MARKET INDEX DEFINITION STATEMENT REVIEW 2019

MEETING NAME	MIDS 2019 Consultation

Target Audience	BSC Parties
Owner/author	Nick Baker, Market Operations Analyst nick.baker@elexon.co.uk 020 7380 4337
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1. Executive Summary

1.1 ELEXON reviews the Market Index Definition Statement (MIDS) 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 2018 to 31 July 2019. 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.

1.2 Following the 2018 MIDS review, BSC Modification P377 amended the description of the timebands in the MIDS so they refer to the Submission Deadline (i.e. the beginning of a Settlement Period) rather than Gate Closure. This has allowed trades between Gate Closure and the Submission Deadline to be included in the calculation of Market Index Prices (MIPs). A BSC Modification was required to change the definition of 'short term' in BSC Section T 1.5.3 (b)(iii), as previously this referred to Gate Closure.

1.3 BSC Modification P377 also removed timeband 6 as a weighted product in Market Index Data (MID). Timeband 6 has historically represented a very small percentage of total Market Index Volume (MIV). As a proportion, timeband 6 has represented less than 2% of the MIV in the three previous MIDS review periods.

1.4 BSC Modification P377 was implemented on 18 April 2019. In this review, analysis covers the period 1 August 2018 to 31 July 2019. The review period includes eight months and 17 days with the MIP calculated under the pre-P377 calculation, and three months and 13 days calculated with the post P377 MIP calculation. Graphs and analysis in this review have therefore been carried out to show the split of MID for pre and post the implementation date of P377.

1.5 The 2019 MIDS review indicates that the current ILT, timeband weightings and product weightings (following the changes from BSC Modification P377) remain suitable. Therefore our preliminary recommendations are not to change the parameters.

1.6 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 which act as Market Index Data Providers (MIDPs).

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

- **Volume**: The daily average MIV (the traded volume across weighted timebands and products) was 1,013MWh between 18 April 2019 and 31 July 2019 using the post P377 calculation. This is 279MWh higher than the daily average MIV between 1 August 2018 and 17 April 2019 (734MWh) and 326MWh higher than in the previous review period (687MWh). See Appendix 1, Section 3 for more information.

- **Individual Liquidity Threshold (ILT)**: Between 18 April 2019 and 31 July 2019 using the post P377 calculation, there was one Settlement Period out of 5,040 (0.02%) with traded volume below the ILT. Using the pre-P377 calculation for the period up to 18 April, there were 39 Settlement Periods out of

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12,480 (0.31%) where the traded volume was below the ILT. In the previous review period there were 62 Settlement Periods out of 17,520 (0.35%) where the traded volume was below the ILT. Following the changes under P377, 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 included, and to what extent, in the MIP calculation. Currently, the MIDS defines the use of either '1' or '0' weights, where '1' results in the data being fully included and '0' fully excluded.

  o **Timebands**: The current '1' weighting of timebands 1 to 5 includes all trades within eight hours of the Submission Deadline. The analysis indicates that the current timebands, following the changes made in P377 with timeband descriptions changing from Gate Closure to the Submission Deadline and the removal of timeband 6 as a weighted product, are suitable.

  o **Products**: The weighted products are those of half hour, 1 hour, 2 hour and 4 hour duration. The analysis indicates that the current product weighting remain suitable in accordance with the MIDS principles.

1.8   This review has also assessed whether the changes proposed in last year's MIDS review have delivered the expected benefits of ensuring that there was increased liquidity in the MID, and that a reflective MIP is calculated based on the short term market.

1.9   The changes have resulted in the trades used to calculate the MIP being closer to real time, as they are now up to eight hours ahead of the start of the Settlement Period rather than between one and 13 hours ahead. The changes to time bands has meant that the daily average MIV has increased, and the percentage of Settlement Periods with traded volume less than the ILT has decreased.

1.10   However, as this assessment is based on only three months and 13 days of the P377 calculation, this should be reassessed at the next MIDS review in a year's time.

1.11   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   The European Balancing Guideline (EBGL) requires all Transmission System Operators (TSOs) to develop a proposal for harmonisation of Imbalance Settlement, including imbalance pricing. The use of the MIP will be considered in making the BSC compliant with the EBGL. As the MIP is derived from wholesale markets and not balancing products, it would not be consistent with the EBGL obligation and therefore cannot be used as a default price. Proposals by TSOs are to be resubmitted by the end of 2019 for approval by National Regulatory Authorities.

3.   ISG Views

3.1   The ISG noted the analysis presented in the MIDS Review and agreed with the recommendations made by ELEXON.

3.2   The ISG approved the consultation questions for the review.

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Appendices

Appendix 1 – Market Index Base Data Analysis

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APPENDIX 1 - MARKET INDEX BASE DATA ANALYSIS

Section 1 - Background Information

- Definitions for the terms used in the review

- Changes to timebands by BSC Modification P377

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 2018 to 31 July 2019. 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 MIP is to reflect the price of wholesale electricity in Great Britain in the short term market, for delivery in respect of that Settlement Period.

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.

1.3 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 or MIP) and volume (Market Index Volume or MIV) calculation process;

- A volume threshold (Individual Liquidity Threshold or ILT), 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 the Submission Deadline they are made;

- Weightings which reflect the importance of the products and timebands; and

- Principles by which the weightings, products and thresholds are determined.

1.4 The Individual Liquidity Threshold (ILT) is a volume threshold that is set to apply default rules (see 1.5) 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 setting the ILT too low), and to minimise the number of Settlement Periods where the default rule is applied (i.e. not setting the ILT too high).

1.5 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.

1.6 The current MIDS (effective from 18 April 2019, following the implementation of BSC Modification P377) 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 eight hours of the Submission Deadline. Prior to these changes the MIDS the products were required to be traded within 12 hours of Gate Closure.

1.7 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 current weightings applied to the different products and timebands used in the calculations are shown in **Table 1.1**.

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Table 1.1 Product and Timeband Weightings

| Product		Timeband											
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Half-Hour	**H**	1	1	1	1	1	0	0	0	0	0	0	0
1 Hour Block	**1**	1	1	1	1	1	0	0	0	0	0	0	0
2 Hour Block	**2**	1	1	1	1	1	0	0	0	0	0	0	0
4 Hour Block	**4**	1	1	1	1	1	0	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

Changes to timebands by BSC Modification P377

1.8 On 2 November 2017, Approved BSC Modification P342 'Change to Gate Closure for Energy Contract Volume Notifications' introduced a new deadline for the purpose of submitting Energy Contract Volume Notification (ECVNs) and Metered Volume Reallocation Notifications (MVRNs). This new contract notification deadline, the Submission Deadline, would be decoupled from Gate Closure, and was set at the start of the relevant Settlement Period. During Modification P342, it was agreed that Gate Closure would remain as the deadline for qualifying trades for the provision of Market Index Data. Following the 2018 MIDS review, BSC Modification P377 was raised to change the deadline for qualifying trades based on the analysis of Market Index Data following the implementation of P342.

