

DE MINIMIS ACCEPTANCE THRESHOLD (DMAT) REVIEW

Imbalance Settlement Group

Date of meeting **01 December 2020**

Paper number **236/04**

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Purpose of paper **For Decision**

Classification **Public**

Document version **V1.0**

Summary

The De Minimis Acceptance Threshold (DMAT) is a pricing parameter used to identify and remove balancing actions with a volume smaller than a set value from the Energy Imbalance Price calculation. DMAT is set to 0.1MWh and is reviewed from time to time in accordance with the BSC.

This review suggests that the current value, 0.1MWh, should not be changed. The Imbalance Settlement Group (ISG) is invited to note the content of the analysis and agree that Elexon will conduct the next scheduled review in two years' time.

1. Background Information

1.1 The De Minimis Acceptance Threshold (DMAT) removes balancing actions smaller than a set value, currently 0.1MWh, from the Energy Imbalance Price calculation. DMAT has been subject to eight parameter reviews since its implementation. The last review in 2018 resulted in a change in the DMAT for the first time, with the value decreasing from 1MWh to 0.1MWh. The change was effective from 1 April 2019.

1.2 The parameter was introduced in 2001 following the implementation of [BSC Modification P10 'Eliminating Imbalance Price Spikes Caused By Truncating Effects'](#). This was an urgent modification raised to deal with rounding errors between National Grid and Settlement Administration Agent (SAA) systems, which were causing spurious Bid Offer Acceptances (BOAs) and had resulted in price spikes.

1.3 Data passed to settlement is specified to the nearest minute, and as a whole number of megawatts. Spurious BOAs can still occur when BOA instructions coincide with the ramping up or down of a BMU. **Figure 1** illustrates how this can occur for an example BOA. The figure shows the Bid Offer Pairs (BOP) above (BOP+1) and below (BOP-1) the Final Physical Notification (FPN).

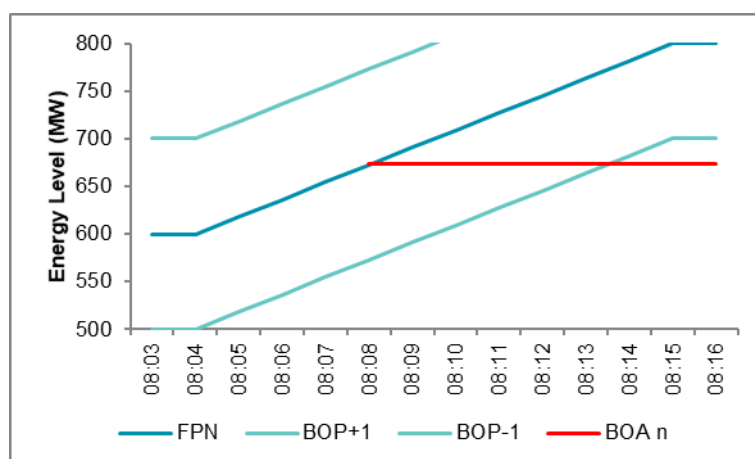


Figure 1: Example BOA instruction during a BMU ramping up

1.4 In this example, the System Operator instructs the BMU to remain at 673MW at 08:08 by a BOA. Settlement Systems calculate the FPN at 08:08 as 672.72MW. This is calculated by linear interpolation between the two instructed levels at 08:04 and 08:15. There is a positive 0.28W difference between the BOA and FPN at 08:08 this difference results in a spurious Offer of 0.005MWh.

