GC/DC KPI QUARTERLY REPORT – SPRING 2018

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Purpose of paper	Information
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Summary	This paper provides analysis on the GC/DC KPIs to help the ISG determine if a formal review of GC/DC Limits is necessary. This is the first of four quarterly reports, provided at the end of each BSC Season. This first KPI report relates to Settlement Periods during BSC Spring 2018 (i.e. 1st March to 31st May). We invite the ISG to comment on the analysis provided.

1. Executive Summary

1.1 This is ELEXON's first quarterly report of Settlement Data, intended to support the Imbalance Settlement Group's (ISG) consideration of whether to review the current Generation Capacity (GC) Limit and Demand Capacity (DC) Limit (collectively 'GC/DC Limits'). This report contains analysis of specific pre-determined Key Performance Indicators (KPIs) and additional complementary analysis.

1.2 Using Settlement Data for Settlement Periods from BSC Spring 2018 and taking into consideration this is the first of four quarterly reports, the following can be observed:

- 2149 of 3535 (61%) of BM Units are active BM Units (i.e. with Metered Volumes allocated to them).
- 1663 of 2149 (77%) active BM Units are Supplier BM Units (2_).
- 1523 of 1663 (91.58%) of active Supplier BM Units have declared DC of less than 100 MW.
- 3599 of 4091 (87.97%) of all GC and DC breaches were DC breaches[1], and 92.1% of DC breaches were by Supplier BM Units with a declared DC of less than 100 MW.
- Our analysis shows that throughout the season, there were 50,138 instances where DC was exceeded[2] but only 3599 were more than the DC tolerance limits. Similarly, there were 3560 instances where GC was exceeded but only 492 were more than the GC tolerance limits. BM Units exceeding GC or DC but not breaching the TLs are mainly registered by smaller Suppliers.
- Supplier BM Units with a declared DC of less than 100 MW tend to be responsible for the most number of breach days; a single Supplier BMU with a declared DC of less than 100MW on average had 12 breach days in BSC Spring 2018.
- Supplier BM Units use on average 33% (i.e. 0.33 MWh) of their 2 MW GC Limit and 25% (i.e. 0.25 MWh) of their 2 MW DC Limit.

[1] For the purpose of this analysis, each individual Settlement Day that a BM Unit's Metered Volume exceeds GC or DC by more than the tolerance limits in at least one Settlement Period is counted as a separate breach.
[2] The total number of possible GC and DC breaches is 193410, which is the number of days in BSC Spring 2018 (92) multiplied by the number of active BMUs (2149).

- 191 of 287 (67%) Supplier BM Units with a DC of 0 MW, used less than 20% of the 2 MW tolerance limit.
- Based on the BSC Spring 2018, Supplier BM Units with a declared DC and GC of less than 100 MW tend to most frequently breach and for most time in the season. This suggests that action might be necessary either to change the 2 MW tolerance limit and/or to revise assurance measures in this area.
- Future GC/DC KPI Quarterly Reports will provide further analysis to complement and validate initial findings and investigate the materiality of the breaches.

2. Background

2.1 GC and DC are estimates of the Settlement Period maximum demand and generation capacity for a BM Unit in a BSC Season. GC and DC values are used in the calculation of Parties' Credit Assessment Energy Indebtedness (CEI) and Credit Cover Percentage (CCP). Accurate values of GC and DC are essential to ensure the accurate calculation of CCP and CEI.

2.2 In accordance with Balancing and Settlement Code (BSC) Section K 'Classification and Registration of Metering Systems and BM Units' paragraph 3.4 and BSCP15 'BM Unit Registration', a BM Unit's DC and GC values are derived, respectively, using the Lead Party's forecast of expected maximum magnitude of negative (indicating Demand) and positive (indicating Generation) BM Unit Metered Volumes for a single Settlement Period in the forthcoming or prevailing BSC Season. The Central Registration Agent (CRA) divides the half-hourly (HH) BM Unit Metered Volumes by the Settlement Period Duration (SPD) to convert from MWh to a MW GC or DC.

2.3 Parties must submit expected maximum positive and negative BM Unit Metered Volume values to the CRA ahead of each BSC Season. This is to ensure that the CRA updates GC and DC values that reflect the likely operation of the BM Unit in the forthcoming BSC Season.

2.4 A GC/DC breach is when, for a BMU, an actual Settlement Period value of positive or negative BM Unit Metered Volume (QM_{ij}) divided by SPD exceeds its declared GC or DC by more than the GC Limit or DC Limit (for the remainder of this paper, the limits are collectively referred to as 'tolerance limits'). According to K3.4.2(c) and K3.4.3, if a Lead Party becomes aware of or believes that a breach will occur, it must re-declare maximum BM Unit Metered Volume(s) for its BMU(s) so the CRA can update declared GC and/or DC values. ELEXON regularly monitors BM Unit Metered Volumes and GC/DC values. If a GC or DC breach occurs, ELEXON sends a reminder to the Lead Party. However, the Lead Party is responsible for monitoring and maintaining its estimates of maximum BM Unit Metered Volume.

2.5 Approved BSC Modification P357 'Removal of GC/DC tolerance parameters from BSC Section' was implemented on 22 February 2018. P357 was raised in order to improve the process for reviewing and amending the tolerance limits used to determine if a GC/DC breach occurs. Prior to BSC Modification P357, the tolerance limits were set in BSC Section K 3.4 and amending them required a BSC Modification. The Issue 68 workgroup originally identified this lack of flexibility and recommended the BSC is changed. P357 was raised to move the limits from the BSC to the BSC Website and implement a more flexible process for amending them.

