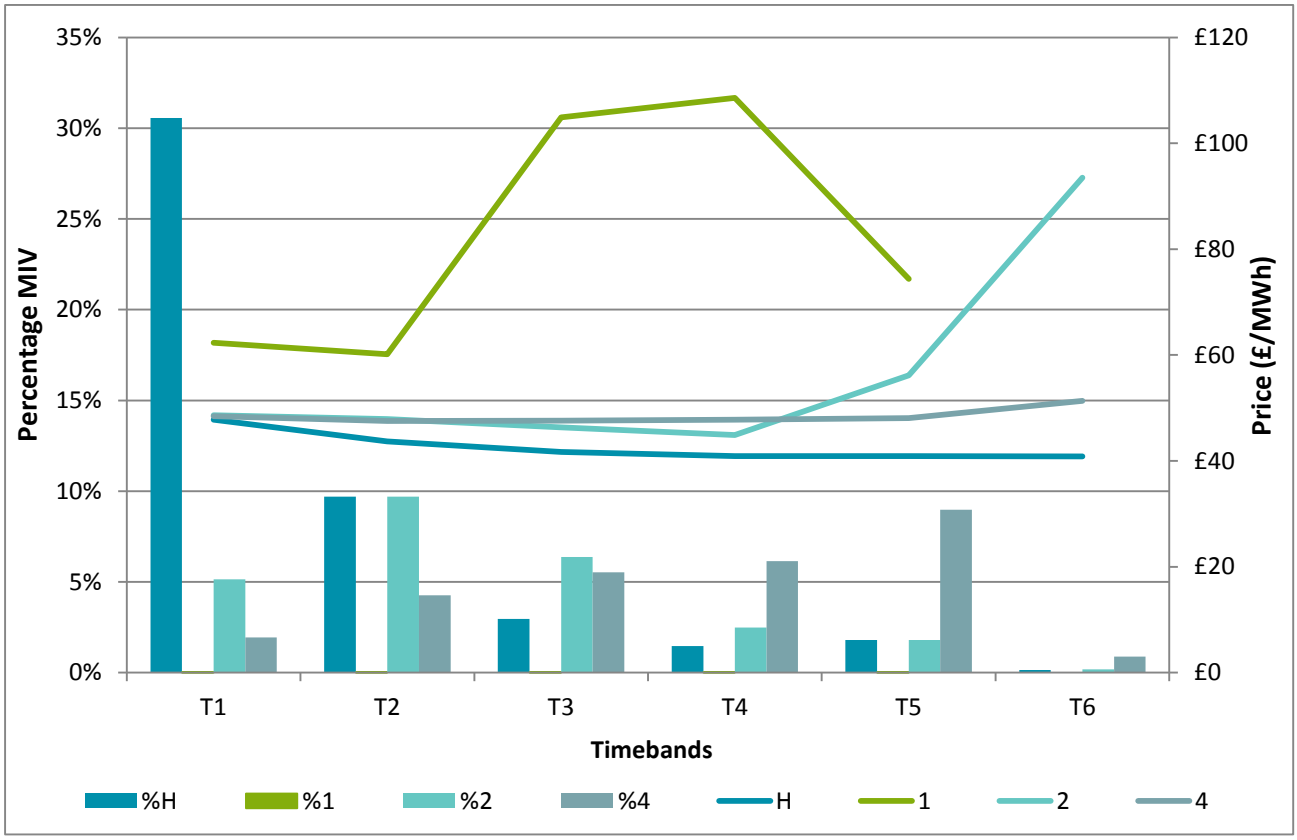
5.6 **Graph 5.1** shows the percentage of traded volume on the '1' weighted products captured in the '1' weighted timebands. As expected, due to the nature of the products:

- The volume traded on the Half-Hour Product dominated in timebands 1 and 2;
- The volume traded on the 2-Hour Product was mainly captured in timebands 2 and 3; and
- Traded volume on the 4-Hour Product was mainly dominating in timebands 4 and 5.