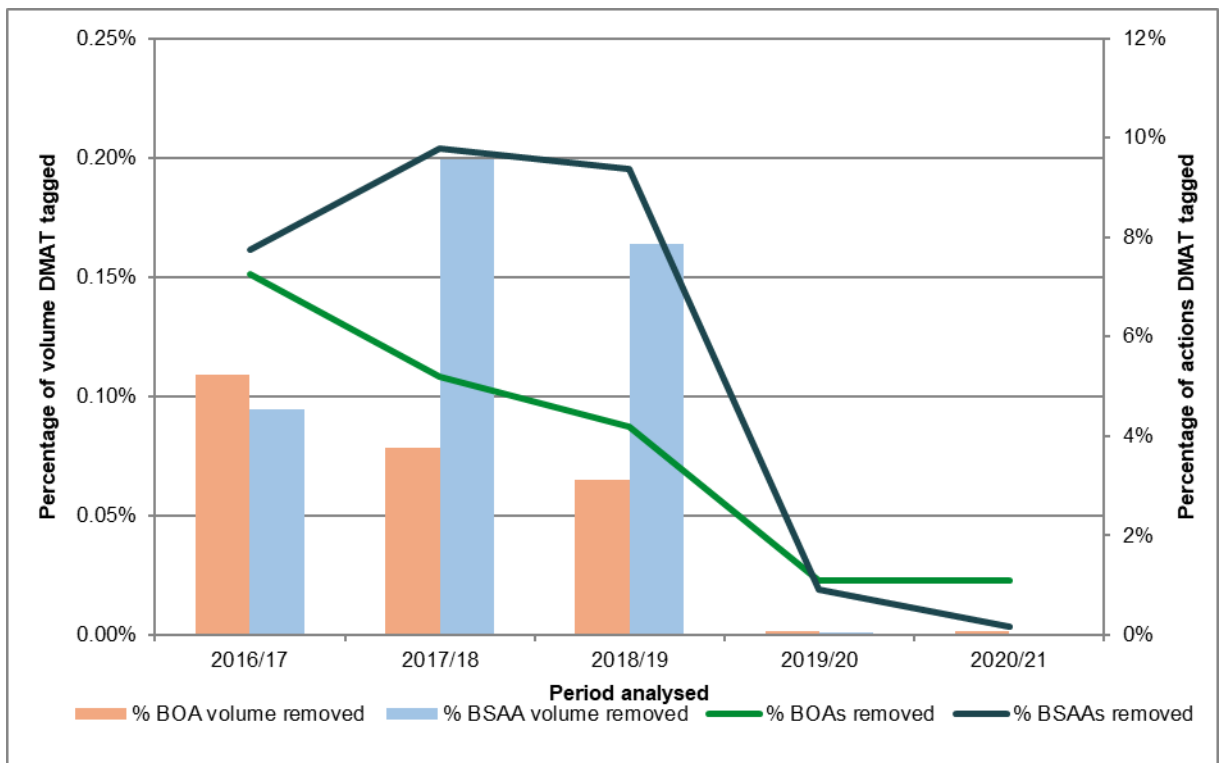
- 1.5 Spurious BOAs produced because of the level of granularity of Settlement Systems will naturally have a small volume. A difference of 1MW between an FPN and a BOA for a minute would result in an erroneous volume of 0.017MWh.
- 1.6 As no rounding of acceptance volumes takes place during the price calculation, this suggests that a non-zero DMAT is a sensible precaution.

2. BSC Modifications impacting the DMAT

- 2.1 Balancing Volumes from Trans European Replacement Reserve Exchange (TERRE) activations were introduced into the Imbalance Price calculation as part of [BSC Modification P344](#). TERRE is activated to serve a balancing need in a 15 minute block. Balancing volumes associated with TERRE activations are entered into the Imbalance Price calculation as aggregated volumes: Volume of GB Need Met and Replacement Reserve Aggregated Unpriced System Actions. These volumes are subject to DMAT Tagging, but as they are aggregated volumes, we would expect these to not fall below the DMAT. There have been no balancing volumes from TERRE in the GB market so far.
- 2.2 BSC Modification P344 also brought in Wider Access provisions, enabling participants to aggregate activity at several sites into one Balancing Mechanism (BM) Unit, which they can use to trade in the UK balancing market. More detail has been provide in Section 4 on the volume of BOAs seen for Virtual Lead Parties.
- 2.3 Project MARI (Manually Activated Reserve Initiative) will introduce a platform for the exchange of balancing energy from manually activated frequency restoration reserves (mFRR) by July 2022. BSC Modification P407 has been raised to introduce these arrangements into the GB market. How balancing volumes from MARI will be incorporated into the Imbalance Price Calculation, and how the action volume will form part of the input has yet to be determined by the modification workgroup.