1.9 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. Prior to the implementation of BSC Modification P377 on 18 April 2019, timebands 1-6 were used to calculate the MIP. These timebands represented zero to 12 hours prior to Gate Closure, or one to 13 hours before the start of the Settlement Period. These timebands are shown in **Diagram 1.1** below.

Diagram 1.1 Timebands 1 to 6 in effect until 17 April 2019. Each coloured block denotes a 30 minute period.

1.10 P377 changed the description of the timebands in the MIDS to refer to the hours from the Submission Deadline as opposed to Gate Closure. Timeband 6 was also removed as a weighted timeband. Timebands 1-5 represent zero to eight hours prior to the Submission Deadline (the start of a Settlement Period). The current timebands are shown in **Diagram 1.2** below.

Diagram 1.2 Timebands 1 to 5 in effect following the implementation of P377 on 18 April 2019. Each coloured block denotes a 30 minute period.
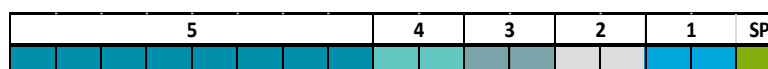
1.11 **Table 1.2** shows the proportion of MIV made up by timeband 6 in the last five years. Prior to the implementation of P377, timeband 6 represented 1.23% of MIV in the 2018/19 review period. Since the review year 2015/16, the proportion of the MIV by timeband 6 has been less than 2%.

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Table 1.2. Proportion of total MIV contributed by Timeband 6

| MIDS Review Year	Timeband 6 Volume as a proportion of MIV
2014/15	2.65%
2015/16	1.16%
2016/17	1.18%
2017/18	1.26%
1 Aug 2018 – 17 April 2019	1.23%

1.12   Weighting principle **f)** states that weightings should be allocated as close as possible to the Submission Deadline, and timeband 6 represents trades made 8-12 hours prior to the start of a Settlement Period. The inclusion of trades made post-Gate Closure and prior to the Submission Deadline in the MID, and the removal of timeband 6 as a weighted timeband, through Modification P377 has further aided weighting principle **f)**, whilst not compromising ILT principles **e)** (minimising MIP set by a single trade). Please see Section 4 for further details.

2. Use of the Market Index Price (MIP)

2.1 BSC Modification P377 changed the way the MIP is calculated, but did not change the situations in which the MIP is used in the System Price Calculation. Hence, the analysis in this section does not compare the use of the MIP in the pre P377 scenario to the post P377 scenario.

2.2 Since the introduction of BSC Modification P305 'Electricity Balancing Significant Code Review Developments', implemented on 5 November 2015, the MIP is used to set the System Price in two scenarios:

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

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

2.3 Prior to the implementation of BSC Modification P305, the 'reverse' System Price was calculated for every Settlement Period and used for Energy Imbalance Settlement. The aim of the 'reverse' price was to reflect the price of wholesale electricity in the short term market for Great Britain, with the MIP used to set the 'reverse' price.

2.4 The System 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.

2.5 **Graph 2.1** below shows the number of Settlement Periods with a Replacement Price over the past seven review periods. The Replacement Price is primarily determined based on the weighted average cost of the most expensive 1MWh of unflagged balancing actions, the Replacement Price Average Reference (RPAR). Where there are no unflagged balancing actions, the Replacement Price is set at the MIP.

2.6 The MIP set the Replacement Price in 536 Settlement Periods between 1 August 2018 and 31 July 2019. This represents 3.1% of all Settlement Periods, and 24.2% of Settlement Periods with a Replacement Price. The number of Settlement Periods with a MIP Replacement Price decreased by 10% from last year.

Graph 2.1 Annual incidences where the Replacement Price has been used in the System Price calculation. Annual periods are from 1 August to 31 July.

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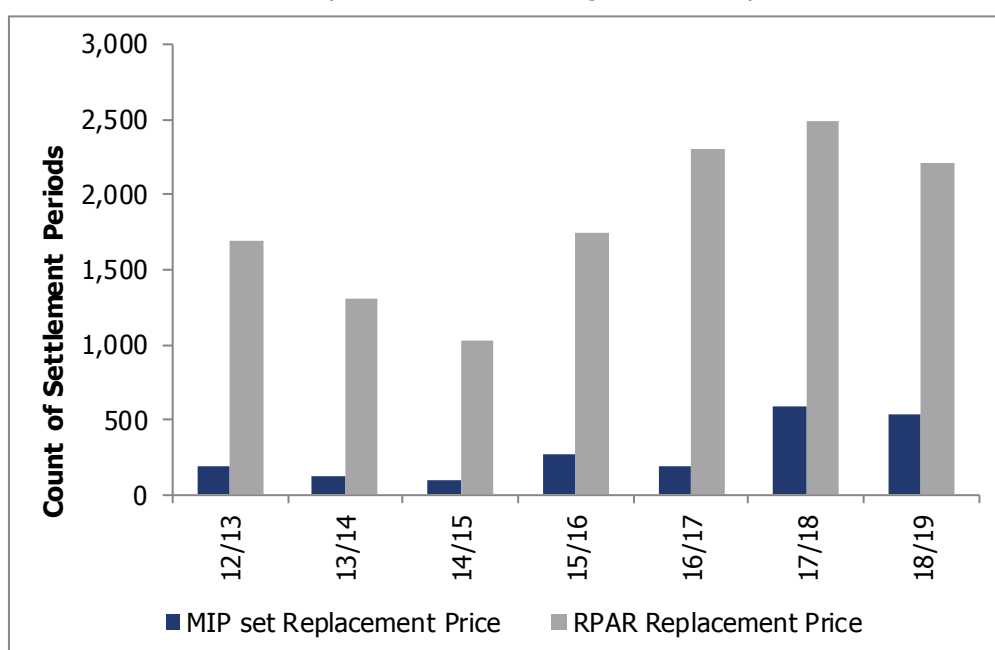
Future use of MIP

2.7   The European Balancing Guideline (EBGL) requires all Transmission System Operators (TSOs) to develop a proposal for the harmonisation of imbalance settlement, including pricing. The proposal contains requirements for the calculation and use of a 'Value of Avoided Activation of Balancing Energy' VOAA. This is the terminology that refer to a default price in situations where we currently default to the MIP. National Regulatory Authorities (NRAs) have requested amendments to the proposal including a definition of, but not a methodology for calculating, VOAA.