2.6 Currently, the tolerance limits are (in magnitude):

Declared GC/DC	Tolerance Limit
<100 Megawatt (MW)	2 MW

100-500 MW	2% of declared value
>500 MW	10 MW

Table 1: Current tolerance limits (in magnitude)

2.7 P357 introduced a requirement that the Panel establish guidance for determining and reviewing the GC/DC limits, 'Demand Capacity and Generation Capacity Limit Review and Determination'. This document explains how ELEXON will provide the ISG with a quarterly report (after each BSC Season) containing analysis of Settlement data against a set of Key Performance Indicators (KPIs). The report is available three months after the end of the BSC season to allow sufficient time to retrieve and analyse the settlement data. This analysis will be used by the ISG to assess the performance of BM Unit Metered Volume declarations and suitability of the tolerance limits. At the ISG's September 2019 meeting, the ISG will have a full year's worth of data collection and reporting and will be in a position to decide whether to trigger a full review of the tolerance limits.

2.8 The guidance document specified at least the following KPIs:

- The number of dormant BM Units, i.e. with no Metered Volumes allocated to them;
- The number of breaches of the tolerance limits for each of the GC and DC per BSC Season;
- The maximum and average amplitude of the breaches in MWh;
- The maximum difference between the relevant BM Units' Metered Volumes and their declared GC and DC; and
- The proportion of distinct BM Units that breached the tolerance limit over a BSC Season.

2.9 At ISG206, it was noted that analysing the maximum amplitude of breaches show inconclusive information and therefore it was agreed to remove this KPI and study the averages between actual metered volumes and declared maximum metered volumes. The calculated averages will be complemented with analysis of standard deviation and correlation graphs.

2.10 Whilst producing this Spring 2018 report, ELEXON has identified opportunities to complement the mandatory KPIs listed above and so has provided the following additional analysis:

- The number of BM Units (consuming and/or producing), by BMU Type, which fall under the different limit type. This helps to identify which type of BM Units are more likely to breach either GC or DC.
- The number of BMUs where actual QM_{ij} exceeded declared GC or DC (irrespective of the tolerance limits). This identifies how many BM Units would breach if the tolerance limits were removed or set to zero.
- ELEXON has calculated the standard deviation of several KPIs to further understand how declarations and actual metered volumes are scattered (or varied) from its mean value in both directions.
- Correlation graphs where actual maximum demand and generation is plotted against declared capacities. This helps to understand how close actual demand and declared GC and DC values are. It will enable us to assess how accurately Parties forecast their GC and DC requirements and how many BM Unit breaches are outliers (i.e. isolated from all other members of a particular type of BM Units).
- The percentage of time that breaching BM Units stay in breach throughout the season.

- The percentage of the 2 MW tolerance limit used by BM Units (<100 MW) which exceeded their GC and/or DC, but didn't breach due to the 2 MW tolerance limit in place.
- The number of BM Units with Demand Capacity equal to zero ('0') but which have Metered Volumes and are compliant due to the 2 MW tolerance limit. ELEXON also looked at how many BM Units used more than the 2 MW tolerance limit.

2.11 ELEXON produced a GC/DC dashboard (Attachment A) which summarises performance against each KPI and our additional analysis over the reporting season. So we ensure it provides the right level of information, ELEXON invite the ISG to comment on the dashboard.

2.12 The objective of this paper is to look back at the BSC Spring 2018 and analyse the level of GC/DC breaches. The data provided should provide some ground analysis on whether the tolerance limits are set correctly and which ones should be amended to provide more accurate calculations of CEI and CCP.

3. Key Performance Indicators

Active and Dormant BM Units

3.1 A dormant BM Unit is defined as a BM Unit that has no Metered Volume (0 MWh) over the entire BSC Season. The KPI helps us to identify and exclude dormant BM Units, which by nature are GC/DC compliant, from our analysis and avoid misleading results. The KPI also helps to monitor the changes of status (i.e. active vs dormant) of BM Units when producing our quarterly report.

3.2 Figure 1 shows the status of BM Units while Figure 2 offers a breakdown of active BM Units per BM Unit type.

3.3 During BSC Spring 2018, 1386 of 3535 (39%) BM Units were dormant. The below table provides a breakdown of all active and dormant BM Units. Out of the 2149 active BM Units, 1663 (77%) are Supplier BM Units (2_). Similarly, 1245 of 1386 (89%) dormant BM Units are Supplier BM Units (2_).