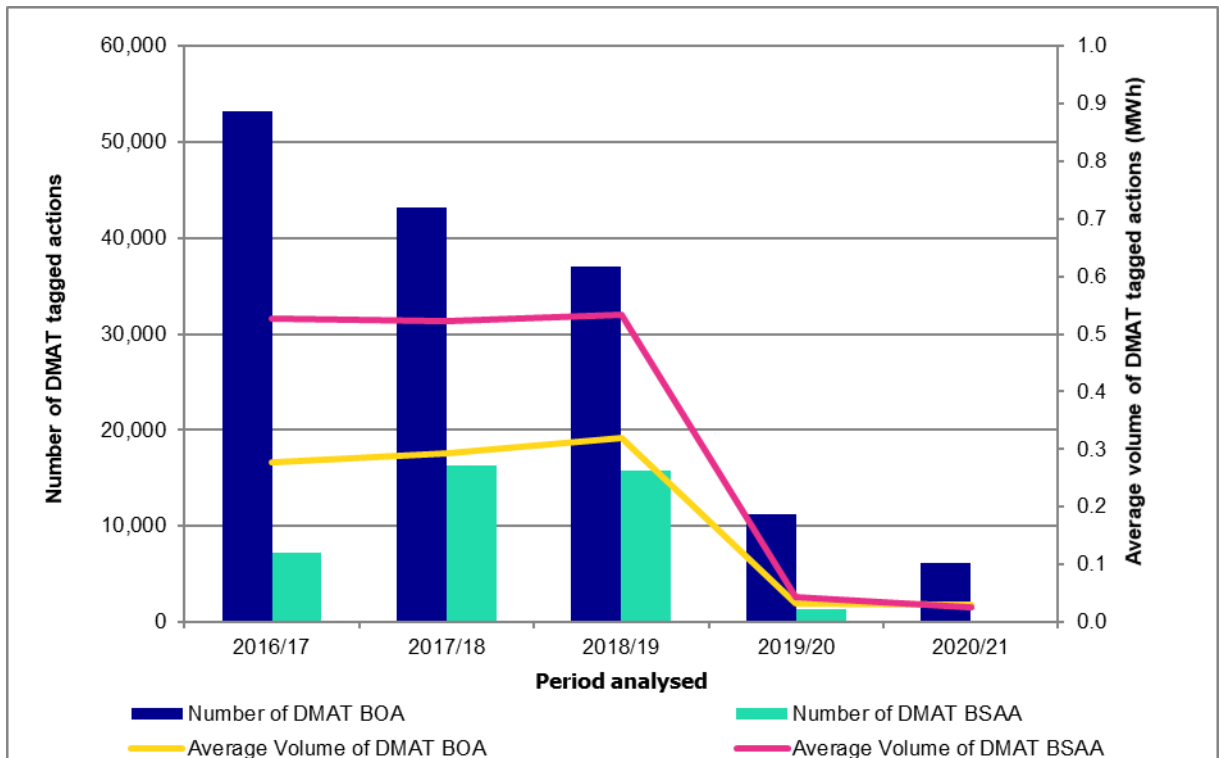
3. Analysis of DMAT Tagged actions

- 3.1 Analysis covers the period 1 April 2016 to 30 September 2020. For each year, the assessed period runs from April to March. 2020/21 data is for the first 6 months of the 2020/21 year, up to the end of September 2020.
- 3.2 **Graph 1, 2 and 3** compare the historic volumes and numbers of BOAs and Balancing Services Adjustment Actions (BSAAs).
- 3.3 **Graph 1** shows that the percentage of BOA and BSAA volume removed by DMAT Tagging has decreased following the reduction of DMAT from 1MWh to 0.1MWh. 0.065% of BOA volume was removed by DMAT Tagging in 2018/2019, but following the decrease to 0.1MWh, 0.00154% was removed in 2019/20. In the first months of 2020/21, 0.00147% of BOA volume was removed.
- 3.4 When looking at the percentage of BOAs and BSAAs removed (RHS of Graph 1), the change in April 2019 to a 0.1MWh DMAT has seen 1.08% and 1.09% of BOA actions removed by DMAT Tagging in 2019/20 and 2020/21 respectively. This is a decrease from 4.20% in 2018/19. The percentage of BSAA actions removed has decreased from 9.38% in 2018/19, to 0.91% in 2019/20 and 0.16% in 2020/21 so far.