2.8   The latest proposal includes a definition making it clear that this value can only be calculated from prices for balancing products, and therefore the MIP cannot be used. This is consistent with the overarching EBGL requirements. All TSOs will resubmit the proposal to NRAs towards the end of 2019, and NRAs will have two months to make a final decision on whether to accept or reject the proposals.

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 1,013MWh between 18 April 19 and 31 July 2019 using the post P377 calculation. This is 279MWh higher than the daily average MIV between 1 August 2018 and 17 April 2019 using the pre P377 calculation. The post P377 daily average MIV is 355MWh higher than the historical daily average MIV from the last six review periods. 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
2017/18	687
1 Aug 2018 – 17 Apr 2019	734
18 Apr 2019 – 31 Jul 2019	1,013

3.3   **Graph 3.1** displays the daily average MIV throughout the review period. The MIV reached a peak on 26 April 2019 at 1,474MWh, compared with last year's peak of 1,508MWh in March 2018. The June 2019 monthly average was 1,036MWh; this was the highest monthly average in this year's review period.

3.4   The orange line on **Graph 3.1** shows the implementation date for BSC Modification P377 (18 April 2019). Daily average MIV can be seen to increase after this date due to the trades made between Gate Closure and the Submission Deadline now being included in the MIV.
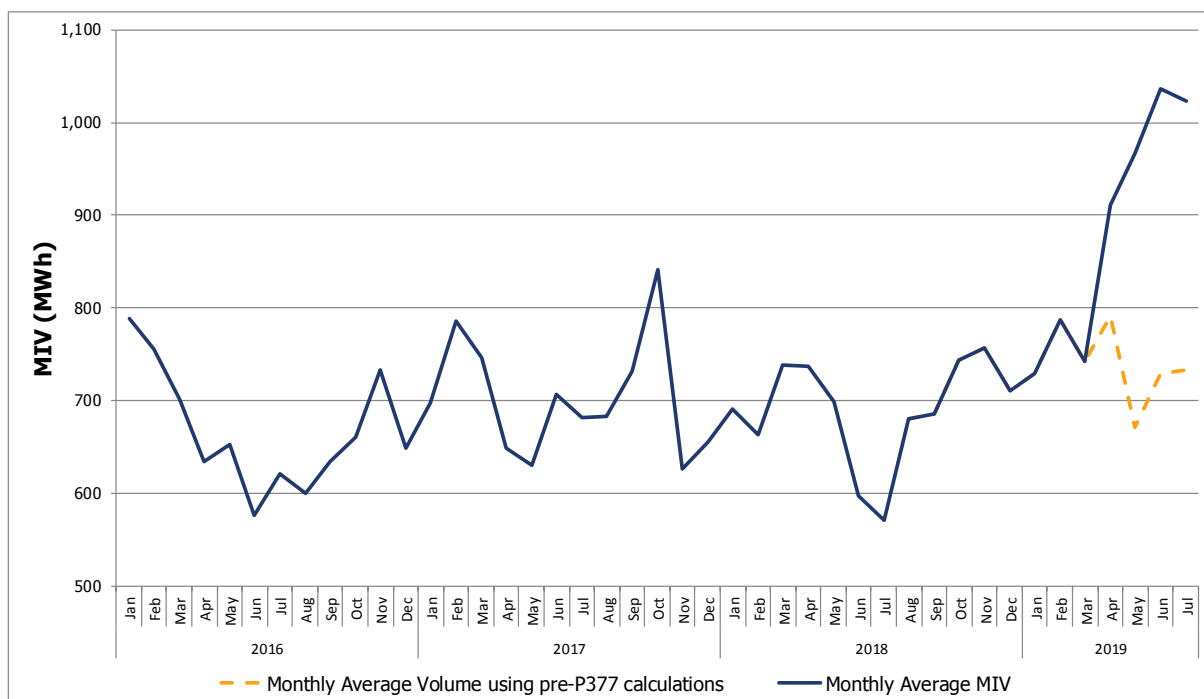
Graph 3.1 Daily and Monthly Average Market Index Volume by Settlement Date
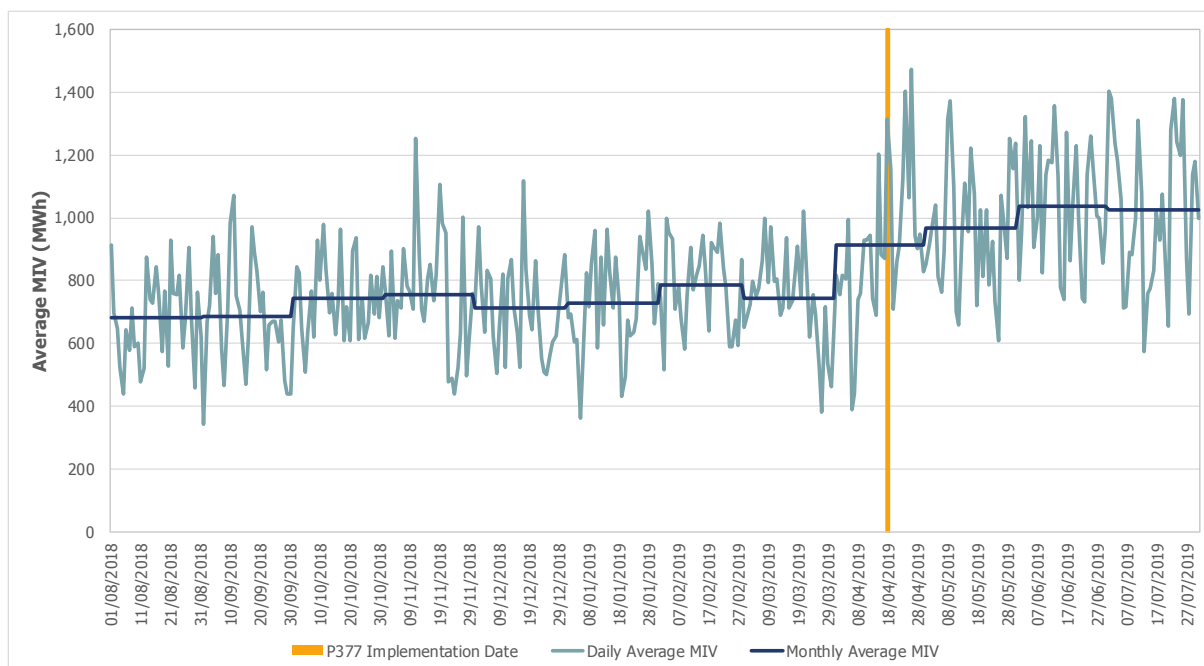
3.5 **Graph 3.2** shows the monthly average MIV for since January 2016. The dashed orange line shows what the monthly average MIV would have been if BSC Modification P377 had not been implemented. In the three full months since the implementation of P377 (May, June and July), the monthly average MIV has increase by 297MWh on average.