3.4 All subsequent analysis only includes active BM Units.

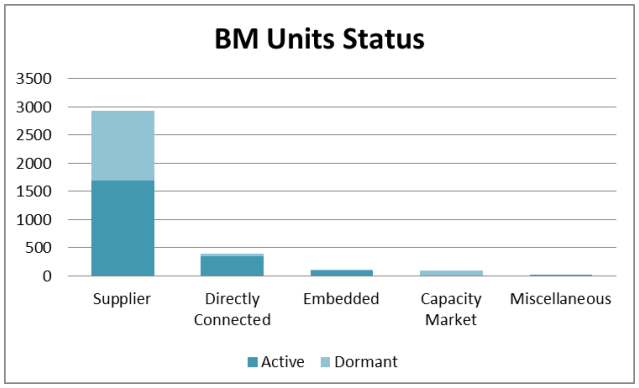


Figure 1: BM Units Status

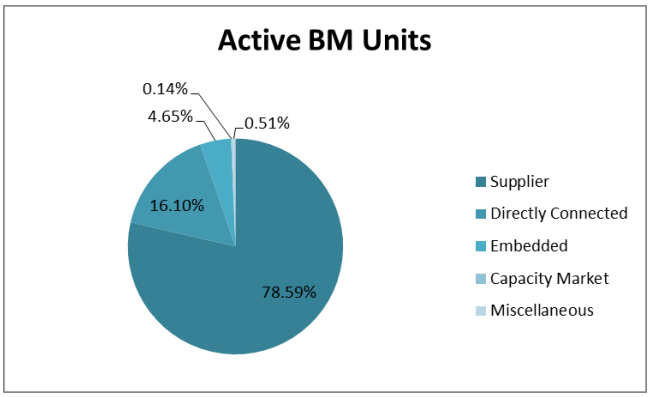


Figure 2: Active BM Units

Limit Type per BM Units

BM Unit Capacity	GC	DC
<100 MW	1917	1964
100-500 MW	169	175
>500 MW	65	21

Table 2: Breakdown of BMUs by declared GC or DC

3.5 Table 2 shows the number of BM Units, broken down by declared GC and DC. Across the whole BSC Spring 2018, the majority of BM Units had a Generation Capacity (89%) and a Demand Capacity (91.3%) of less than 100 MW.

3.6 Table 3 and Table 4 below allow us to breakdown this data by BM Unit type. 1523 of 1700 (89.59%) of Supplier BM Units have declared Demand Capacity of less than 100 MW and therefore fall under the 2 MW tolerance limit. Similarly, 329 of 346 all Directly Connected BM Units (95%) have declared a DC of less than 100 MW. Only 21 BM Units belonging to six large Suppliers have Demand Capacities over 500 MW. The trend can also be observed with Generation Capacity, where 1629 Supplier BM Units have declared less than 100 MW. Directly Connected BM Units have a more diverse capacity portfolio as 184 BM Units declared less than 100 MW, 106 between 100 MW and 500 MW and 56 over 500 MW. The diversity in Directly Connected BM Units is due to the range in sizes and nature of power plants.

Demand Capacity[3]			
BM Unit Capacity	<100 MW	100-500 MW	>500 MW
Limit Type	2 MW	2% declared value	10 MW
Supplier	1523	156	21
Embedded	98	2	0
Contract for Difference (CfD)	3	0	0
Directly Connected	329	17	0
Miscellaneous	11	0	0

Table 3: BM Unit Type – Demand Capacity

Generation Capacity			
BM Unit Capacity	<100 MW	100-500 MW	>500 MW
Limit Type	2 MW	2% declared value	10 MW
Supplier	1629	53	9
Embedded	90	10	0
CfD	3	0	0
Directly Connected	184	106	56
Miscellaneous	11	0	0

Table 4: BM Unit Type – Generation Capacity

3.7 The biggest proportion of active BM Units are Supplier BM Units with less than 100 MW Capacity, both in generation and demand.

[3] Lead Parties for Interconnector BM Units typically submit the maximum QM possible as their GC/DC, so a breach is unlikely.

The number of breaches of the tolerance limits for each of the GC and DC tolerance limit types

3.8 The graphs below give an overview of the number of number of breaches in BSC Spring 2018. The graphs are a key KPI in understanding if breaches are increasing or decreasing after each reporting period. In future reports ELEXON will provide trends over BSC Seasons.

3.9 The BSC describes a breach, as when a BMU exceeds its GC/DC by more than the TL for at least one Settlement Period during the BSC Season. For the purpose of this analysis, each individual Settlement Day that a BM Unit's Metered Volume exceeds GC or DC by more than the TL in at least one Settlement Period is counted as a separate breach. The total number of possible GC and DC breaches is 193410, which is the number of days in BSC Spring 2018 (92) multiplied by the number of active BMUs (2149).

3.10 During BSC Spring 2018, there were 3599 DC breaches and 492 GC breaches.

3.11 DC breaches were mainly attributed to Supplier BM Units (2_) with declared Demand Capacity of less than 100 MW. They accounted for 3314 of the 3599 (92.1%) of DC breaches in this period. Similarly, 92.47% of GC breaches were also Supplier BM Units (2_) with declared Generation Capacity of less than 100 MW. Directly Connected BM Units (T_) accounted for only 0.02% of the GC breaches and only 0.01% of the DC breaches. No DC breaches were reported for Embedded (E_), Contract for Difference (C_) and Miscellaneous BM Units (M_) while only one GC Breach was by an Embedded BM Unit.