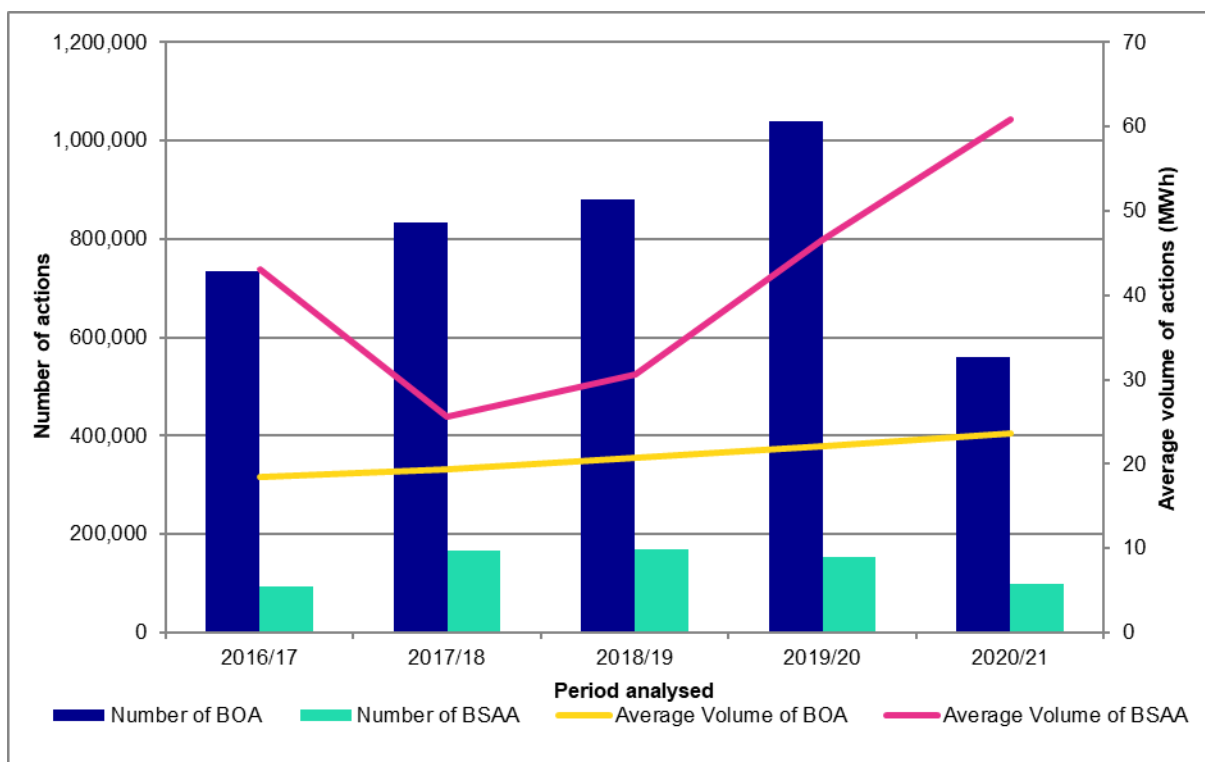
Graph 1. Percentage of BOA and BSAA volumes and actions removed

- 3.5 **Graph 2** shows the number and average absolute volume of DMAT tagged actions in each year.
- 3.6 The number of DMAT tagged BOAs was 11,258 in 2019/20 following the reduction of DMAT to 0.1MWh, down from 36,985 actions in 2018/19. In 2020/21, 6,120 BOAs have been DMAT Tagged.
- 3.7 The number of BSAAs decrease to 1,390 in 2019/20, whilst 160 BSAAs have been DMAT Tagged in 2020/21 up to the end of September.
- 3.8 Since the decrease in DMAT in April 2019, the average volume of a DMAT BOA or BSAA has fallen to 0.03MWh. The total volume of DMAT BOA and DMAT BSAA actions removed in 2019/20 was 414MWh, with 189MWh being removed so far in 2020/21. This is compared to a total of 20,312MWh in 2018/19.