Graph 3.2 Historical monthly average Market Index Volume, with the pre-P377 calculated MIV plotted since April 2019

3.6   **Graph 3.3** shows the average MIV and average volume traded on each product weighted '1' by Settlement Period across between 1 August 2018 and 31 July 2019. BSC Modification P377 did not change the product weightings in the MIDS. Similar to the previous review, the Settlement Period average MIV increased through the day with products H peaking in Settlement Periods 14 and 46.

3.7   During this review period, the 1-Hour Product was traded in the 48 standard Settlement Periods, with the highest average volume in Settlement Periods 3 and 4. In last year's review, the 1-Hour Product was only traded during Settlement Periods 18 and 34-36. **Graph 3.3** shows that the 1-hour Product had the least traded volume of all included products.

Graph 3.3 Average Market Index Volume by Settlement Period
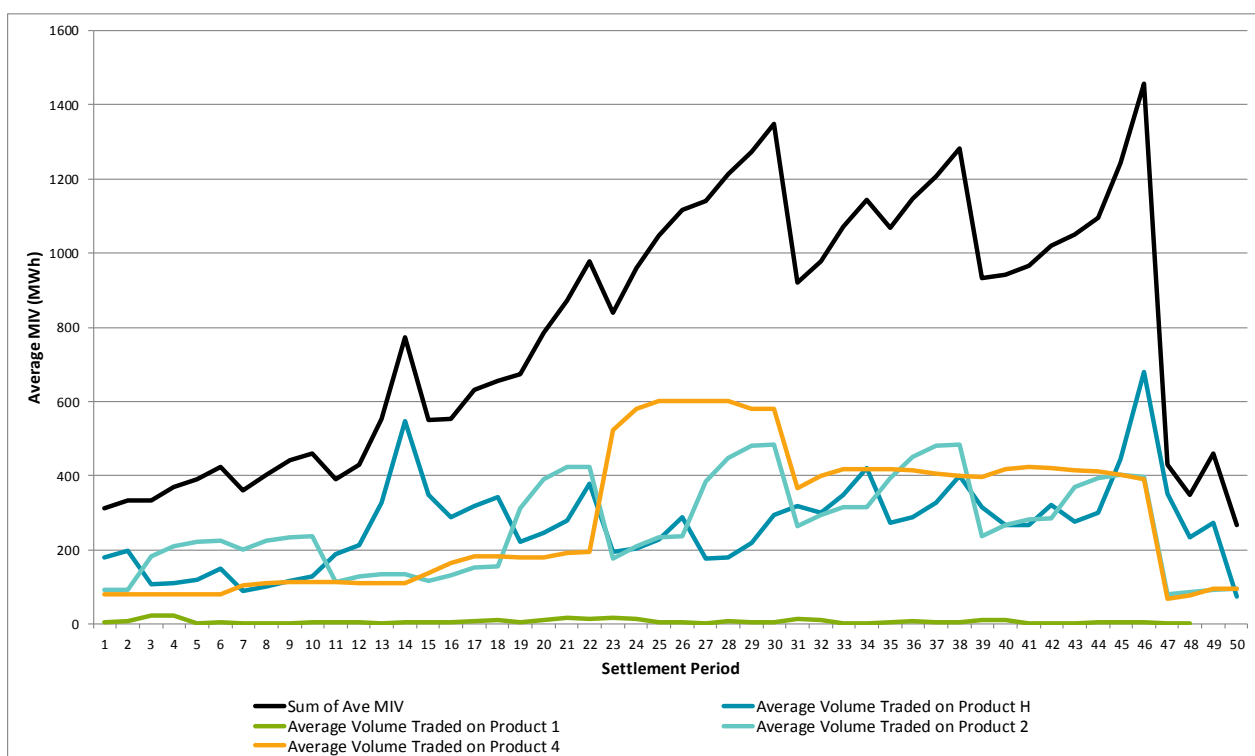
3.8   This section's analysis shows the inclusion of trades up to the Submission Deadline has significantly increased the MIV. It also shows that, as expected, the removal of timeband 6 as a weighted timeband has not had a significant impact on the MIV, due to previous reviews showing only a small amount of the MIV came from timeband 6.

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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** and also the pre-P377 review period (1 Aug 2018 to 17 April 2019).

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 less 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; those applied when 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 the ILT for both MIDPs is 25MWh, 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)**. Between 18 April 2019 and 31 July 2019 using the post P377 calculation, there was one Settlement Period out of 5,040 (0.02%) with traded volume below the ILT and hence the MIP and MIV were defaulted. Using the pre-P377 calculation for the period up to 18 April, there were 39 Settlement Periods out of 12,480 (0.31%) where the traded volume was below the ILT. Reducing the ILT to zero would ensure all qualifying trades are included in the calculation of MIPs, and so reduce the number of occasions when the MIP is defaulted to zero to when there were no qualifying trades at all. However reducing the ILT to zero would also increase the likelihood that the MIP is set on a single trade and so go against principle **e)**.

4.6 In the current review period, three Settlement Periods had the MIP set based on a single trade prior to the implementation of P377, whilst no Settlement Periods had the MIP set by a single trade after the implementation on 18 April 2019. Increasing the ILT increases the chances of the MIP defaulting to zero, which would be contrary to principle **f)**. Principle **c)** allows the ILT to change across different periods, however as mentioned this could result in principle **e)** and **f)** being compromised. Although the principles aim to avoid the price being set on a single trade, and three instances have occurred within the last year, these were on the ILT boundary of 25MWh.

4.7 **Graph 4.1** shows the percentage frequency of the MIV in the review period, both before and after the implementation of BSC Modification P377. P377 increased the MIV; prior to its implementation, 2.7% of Settlement Periods had a MIV between 400 and 425MWh, but following its implementation 2.2% of Settlement periods had a MIV between 550 and 575 MWh.