It is worth noting that timebands 5 and 6 are of four hours duration compared to 1 to 4 which are only one hour as highlighted in **Diagram 1.1**. The volume traded on the 1-Hour Product is typically low, this trend continued this year. The average price of all products is higher this year compared with last year.

5.7 **Graph 5.1** also shows the price curve for the '1' weighted products in each timeband. The average price was flat from timeband 6 towards Gate Closure (from right to left) for Product H and 4. The average price for Product 1 varies due to a lower number of trades on this product (0.01% of all volume traded over the six timebands).

5.8 Product 2 also had a higher average price in timebands further away from gate closure. Timeband 5 had an average price of £56.14/MWh, which represented 10% of the 2-Hour Product. Timeband 6 had an average price of £93.53/MWh which represented 7% of the 2-Hour Product. Combined, timebands 5 and 6 were less than 2% of the MIV, which is comparable to previous reviews. This year, however, there were high prices for the 2-Hour Product in timebands 5 and 6, particularly for 15 September 2016, from Settlement Periods 39-42. This was also a time with high Energy Imbalance Prices, which peaked at £801/MWh in Settlement Period 40.



Graph 5.1 Average Price and Percentage of Market Index Volume by timeband

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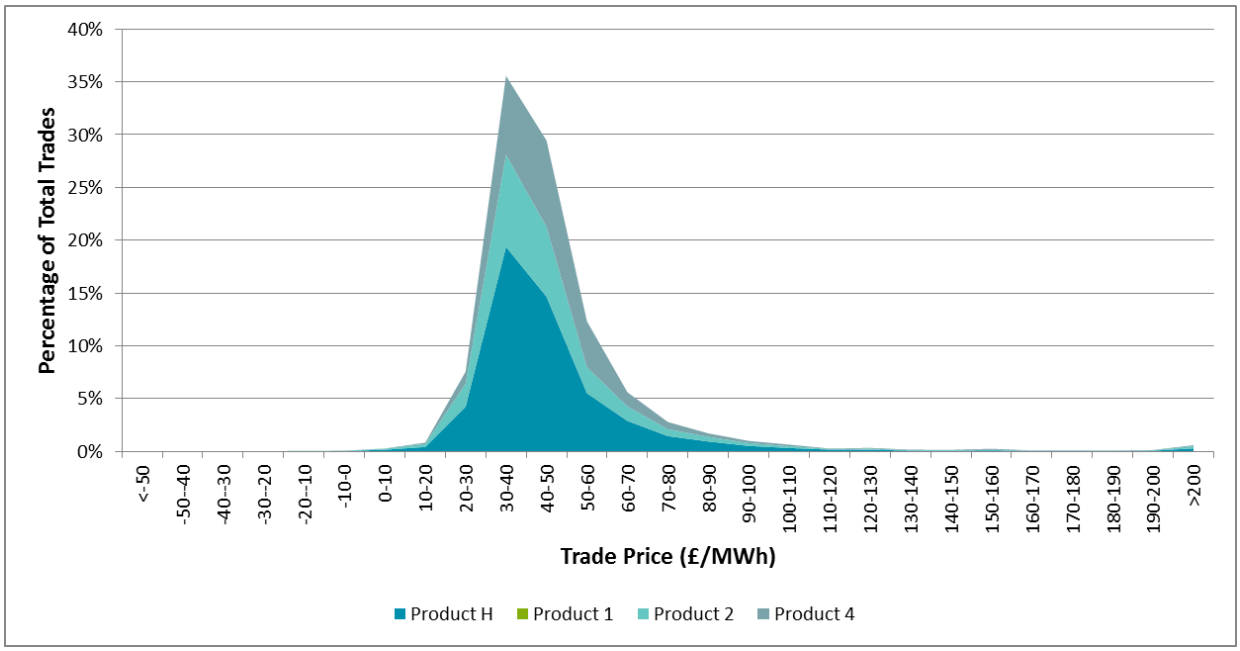
5.9 **Graph 5.2** displays the price distribution for the weighted products and their percentage of total trades. 65% of trades were priced between £30-50/MWh. The highest percentage of Product H and Product 2 was traded between £30-40/MWh (38% and 36% respectively). The highest proportion (33%) of Product 4 was traded between £40-50/MWh. 0.55% of Product H was traded above £200/MWh. Some of the highest prices traded for Product H were on 31 October 2016 during Settlement Periods 35-37. On this date between Settlement Periods 34-39 National Grid issued its first Capacity Margin Notice and there were high System Prices reaching £660.97/MWh.