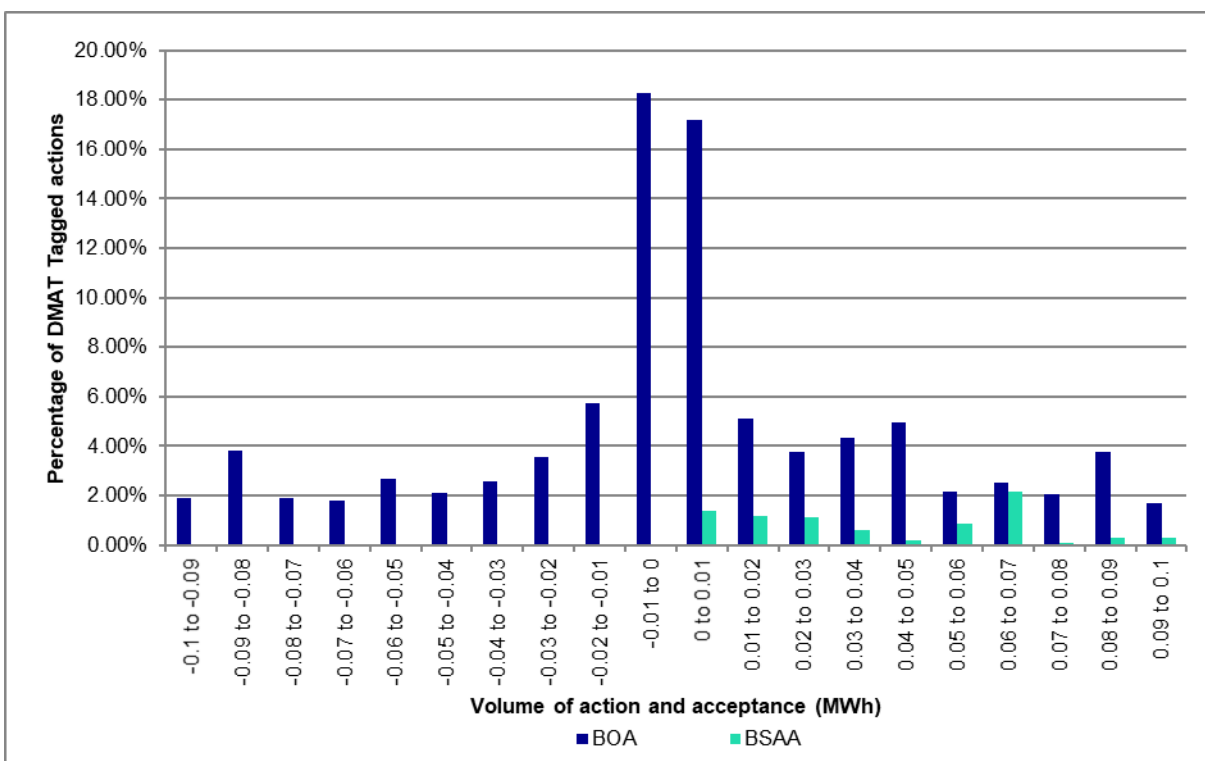
Graph 2. Number and average volume of DMAT Tagged BOA and BSAA

- 3.9 **Graph 2** can be compared with **graph 3**, which shows that in 2019/20 the total number of BOAs increased by 17.8% to over 1,000,000 actions. Over the same period the number of BSAA utilised decreased by 9.13%.
- 3.10 In the six months of 2020/21 data so far, there have been over 560,000 BOAs and 97,500 BSAA.
- 3.11 The average absolute volume of a BSAA has increased to 47MWh in 2019/20 and 61MWh in 2020/21. The average BOA volume has increased steadily since 2016/17, up to 23.6MWh in 2020/21.