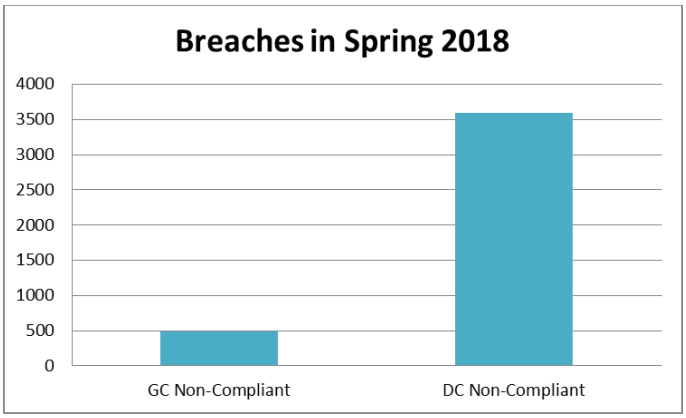


Figure 4: Directly Connected BM Units

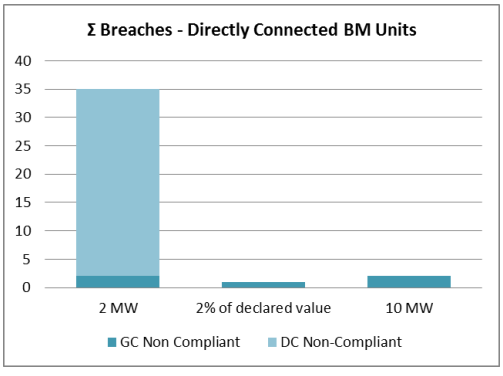


Figure 5: Σ Breaches - Directly Connected BM Units

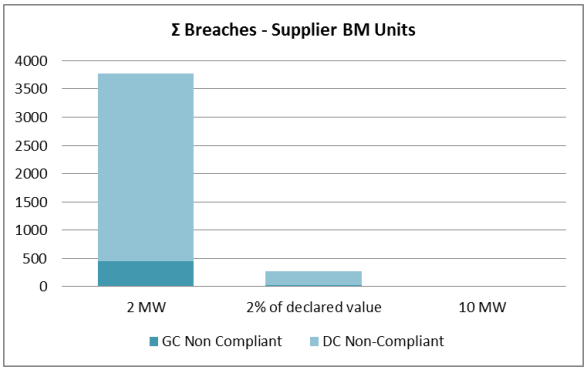


Figure 6: Σ Breaches - Supplier BM Units

3.12 This KPI helps us to monitor the number of breaches throughout the BSC Seasons. However, it does not show the whole picture of breaches. Table 5 below helps to identify the proportion of BM Units that did exceed their GC or DC but are still compliant because they did not exceed GC or DC by more than the

tolerance limit. ELEXON and the ISG should consider over the reporting periods if the proportions are too high or too low, and whether this should be reflected in changing some or all of the limits.

3.13 Table 5 shows that Supplier BM Units with a capacity of less than 100 MW had 47,911 instances where they exceeded their DC and 2095 instances where they exceeded their GC but did not trigger a breach; only 3314 (6.92%) instances were actually DC breaches and 455 (21.71%) were GC breaches. Suppliers with Demand Capacities under 100 MW appear to use and operate within the 2 MW limit in order to not breach their DC.

3.14 Similarly, Supplier BM Units with a capacity of less than 100 MW had 1179 instances where they exceeded their DC and 405 instances where they exceeded their GC but did not trigger a breach; only 33 (0.03%) instances were actually DC breaches and 2 (0.004%) were GC breaches. There is a similar observation for larger BM Units with a GC higher than 500 MW where GC was exceeded 519 times but only two BM Units were GC breaches. Only one GC breach was registered for Embedded BM Units while GC was exceeded 460 times over BSC Spring 2018.

3.15 Table 5 below shows that a lot of BM Units, regardless of type, remain compliant, i.e. within the tolerance limits in place.

BM Unit	Limit Type	Total GC Compliant	GC Exceeded but no breach (Compliant)[4]	GC Breach	Total DC Compliant	DC Exceeded but no breach (Compliant)[5]	DC Breach
Supplier	2 MW	145123	2095	455	132421	47911	3314
	2% of declared value	4668	36	31	13805	298	235
	10 MW	828	0	0	1313	20	17
Directly Connected	2 MW	13685	405	2	25010	1179	33
	2% of declared value	8869	35	1	1402	21	0
	10 MW	3886	519	2	0	0	0
Embedded	2 MW	6989	458	1	7548	707	0
	2% of declared value	742	2	0	184	0	0
Miscellaneous[6]	2 MW	924	0	0	924	2	0
Capacity[7]	2 MW	276	10	0	276	0	0
Total		**185990**	**3560**	**492**	**182883**	**50138**	**3599**

Table 5: Days GC/DC exceeded and/or breached

Amplitude of Breaches

3.16 We have analysed the average difference between actual BMU Metered Volume data and declared GC and DC. For Exports, we used the following formula: Average (QM_{ij} – (SPD*GC)), and for Imports: Average (QM_{ij} – (SPD*DC)) for all BM Units (whether breached or not) which fall under the 2 MW and 10 MW tolerance limit. This helps to show to what extent all Parties are over/under-estimating their GC/DCs.

[4] The total number of GC Exceeded but not breach is included in the total number of GC Compliant.
[5] The total number of DC Exceeded but not breach is included in the total number of DC Compliant.
[6] All Miscellaneous and Capacity BM Units have a DC and GC of less than 100 MW and therefore only fall under the 2 MW tolerance limit.
[7] See Footnote 6.

3.17 The tolerance limit for BM Units that have a Capacity between 100 and 500 MW is currently 2% of the declared GC/DC value. The formula Average((SPD*GC)/QMij)-1) and Average((SPD*DC)/QMij)-1)" enables to understand by how much the average Metered Volumes of BM Units is above the declared GC/DC.

3.18 In order to better help the ISG understand the overall levels of declarations, ELEXON reported the standard deviation in the difference between declarations and actual QM, and provided correlation graphs to illustrate the relationship between declarations and actual QM.