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Graph 4.1 MIV frequency pre, and post, the implementation of P377
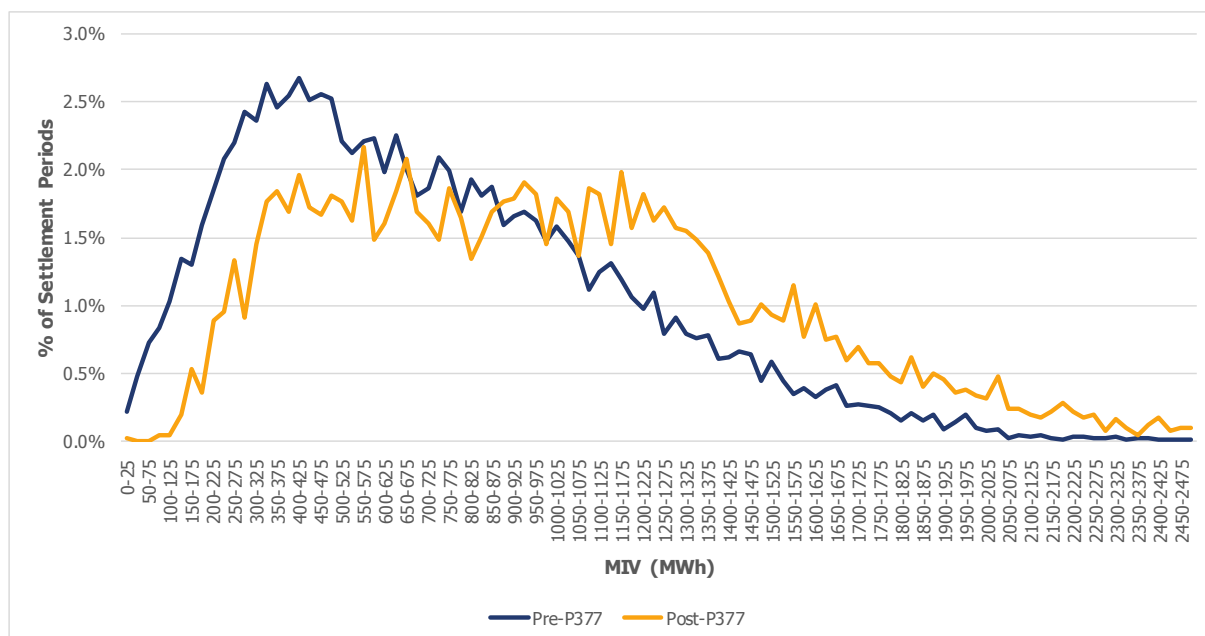
4.8   **Graph 4.2** shows the frequency of count of trades for Settlement Periods which were used in calculating the MIP; P377 increased the number of trades which are used. Prior to its implementation, 6.6% of Settlement Periods had 30 to 35 qualifying trades included in the MIP calculation, but following its implementation 15.8% of Settlement Periods had more than 100 trades included.

4.9   The average number of trades in the MIV was 62 between 1 August 2018 and 17 April 2019 using the pre-P377 calculation and 114 between 18 April 2019 and 31 July 2019 using the post-P377 calculation.

Graph 4.2 Count of trades that the MIP was set by prior to, and post, the implementation of P377

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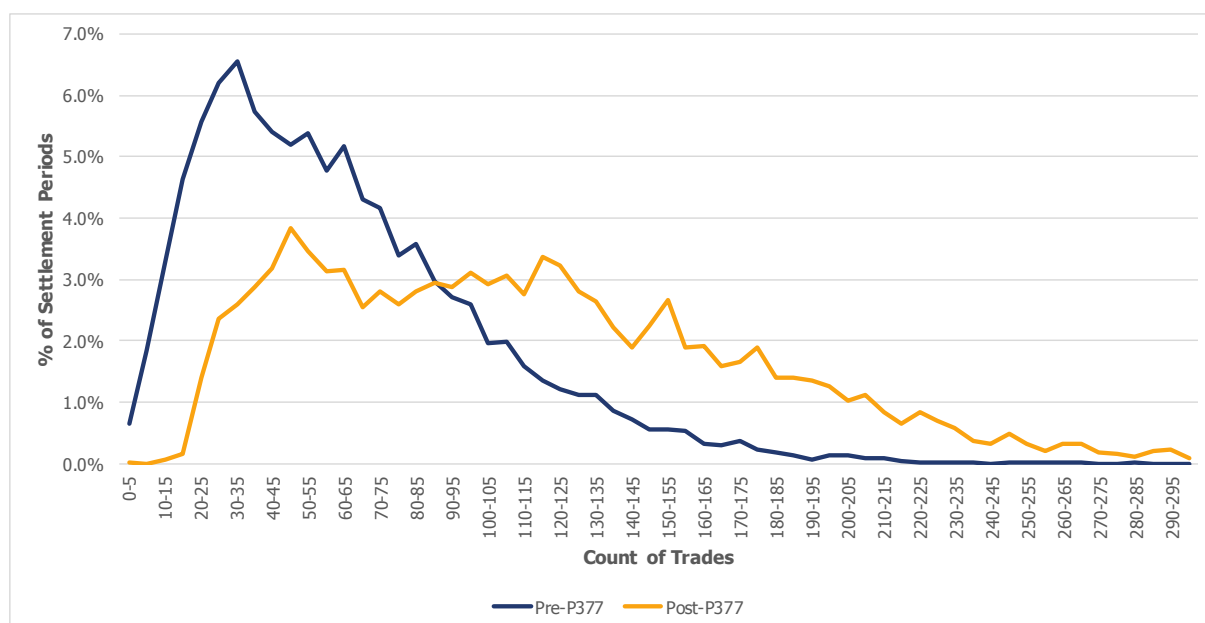
4.10   **Table 4.1** Displays the number of Settlement Periods where the MIV was below 60MWh in the last five MIDS Reviews, along with whether there was greater than one trade. Review periods are 1 August to 31 July. The number of defaulted Settlement Periods where the MIV is below the ILT is 40 in this review, compared to 62 last year. As highlighted in section 4.7, the three Settlement Periods in which one trade did not default the MIP in this review had a MIV of 25 MWh.

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

Count of Trades	No. of Defaulted Settlement Periods (MIV < 25 MWh)		No. of non-Defaulting Settlement Periods (MIV 25-60MWh)	
	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
2017/18	34	28	6	96
1 Aug 2018 - 17 Apr 2019 (pre-P377)	28	11	3	70
18 Apr 2019 -31 Jul 2019 (post-P377)	1	0	0	0

4.11   **Table 4.1** shows that the ILT remains appropriate, with the inclusion of trades up to the Submission Deadline increasing the liquidity of the MIV. The change has aided ILT principle **f)**, by reducing the number of Settlement Periods the Market Index Price is defaulted in this review period from 39 pre-P377 to one post-P377. It has also benefited ILT principle **e)**, by reducing the Settlement Periods with the MIP set by a single trade from three to 0.

4.12   Whilst the analysis from this review suggest the ILT remains suitable, the value could potentially be changed in the future once a full review period of post-P377 data is available. After the implementation of P377, there was only one Settlement Period where the MIV was below the ILT. This was on a Settlement Period where one of the MIDPs was undergoing planned maintenance. There were only two other Settlement Periods with a MIV below 100MWh since P377 was implemented.