Graph 5.2 Frequency distribution of Trade Prices and Weighted Products

5.10 **Graph 5.3** shows the same information as **Graph 5.1**, but with the x-axis to hourly scale. The volumes for the longer timebands (5 and 6) are averaged out across each of the four hours. As seen in the previous graph, the respective products percentage of MIV peaks when they are closest to Gate Closure. With the H-Hour Product peaking in the hour before Gate Closure, the 2-Hour Product peaking two hours before Gate Closure and so forth. Product H has a higher percentage of MIV compared with last year, increasing by 5%; Product H now represents 38% of the MIV compared to 28% in 2015.

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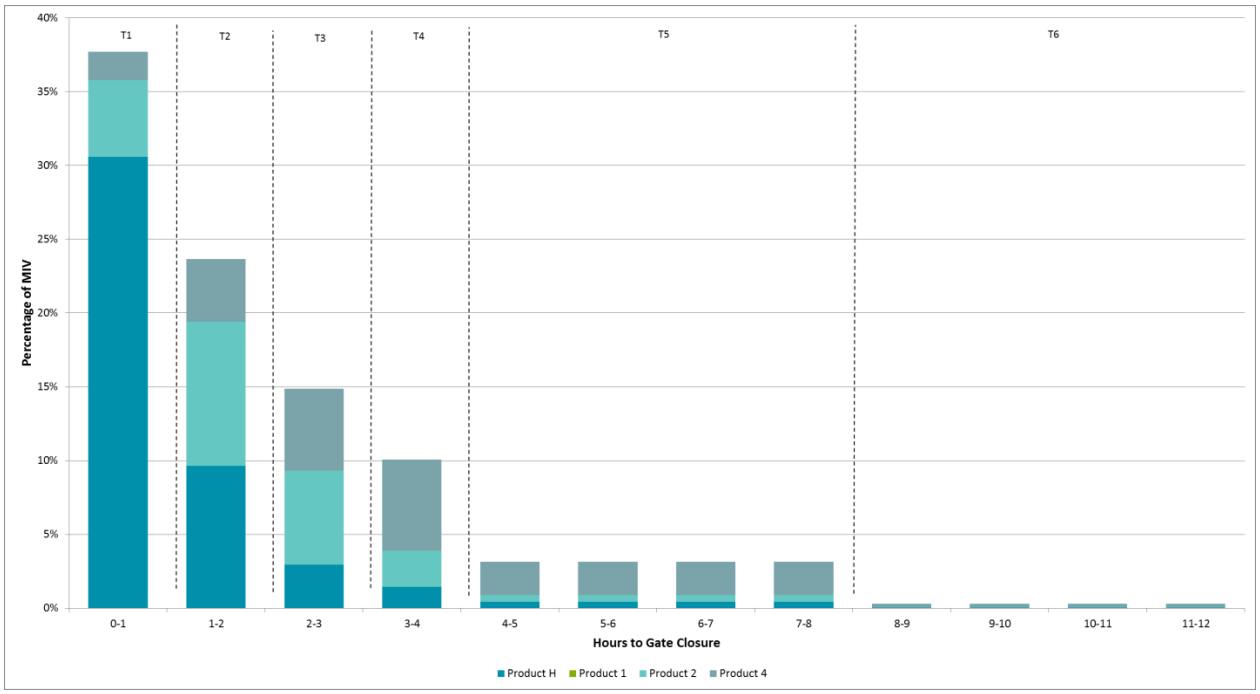