3.19 DC (indicating Demand) is a negative value while GC (indicating Generation) is a positive value. Average (QMij – (SPD*DC)) is positive means that on average, the BM Unit isn't exceeding its DC. In contrast, when Average (QMij – (SPD*GC)) is negative, the BM Unit isn't exceeding its GC.

3.20 Tables 6 and 7 show that on average BM Units are over-estimating their GC and DC. ELEXON has calculated the standard deviation to understand how close the data is to its relative mean. The standard deviation is a measure of how scattered (or varied) the data can be away from its mean value in both directions.

3.21 The standard deviation of Supplier BM Units with a DC of less than 100 MW has the smallest standard deviation, with 3.917 and a mean of 1.70 MWh. However, the standard deviation is more than double the value of the mean indicating a high variance.

3.22 Large Supplier BM Units (DC > 500 MW and therefore subject to DC Limit of 10MW) have the highest standard deviation amongst all BM Unit and Limit Types with a value of 58.916. However their mean of 152.811 indicated a low variance.

3.23 The mean and standard deviation for BM Units which fall under the 2% tolerance limit show that most BM Units are under the tolerance limit and that most of them are compliant. This analysis can be confirmed by using the data from Table 5.

Demand Capacity			
Limit Type	BM Unit Type	**Average (QMij – (SPD*DC) in MWh**	**Standard Deviation(QMij – (SPD*DC) in MWh**
2 MW	2_	1.700	3.917
	T_	4.535	6.296
	E_	3.614	6.832
10 MW	2_	152.811	58.916
Limit Type	BM Unit Type	**Average((SPD*DC)/QMij)-1) in MWh**	**Standard Deviation((SPD*DC)/QMij)-1) in MWh**
2% of declared DC value	2_	68%	0.747
	T_	138%	1.467

Table 6: Difference between actual metered volumes and DC

Generation Capacity			
Limit Type	BM Unit Type	**Average (QMij – (SPD*GC) in MWh**	**Standard Deviation(QMij – (SPD*GC) in MWh**
2 MW	2_	-7.266	10.341
	T_	-6.465	6.294
	E_	-6.287	6.352

10 MW	2_[8]	*-644.160*	*315.260*
	T_	-42.271	50.776
Limit Type	BM Unit Type	**Average((SPD*GC)/QMij)-1) in MWh**	**Standard Deviation((SPD*GC)/QMij)-1) in MWh**
2% of declared GC value	2_	1284%	34.136
	T_	54%	0.774
	E_	105%	1.227

Table 7: Difference between actual metered volumes and GC

3.24 Large Supplier BM Units (GC > 500 MW) had the highest standard deviation amongst all BM Unit and Limit Types. However this was mainly due to one BMU which had a very high declared QM in comparison to its actual maximum QM.

3.25 Supplier BM Units with a GC of less than 100 MW have a standard deviation of 10.341 with a mean of -7.266 MWh, indicating a high variance in data. Looking at the other standard deviations calculated we can observe that the other BM Units type (i.e. E_ and T_) with a GC of less than 100 MW have their mean close to their standard deviation.

Comparison between Declared GC and Monthly Maximum Generation

3.26 In both Figures 7 and 8, any value above the red line denotes a BM Unit whose maximum actual generation have exceeded the maximum declared generation. Overall, declared generation and demand are aligned with maximum actual generation and demand, indicating that parties are forecasting effectively.

3.27 Figure 7 indicates the level of declarations of all BM Units that have generation (i.e. Export). Figure 8 shows the level of declarations of only Supplier BM Units that have generation. From both figures, ELEXON have excluded BM Units that only have demand (i.e. import) as they would be compliant against their GC (which would be 0). Figure 7 provides a visualisation and a comparison between declared GC and Season maximum generation. Overall, the levels of declaration seem aligned with maximum actual metered volumes. However, we can identify some noticeable outliers. Table 5 indicates that most of the BM Units which breach their GC but are within the tolerance limit come from Supplier BM Units. Figure 8 offers a visualisation of these breaches and suggest that the current tolerance limit of 2 MW could be lowered as it would allow to capture a greater proportion of Supplier BM Units exceeding their GC.

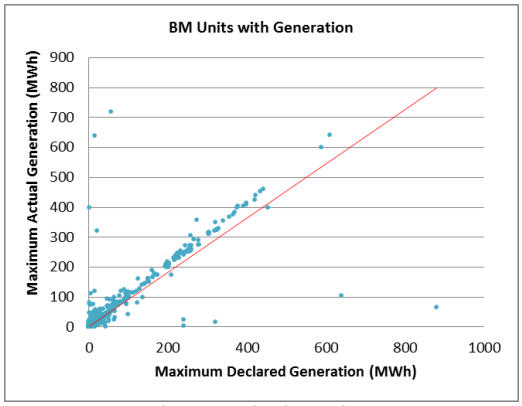


Figure 7: Comparison between Declared GC and Season Maximum Generation

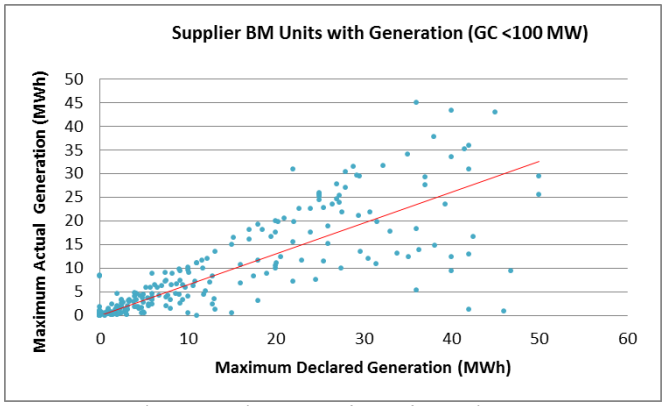


Figure 8: Comparison between Suppliers BM Units (GC<100) MW and Season Maximum Generation

[8] one party declared high GC compare to relatively low volumes.