Graph 1. Number and average volume of BOA and BSAA

- 3.12 **Graph 4** shows the distribution of volumes of DMAT tagged actions between April 2019 and September 2020. April 2016 to March 2019 have not been included in this graph due to the change in DMAT from 1 April 2019.

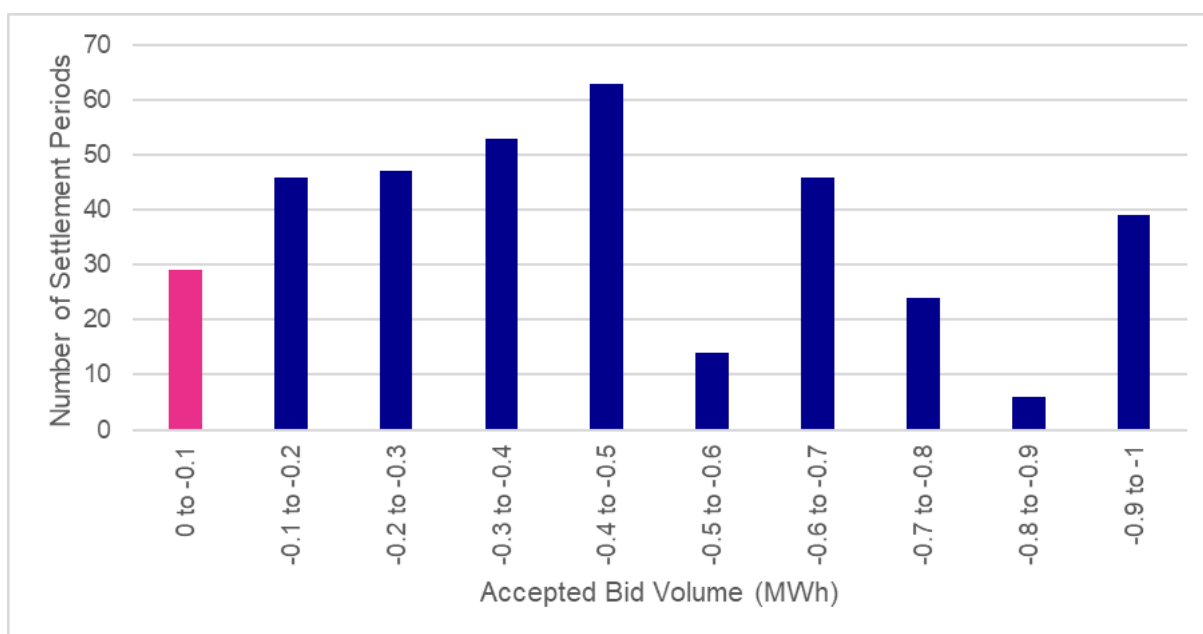


Graph 4. Percentage of DMAT Tagged actions by volume of action between April 2019 and September 2020

- 3.13 The graph shows that 37% of all DMAT Tagged actions had a volume between -0.01MWh and 0.01MWh.
- 3.14 Over the period, 91.8% of tagged actions were BOAs. The distribution of DMAT Tagged BOAs has a degree of symmetry with 48% less than zero and 52% greater than zero. In contrast 99.9% of tagged BSAA are greater than 0MWh.
- 3.15 **Graph 4** also shows that, on average, 0.8% of all DMAT Tagged actions are BSAA in each category greater than 0MWh. The difference in distributions implies that the Settlement System issue that causes erroneous BOAs is different to any issue that might cause erroneous BSAA.
- 3.16 The analysis presented in these four graphs shows that over the period analysed, there are distinct differences in how BSAA and BOAs have been utilised, and the volumes and number of these actions that have been DMAT tagged.