Graph 5.3 Percentage of Market Index Volume by Time (hours) to Gate Closure

5.11 Timeband 6 represents 1.2 % of the MIV, which is the same as the previous review period. The potential removal of timeband 6 as a weighted product was raised and analysed in the 2014 MIDS Review[4]. The ISG recommended that no change should be made to the MIDS. The rationale behind the ISG's decision was the potential internal cost for Parties in making changes to their system to adapt and, having considered the small effect on prices, the benefits around changing the MIDS could be outweighed by the implementation costs.

[4] https://www.elexon.co.uk/wp-content/uploads/2013/10/03_ISG160_04_MIDS_Review_2014.pdf

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6. Analysis of all Products and Timebands

6.1 Analysis of all timebands and products for potential changes on current weightings

6.1.1 All of the MIDS Products are detailed in **Table 6.1.1**. The analysis considers all of the products listed below **except for the Day Ahead Auction Product** (Product A), which is considered separately as the volume traded on this product is significantly larger than the other products.

Table 6.1.1. Available Products

Product	Identifier	Duration (hours)
Half-Hour	**H**	0.5
1 Hour Block	**1**	1
2 Hour Block	**2**	2
4 Hour Block	**4**	4
Overnight	**O**	8
Peak	**P**	12
Extended Peak	**E**	16
Block 3 and 4	**S**	8
Off Peak	**N**	8
Base Day	**B**	24
Day Ahead Auction	**A**	1

6.1.2 We have reviewed data for trades up to three Calendar Days ahead of Gate Closure and this period is broken down into 12 timebands. Timebands 1-6 which cover trades made up to 12 hours ahead of Gate Closure. We will now consider timebands 1-12 to confirm the relevance of the current weightings. Note that zero trades were made on timeband 12 during this review period of 1 August 2016 to 31 July 2017.

6.1.3 **Graph 6.1.1** shows the cumulative percentage of volume traded on all products in all timebands for the review period. In the earlier timebands, a much higher percentage of volume is traded on products H, 2 and 4 than any other products. This suggests that the current products remain suitable as they are traded close to Gate Closure (principle **f)**) and represent a significant percentage of the total volume.

6.1.4 The volume traded on the Overnight Product is visible from timebands 5 onwards, which is similar to that noted in the previous review. Previous consultations with industry on including this product have not resulted in any change to its weighting due to the flattening or 'smoothing' effect.