Declared DC and Monthly Maximum Demand

3.28 In Figure 9, 10 and 11 any value above the red line denotes a Supplier BM Unit whose maximum actual demand have exceeded the maximum declared demand.

3.29 Suppliers BM Units with a Declared Capacity of less than 100 MW have their maximum actual demand close to their declared demand. While we can identify some outliers with greater breaches, most breaching BM Units are close to their declarations, either within the tolerance limit or just above. However, Table 5 shows only 3314 of the 47911 instances where Supplier BM Units exceeded their DC, are actually above the current tolerance limit in place. This would confirm that the current tolerance limit does not capture a large proportion of Supplier BM Units exceeding their DC.

3.30 In contrast, Table 5 indicates that 235 of the 298 instances where Supplier BM Units with a DC between 100 MW and 500 MW, exceeded their DC but also the tolerance limit. Figure 10 offers a visualisation of the breaches and confirms that the current tolerance limit in place captures most of the Supplier BM Units exceeding their DC.

3.31 Similarly, Table 5 shows that 17 of the 20 instances where Supplier BM Units with a DC>500 MW, exceeded their DC but also the tolerance limit. The correlation graph (Figure 11) shows that the current tolerance limit of 10 MW in place captures most of the BM Units exceeding their DC.

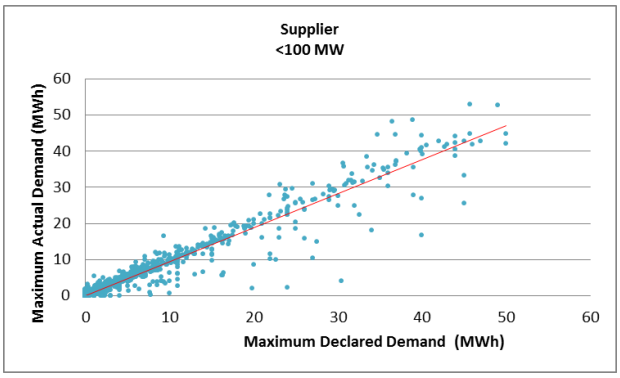
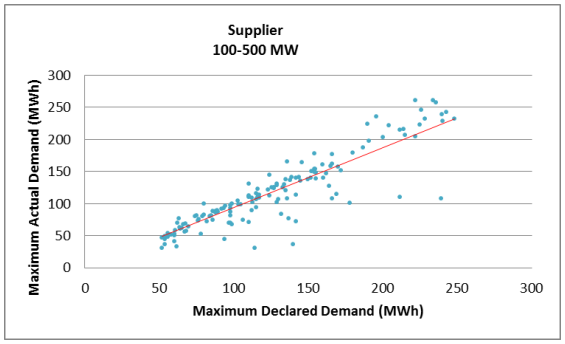


Figure 9: Comparison between Declared DC (<100 MW) and Season Maximum Demand



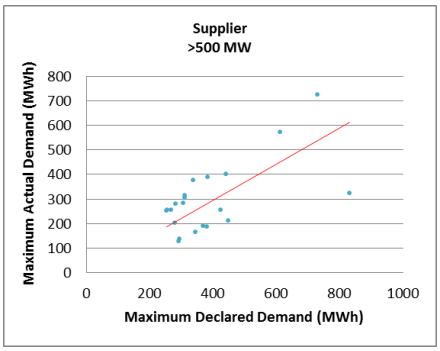


Figure 10: Comparison between Declared DC (100-500 MW) and Season Maximum Demand

Figure 11: Comparison between Declared DC (>500 MW) and Season Maximum Demand

Proportion of BM Units that breached the Tolerance Limit of all active BM Units

3.32 This can be used by the ISG to understand, for each GC/DC limit type and BM Unit type, the scale of the breaching process and if there is an issue with the tolerance limit. This should provide, for both GC and DC separately, the percentage of BM Units that breached at least once during the Season, over the total number of active BM Units in the same category. These graphs should be analysed together with the total number of GC and DC breaches as it allows to understand how many and which BM Units are accountable for the total number of breaches.

3.33 Figure 12 shows that during BSC Spring 2018, 349 of 1689 (21%) of active Supplier BM Units were DC non-compliant at least once in the reporting period. Out of 349 DC non-compliant Supplier BM Units, 283 (81%) of the DC non-compliant Supplier BM Units had a DC of less than 100 MW. Figure 13 shows that 32 Supplier BM Units with a GC of less than 100 MW breached their GC during the Season. This group of BM Units was responsible for 455 GC breaches (see Table 5) which means they were on average breaching 14.2 times over the Season. Figure 14 shows that seven GC non-compliant Directly Connected BM Units were responsible for the 33 GC breaches over the seasons.