4. Wider Access and Virtual Lead Parties

- 4.1 The Wider Access provisions of BSC Modification P344 'Project TERRE implementation into GB market arrangements' enabled participants to aggregate activity at several sites into one Balancing Mechanism (BM) Unit which they can use to trade in the UK balancing market. A Virtual Lead Party (VLP) can use a Secondary BM Unit to aggregate balancing actions across sites independently of the relevant Suppliers.
- 4.2 **Graphs 5a) and 5b)** break down the BOA volume from VLPs, from the first VLP BOA on 23 April 2020 to the end of September 2020. A total of 2,783 Bids by VLP BM Units have been accepted in this time, with an average volume of -11.1MWh. 13.2% of Bids by VLPs were less than 1MWh in volume. **Graph 5a)** shows in pink that 1% of all VLP Bid Volume was removed with DMAT tagging. This is comparable to the percentage of all BOAs removed by DMAT Tagging in **Graph 1**, showing the DMAT of 0.1MWh is not unfairly removing BOAs by VLPs, which are expected to be smaller in magnitude.



Graph 5a). Distribution of volume of VLP Bids less than 1MWh up to 30 September 2020. DMAT removed Bids are shown in pink.

- 4.3 **Graph 5b)** displays the same graph as 5a), but for Offers by VLPs between 23 April 2020 and the end of September 2020. A total of 2,089 Offers by VLPs have been accepted, with an average volume of 14.5MWh. 12.5% of accepted Offers by VLPs had a volume of less than 1MWh. The percentage of VLP Offer Volume removed by DMAT Tagging was 1.2%, which again is comparable to the percentage of all BOAs removed in **Graph 1**.



Graph 5b). Distribution of volume of VLP Offers less than 1MWh up to 30 September 2020. DMAT removed Offers are shown in pink.

5. Impact on System Prices

- 5.1 Scenarios where DMAT is 1MWh and 0MWh have been compared against the live System Price calculation (for the period April 2019 to September 2020, with a DMAT of 0.1MWh). Neither 0MWh nor 1MWh are suggested values for DMAT; they have been assessed to show for reference how a zero DMAT changes the Imbalance Price calculation, and what the System Price would have been had there not been a DMAT change to 0.1MWh in April 2019. Note that a CADL of 10 minutes (which reduced from 15 minutes in April 2019), has been used in all scenarios.
- 5.2 Without the change to a 0.1MWh DMAT, System Prices would have been on average £0.30/MWh higher with a System Price change in 2.49% of Settlement Periods between 1 April 2019 and 30 September 2020.

Table 1. Impact of a changing DMAT on System Prices between 1 April 2019 and 30 September 2020

DMAT (MWh)	Number of Settlement Periods with a change	% of total Settlement Periods	Average System Price change (£/MWh)	Max Change (£/MWh)	Min Change (£/MWh)
0	369	1.40	-2.83	36.34	-40.50
1	655	2.49	0.30	81.45	-49.00

6. Conclusion and next steps

- 6.1 Our analysis displays a clear reduction in the percentage of actions and volumes DMAT Tagged following the decrease in DMAT from 1MWh to 0.1MWh since 1 April 2019. The total volume of BOA and BSAA volume removed by DMAT Tagging reduced by 98% from 2018/19 to 2019/20, showing a significant improvement by reducing the DMAT following the last review.
- 6.2 The analysis shows there could be an argument to reduce the DMAT even further to 0.01MWh. Whilst this maybe an improvement, there is not sufficient evidence at this time to make this change whilst there is a known Settlement System issue that causes erroneous BOAs. Elexon will continue to monitor how much volume is removed by DMAT Tagging through the monthly System Price Analysis Report.
- 6.3 We are therefore recommending no change at present to the current DMAT of 0.1MWh, and hence, we have not published an industry consultation. We invite you to provide comments on the analysis included in this paper, and any industry changes that could impact the value of DMAT. We invite you to make a final recommendation to the BSC Panel for its December 2020 meeting.

7. Recommendations

7.1 We invite you to:

- a) **NOTE** the analysis presented in this paper;
- b) **RECOMMEND** to the BSC Panel that no change is made to the DMAT; and
- c) **AGREE** that Elexon conduct the next review in two years' time.

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