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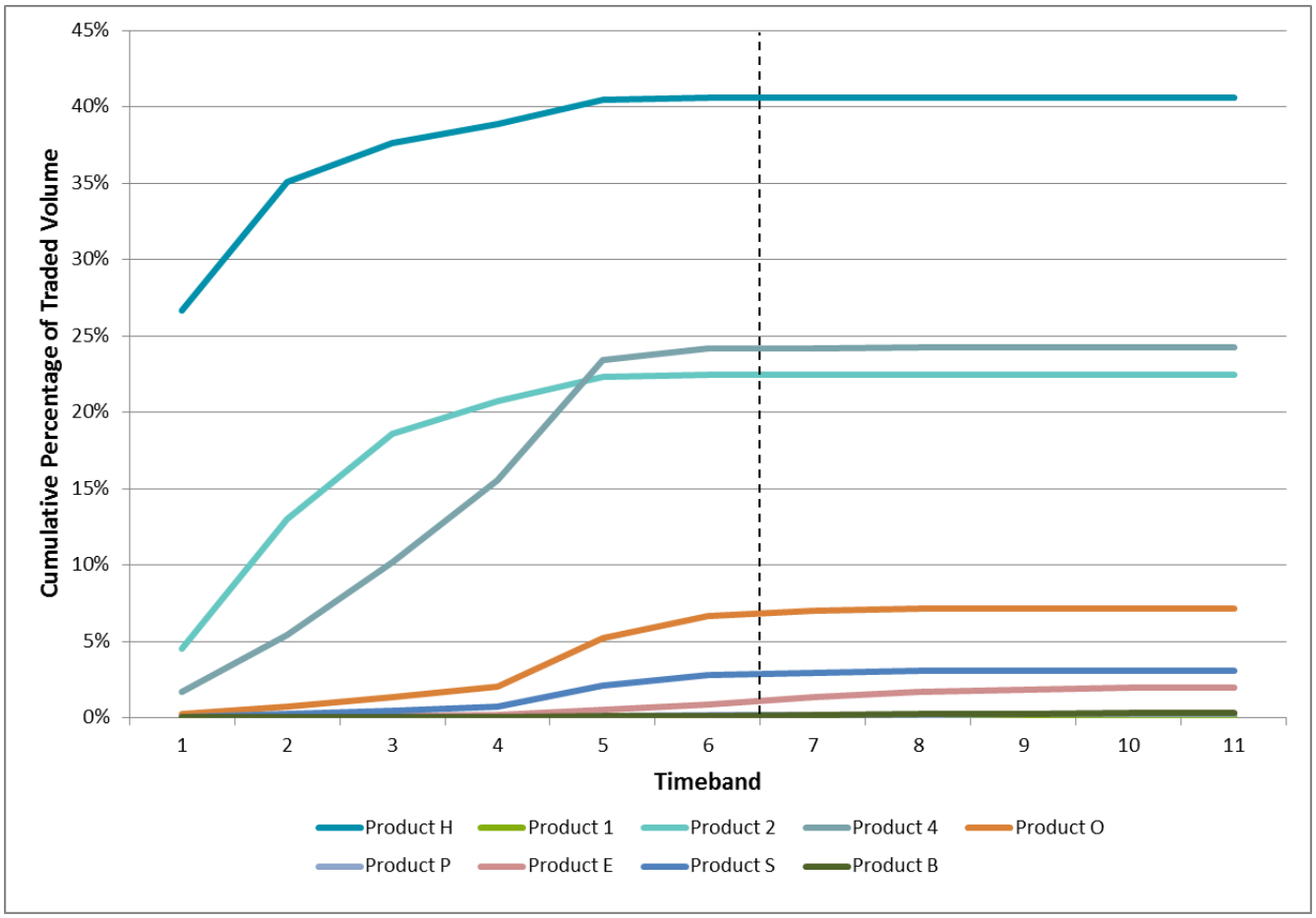

Graph 6.1.1. Cumulative Percentage of Total Trade Volume on all Products (excluding Product A) across all timebands.

6.1.5 **Graph 6.1.2** shows the average price of each traded product and the cumulative percentage of total volume traded in each timeband. The largest volumes were traded at timeband 1 (accounting for 33.15% of the total trade), representing a 4% increase from the previous review. Except for timeband 1, the total volume traded on the other timebands has not significantly changed since the last review. Product 2 spikes in price in timeband 8, however this price was set by a relatively small number of trades.