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 with an effective from date of 18 April 2019 following the implementation of BSC Modification P377. The current weighted timebands and products are 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 the Submission Deadline;

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 5, which results in trades relating to these product and timeband combinations being used to calculate the MIP and MIV.

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 was highest 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 timeband 5.

It is worth noting that timebands 5 is 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.

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 5 towards the Submission Deadline (from right to left) for Product H, 2 and 4. Average prices for Product H in each timeband ranged between £37.66/MWh and £40.89/MWh. Average timeband prices for Product 2 ranged by £0.86/MWh and for Product 4 by £0.58/MWh. The average price for Product 1

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varies more than the other three products. However, there are a lower number of trades on this product, less than 0.01% of all volume traded over the five timebands.

Graph 5.1 Average Price and Percentage of Market Index Volume by timeband between 18 April 2019 and 31 July 2019 (post-P377)
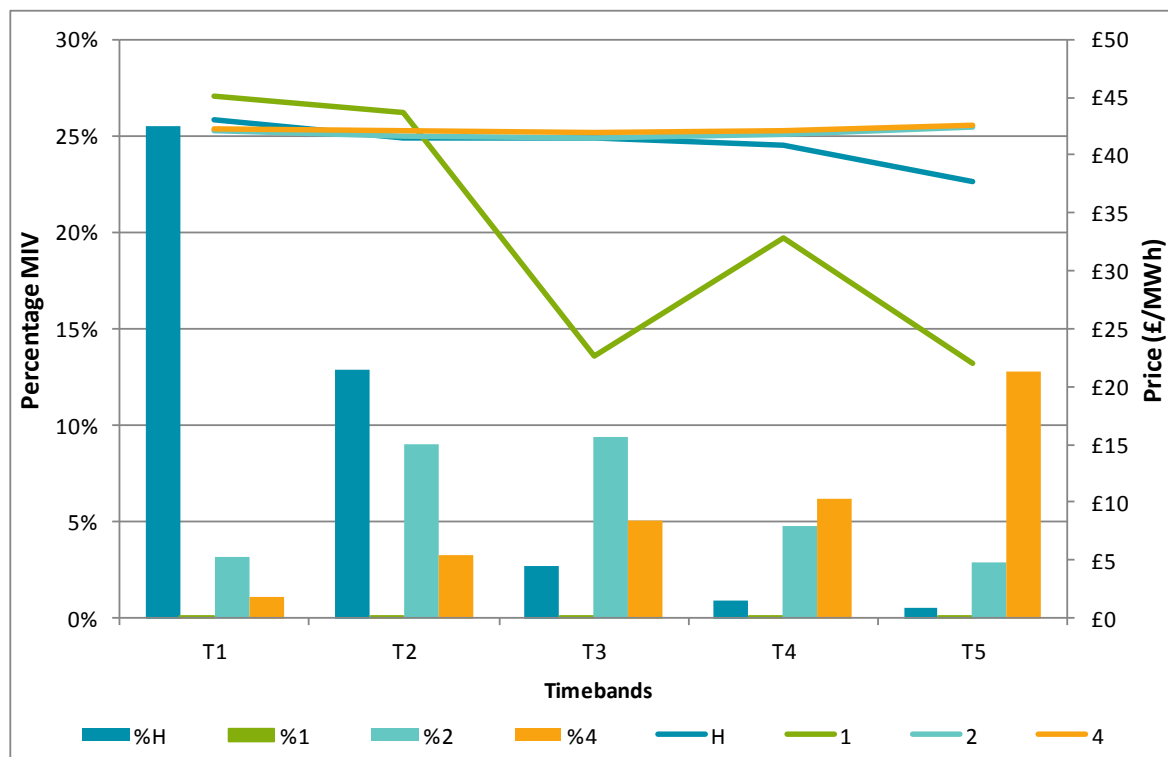
5.8 **Graph 5.2** displays the same information as **Graph 5.1**, but with the x-axis set to an hourly scale. The volumes for the longer timeband 5 are averaged out across each of the four hours. As seen in the previous graph, the respective products percentage of MIV peaks when they are closest to the Submission Deadline. With the Half-Hour Product peaking in the hour before the Submission Deadline, the 2-Hour Product peaking two to three hours before the Submission Deadline and so forth.

5.9 Trades made within two hours of a Settlement Period now make up 55% of the MIV. In the 2018/19 review period prior to implementation of P377, trades within two hours a Settlement Period represented 34% of the MIV. This was due to the timeband descriptions referring to Gate Closure and not the Submission Deadline at that time.

Graph 5.2 Percentage of Market Index Volume by Time (hours) to the Submission Deadline 18 April 2019 and 31 July 2019 (post-P377)
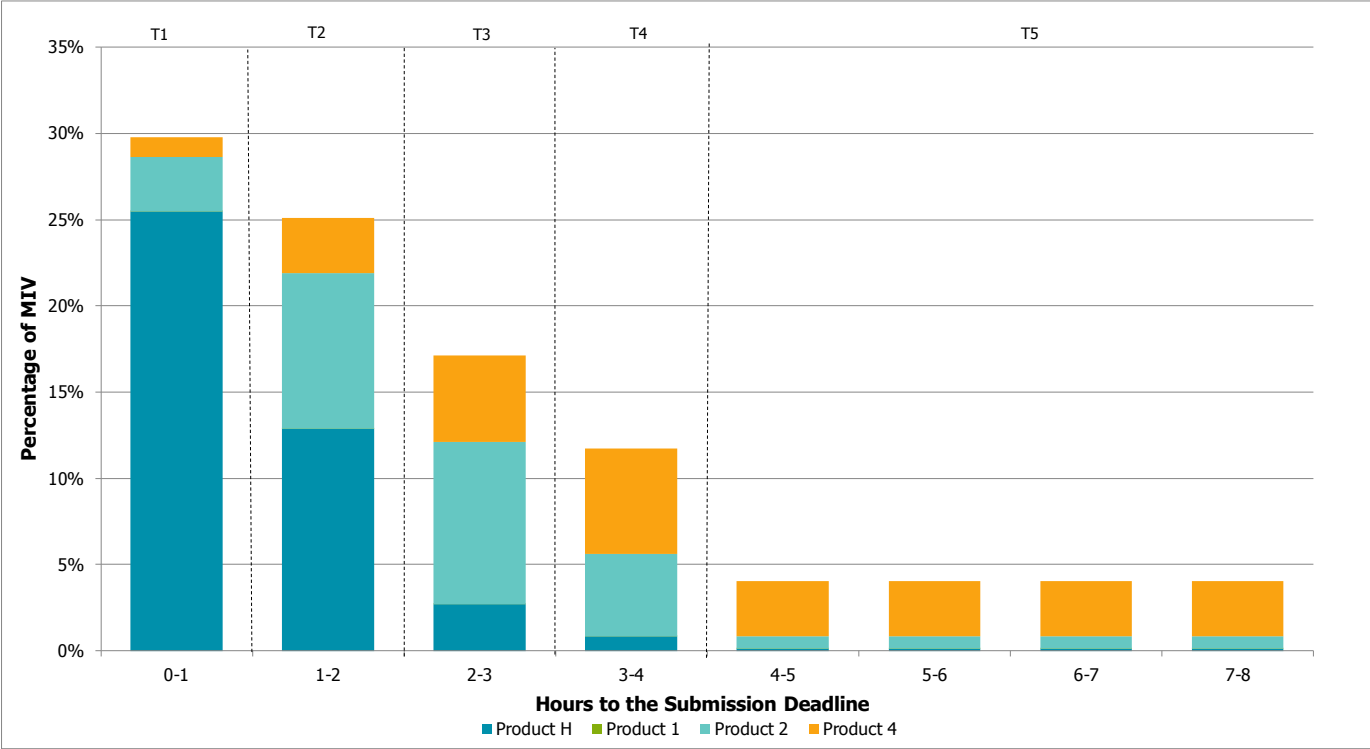
6. Analysis of all Products and Timebands