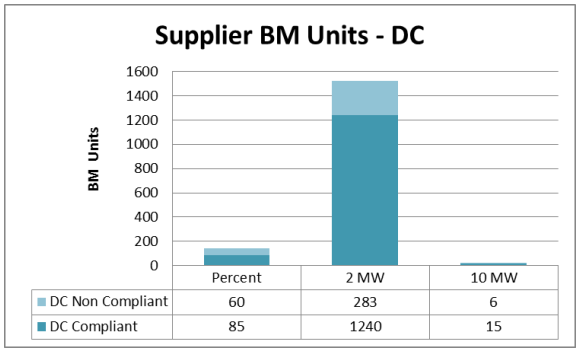


Figure 12: Breached Supplier BM Units – DC

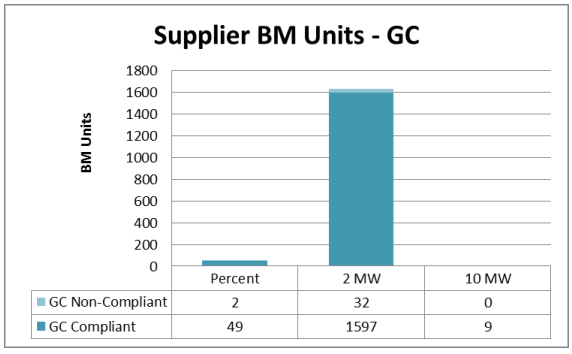


Figure 13: Breached Supplier BM Units - GC

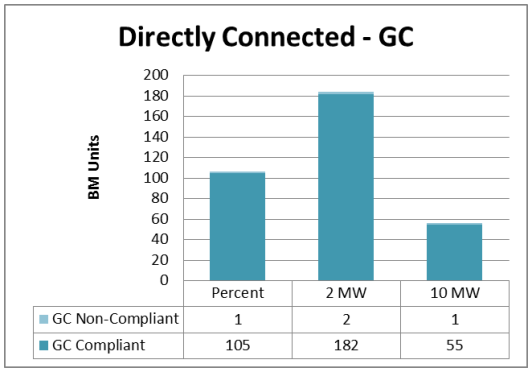


Figure 14: Breached Directly Connected BM Units - GC

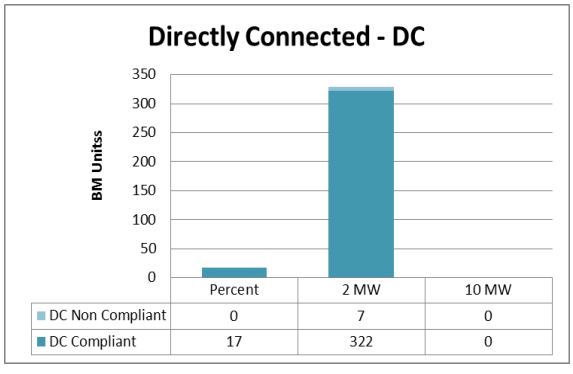


Figure 15: Breached Directly Connected BM Units – DC

3.34 Table 8 and 9 below provide additional information on BM Units which have breached at least once over the season and show how long a BM Unit was in breach over the season. This is an indicator of how closely Parties monitor their metered volumes and re-declare their GC and DC accordingly. BSC Spring 2018 had 92 days. ELEXON noted that Supplier BM Units with a DC of less than 100 MW are the longest in breach, which breached on average 13.1% of the season. Similarly, the same BM unit type was 18% of the season in GC

breach. In contrast, Directly Connected BM Units breached their GC less than 2.2% of the season. This information shows that mainly Supplier BM Units seem to not re-declare their declarations as often as required which then might impact their Credit Cover Percentage.

BM Unit Type	Declared Capacity	% time DC Breaching throughout BSC Spring 2018
Directly Connected	<100 MW	5.3%
Supplier	<100 MW	13.1%
	100 MW - 500 MW	4.2%
	>500 MW	3.1%

Table 8: Percentage time breaching BM Units are in breach (DC)

BM Unit Type	Declared Capacity	% time GC Breaching throughout BSC Spring 2018
Directly Connected	<100 MW	1.1%
	100 MW - 500 MW	1.2%
	>500 MW	2.2%
Supplier	<100 MW	18.0%
	100 MW - 500 MW	12.0%
Embedded	<500 MW	1.0%

Table 9: Percentage time breaching BM Units stay in breach (GC)

2 MW Tolerance Limit

3.35 ELEXON started identifying BM Units which aren't breaching due to the 2 MW tolerance limit in place. This will help to understand how much of the tolerance limit is used by parties to remain GC and DC compliant.

3.36 Figure 16 shows on average how much of the tolerance limit is used by BM Units to remain compliant. Supplier BM Units use on average 33% of the 2 MW limit (i.e. 0.33 MWh) to remain GC compliant and 25% (i.e. 0.25 MWh) to remain DC compliant. Embedded BM Units use on average 25% of the 2 MW GC limit (i.e. 0.25 MWh) while Directly Connected BM Units only use 16% (i.e. 0.16 MWh) to remain GC compliant.

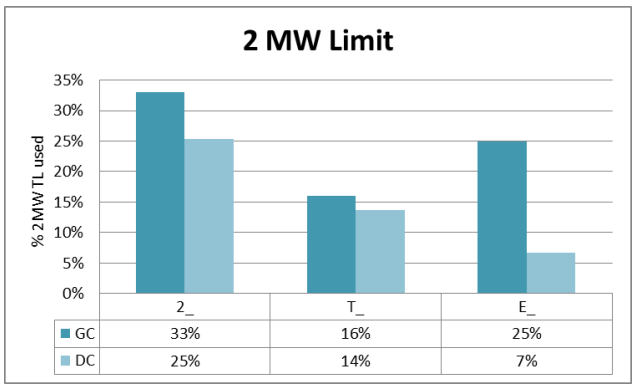


Figure 16: Proportion of 2 MW Limit used by compliant BM Units

3.37 Figure 17 and 18 identifies BM Units with Demand Capacity equal to zero ('0') but have Metered Volumes and are compliant due to the 2 MW tolerance limit. The idea was to understand how much of the tolerance limit is used for BM Units to remain compliant. The analysis only considered BM Units which had import (i.e. demand) during a given Settlement Date as using BM Units with no import would mislead the results.