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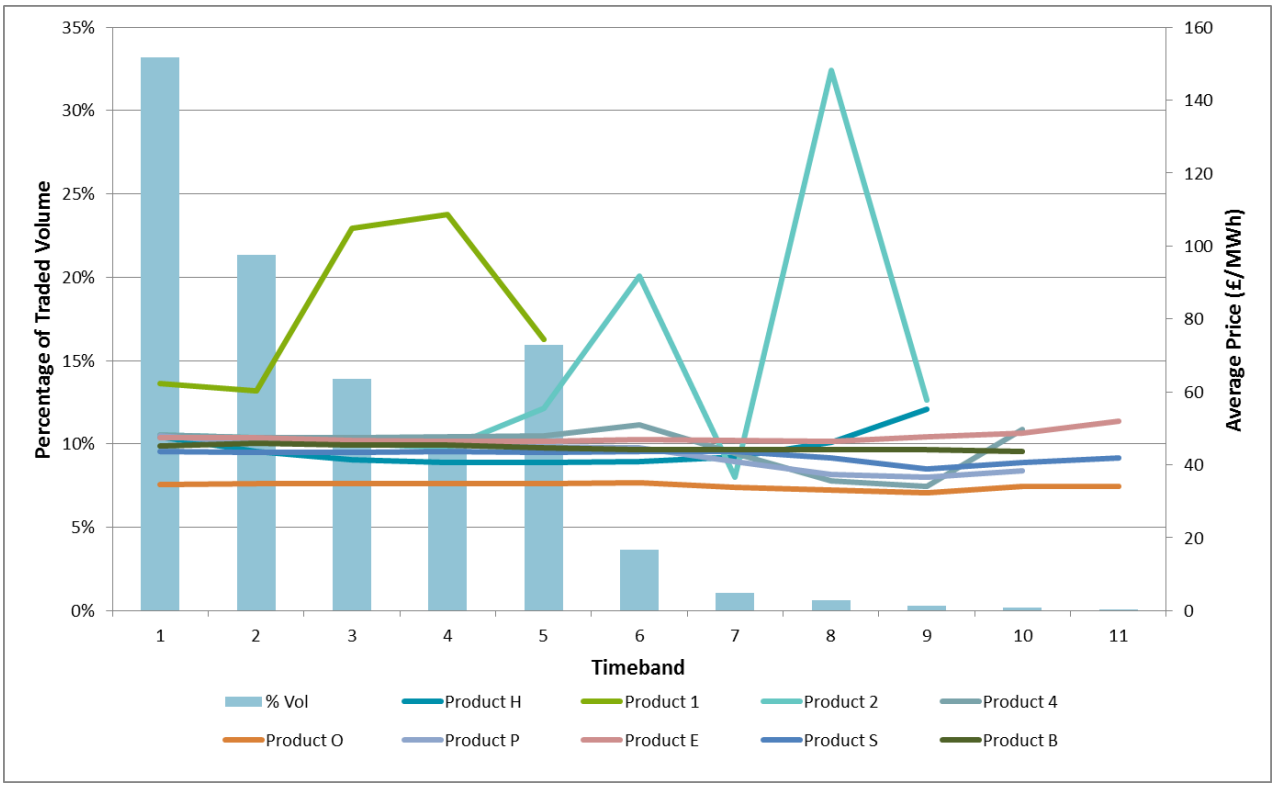

Graph 6.1.2. Percentage of total volume traded (excluding Product A) in each timeband

6.2 Day Ahead Auction Product

6.2.1 The Day Ahead Auction Product (Product A) is a blind auction where buyers and sellers enter anonymous orders for each hourly period from 23:00 to 23:00. The auction market closes at 11:00, after which the orders are matched for each hourly period. The time that the orders are matched gives the trade time used in calculating the timeband for the trade.

6.2.2 **Graph 6.2.1** shows that the Auction Product accounted for 91.87% of total traded volume during the review period. The product only applies from timeband 6. Unlike the other products this product is not traded in timebands 1 to 5 that are closer to Gate Closure. During the last review period, the Auction Product accounted for 95.25% of total traded volume.

6.2.3 The Auction Product has been given '0' weighting and the ISG recommended that this product should be monitored considering its large traded volume on the market.

6.2.4 Considering the current market liquidity and weighting principle **f)**, the current '0' weighting on the Auction Product remains suitable.