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 the two Market Index Data Providers' trades up to three Calendar Days ahead of the Submission Deadline and this period is broken down into 12 timebands. Timebands 1-5 which cover trades made up to 8 hours ahead of the Submission Deadline. 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 the post-P377 review period of 18 April 2019 to 31 July 2019.

6.1.3 **Graph 6.1.1** shows the cumulative percentage of volume traded on all products in all timebands between 18 April 2019 and 31 July 2019. 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.

Graph 6.1.1. Cumulative Percentage of Total Trade Volume on all Products (excluding Product A) across all timebands between 18 April 2019 and 31 July 2019 (post-P377).
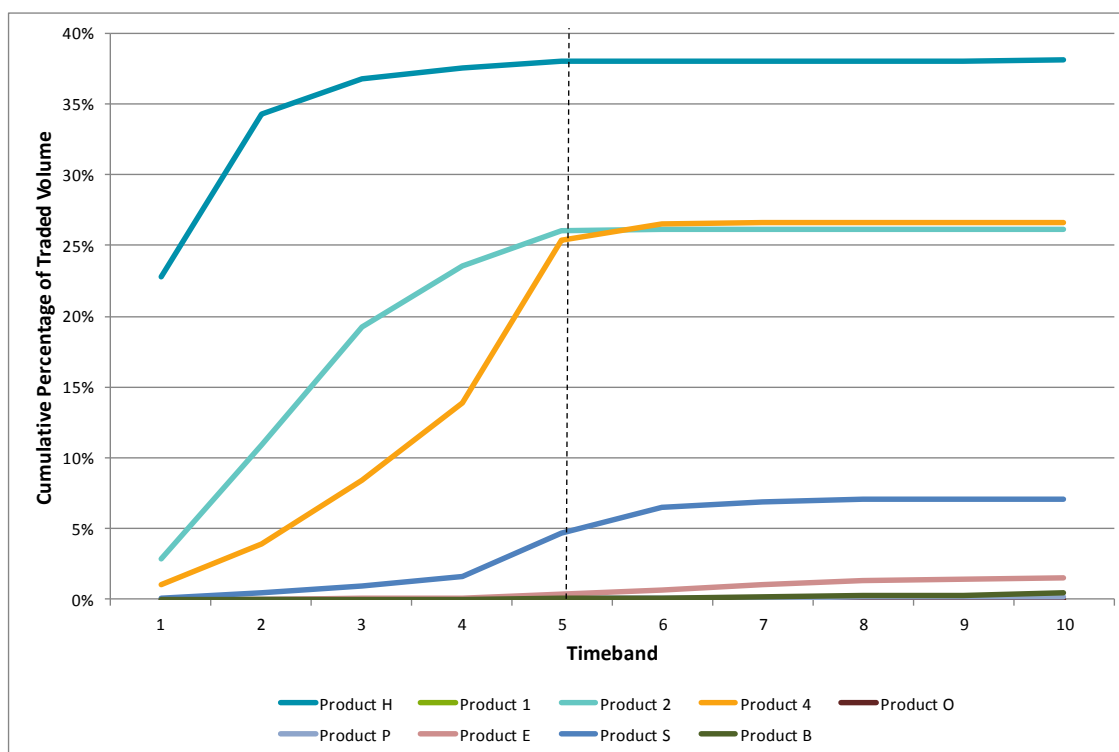
6.1.4 **Graph 6.1.2** shows the average price of each traded product and the cumulative percentage of total volume traded in each timeband. The largest volumes were traded at timeband 1 (accounting for 26.9% of the total trade). 49.6% of all volume (excluding Product A) is now traded within two hours of a Settlement Period. Without Product A, 94.5% of the volume from the other products are traded with the weighted timebands, which represent 0-8 hours prior to the start of a Settlement Period.