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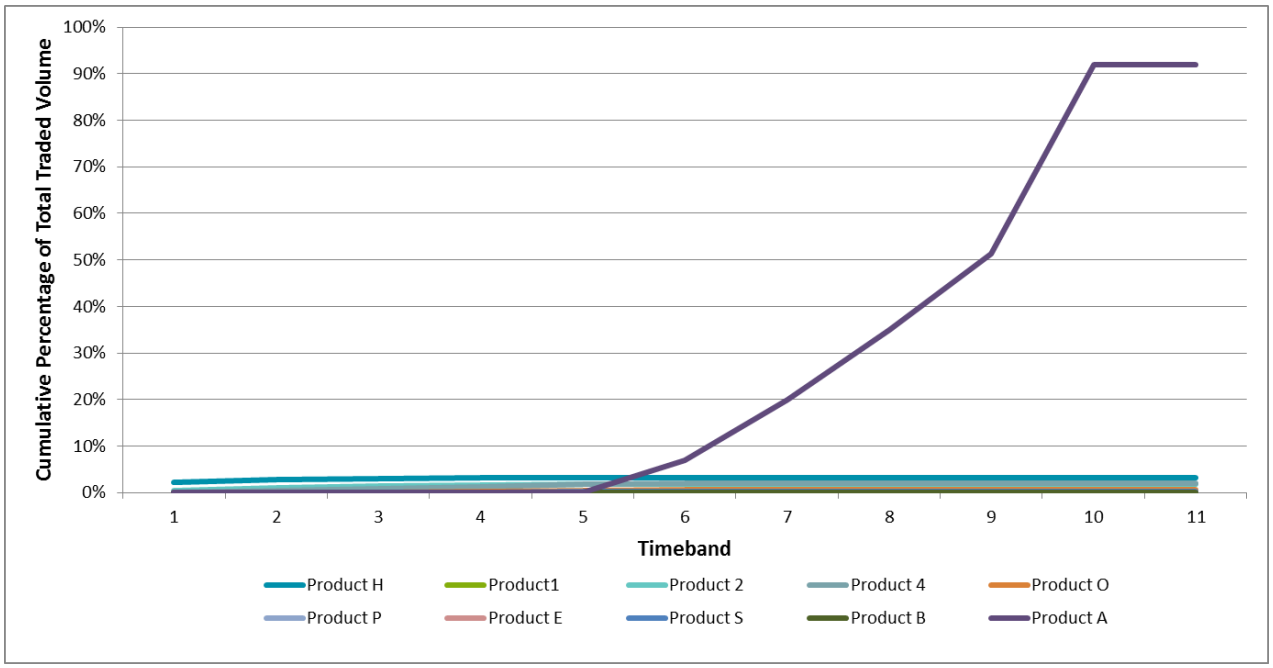

Graph 6.2.1. Cumulative Percentage of total traded volume on all Products (including A) across all timebands.

6.2.5 **Table 6.2.1** shows the total traded volume on all products across all timebands. As displayed in **Graph 6.2.1**, Product A accounts for most of the traded products and a large proportion or all trades (40.52%) is made during timeband 10 driven by Product A (accounting for 40.53% of all trades at timeband 10).

Table 6.2.1 Percentage of Total Traded Volume on all Products across all timebands

Products	Timeband											Total
	1	2	3	4	5	6	7	8	9	10	11	
H	2.16%	0.68%	0.21%	0.10%	0.13%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	**3.28%**
1	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	**0.00%**
2	0.37%	0.69%	0.45%	0.17%	0.13%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	**1.82%**
4	0.14%	0.30%	0.39%	0.43%	0.63%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	**1.96%**
O	0.02%	0.04%	0.05%	0.06%	0.26%	0.12%	0.03%	0.01%	0.00%	0.00%	0.00%	**0.58%**
P	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	**0.02%**
E	0.00%	0.00%	0.00%	0.00%	0.03%	0.03%	0.04%	0.02%	0.01%	0.01%	0.00%	**0.16%**
S	0.01%	0.01%	0.02%	0.02%	0.11%	0.06%	0.01%	0.01%	0.00%	0.00%	0.00%	**0.25%**
B	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	**0.02%**
A	0.00%	0.00%	0.00%	0.00%	0.00%	6.87%	13.13%	15.02%	16.38%	40.52%	0.00%	**91.91%**
Total	**2.68%**	**1.72%**	**1.12%**	**0.79%**	**1.29%**	**7.16%**	**13.22%**	**15.06%**	**16.40%**	**40.53%**	**0.00%**	**100.00%**

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