Graph 6.1.2. Percentage of total volume traded (excluding Product A) in each timeband between 18 April 2019 and 31 July 2019 (post-P377).
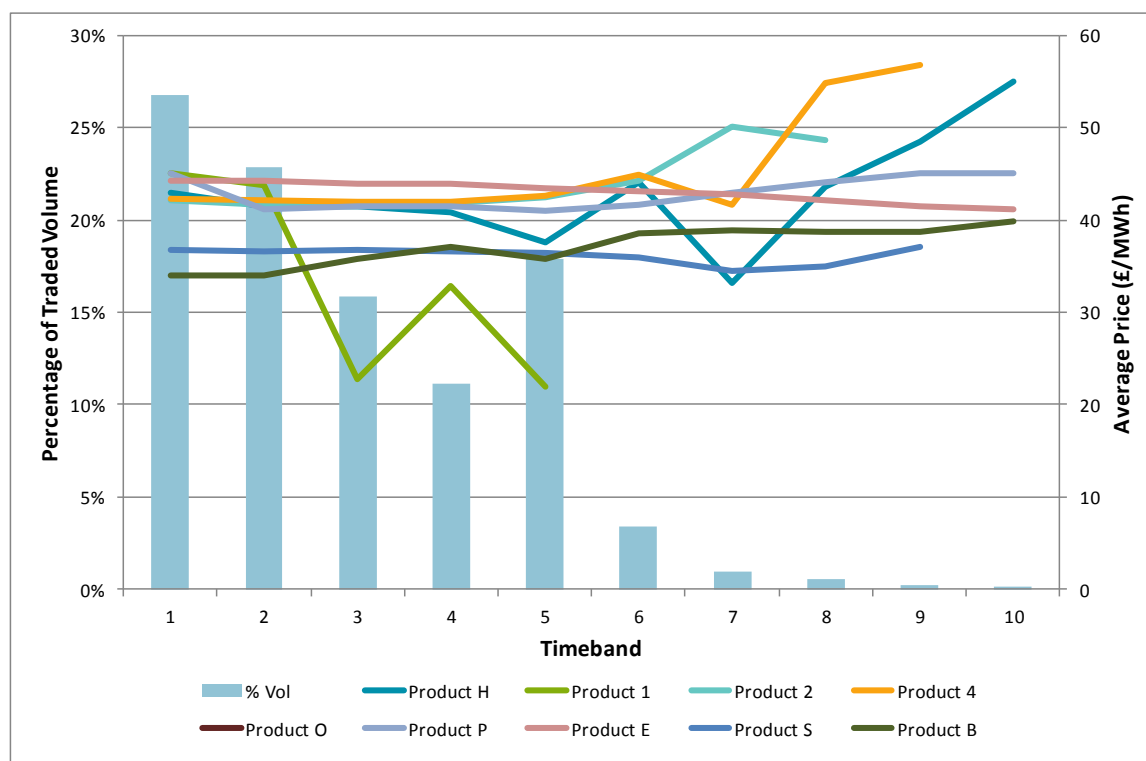

6.2 Day Ahead Auction Product

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 79.7% of total traded volume during the post-P377 review period (18 April 2019 to 31 July 2019). The product only applies from timeband 6. Unlike the other products this product is not traded in the weighted timebands 1 to 5 that are closer to the Submission Deadline. During the 2017/18 review period, the Auction Product accounted for 91.2% 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, which has increased following the implementation of BSC Modification P377, and weighting principle **f)**, the current '0' weighting on the Auction Product remains suitable.

Graph 6.2.1. Cumulative Percentage of total traded volume on all Products (including A) across all timebands between 18 April 2019 and 31 July 2019 (post-P377).
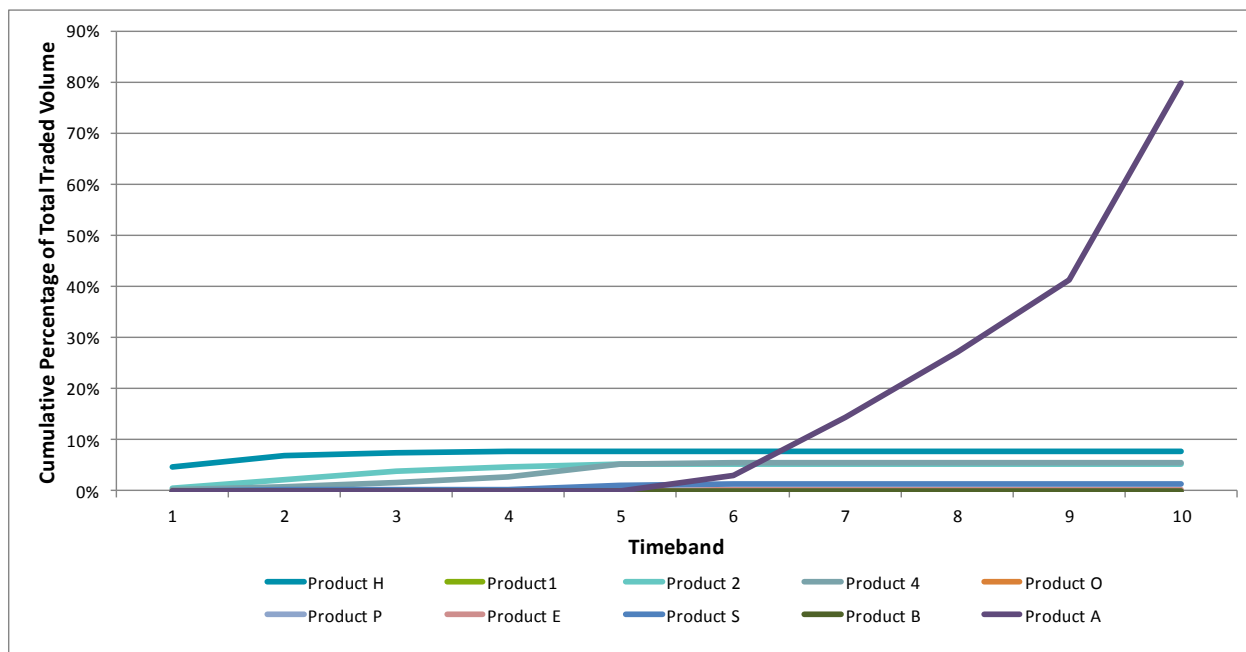
6.2.5 **Table 6.2.1** shows the total traded volume on all products across all timebands. As displayed in **Graph 6.2.1**, Product A accounts for most of the traded products, and a large proportion of all trades (38.59%) is made during timeband 10 driven by Product A (accounting for 38.55% of all trades at timeband 10). The percentage of volume for Product A and for timeband 10 have decreased by 4% from the last review (1 August 2017 to 31 July 2018).

Table 6.2.1 Percentage of Total Traded Volume on all Products across all timebands between 18 April 2019 and 31 July 2019 (post-P377).

Products	Timeband										Total
	1	2	3	4	5	6	7	8	9	10	
H	4.63%	2.34%	0.49%	0.16%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%	**7.72%**
1	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	**0.00%**
2	0.57%	1.64%	1.70%	0.86%	0.52%	0.01%	0.00%	0.00%	0.00%	0.00%	**5.30%**
4	0.20%	0.59%	0.92%	1.11%	2.33%	0.23%	0.01%	0.00%	0.00%	0.00%	**5.39%**
O	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	**0.00%**
P	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.00%	0.00%	**0.03%**
E	0.00%	0.00%	0.01%	0.01%	0.05%	0.06%	0.07%	0.06%	0.03%	0.01%	**0.30%**
S	0.02%	0.07%	0.10%	0.13%	0.63%	0.36%	0.08%	0.03%	0.01%	0.00%	**1.44%**
B	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%	0.02%	**0.09%**
A	0.00%	0.00%	0.00%	0.00%	0.00%	3.06%	11.41%	12.54%	14.16%	38.55%	**79.72%**
Total	**5.43%**	**4.64%**	**3.22%**	**2.27%**	**3.64%**	**3.75%**	**11.61%**	**12.64%**	**14.22%**	**38.59%**	**100.00%**