3.38 Only nine out of 287 Supplier BM Units with a 0MW DC, belonging to three Parties, breached the 2 MW tolerance limit. No Directly Connected or Embedded BM Units have breached the tolerance limit.

3.39 278 Supplier BM Units use on average 18.1% of the 2 MW tolerance limit (i.e. 0.181 MWh) while 18 Embedded BM units use on average 8.20% of the 2 MW (i.e. 0.082 MWh) and 34 Directly Connected BM Units only use 8.60% (i.e. 0.086 MWh) of the 2 MW tolerance limit to remain DC compliant.

BM Units (DC=0)	Supplier	Directly Connected	Embedded
Number of BM Units	375	54	28
Number of BM Units (QMij>=0)	88	34	18
Number of BM Units with import	287	20	10
Average of QMij<0 (MWh)	-0.302	-0.086	-0.081
Number of Breaches	9	0	0
Parties affected	3	0	0
Number of BM Units that didn't breach using the 2 MW tolerance limit to remain compliant	278	20	10
Percentage of 2 MW TL used to remain DC compliant	18.1%	8.60%	8.20%
Standard Deviation of BM Units that didn't breach using the 2 MW tolerance limit to remain compliant	0.203	0.073	0.0579

Table 10: BM Units – 2 MW Tolerance Limit (DC=0)

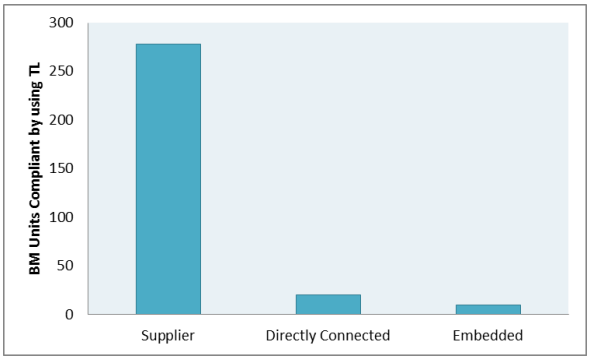


Figure 17: DC Compliant BM Units (DC=0)

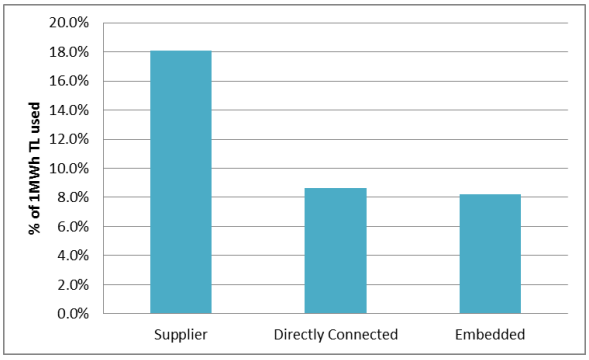


Figure 18: Percentage of 2 MW TL used to remain DC Compliant (DC=0)

3.40 Table 11 shows that 191 of 287 (67%) Supplier BM Units with no Demand Capacity declared, used less than 20% of the 2 MW limit. Only nine BM units with zero value Demand Capacity declared, used more than the 2 MW limit. This analysis supports previous findings that reducing the 2 MW limit might be beneficial as most Supplier BM Units use less than 0.3 MWh of it. This would not have any effect on the majority of Suppliers but would allow ELEXON to monitor breaches more closely to result in more accurate values of DC which are essential to ensure the accurate calculation of CCP and CEI. However, further reporting periods will identify potential trends and see if the usages of the limits change over BSC Seasons.

Zero DC Submissions	% of 2 MW TL used	Number of BM Units
Suppliers BM Units	<20%	191
	20-50%	59
	50-100%	28
	>100%	9

Table 11: Supplier BM Units - Percentage of 2 MW used (DC=0)

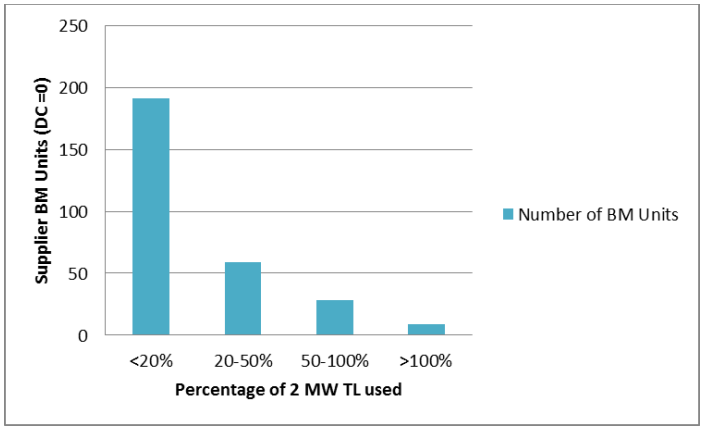


Figure 19: Supplier BM Units - Percentage of 2 MW TL used (DC=0)

3.41 The data and analysis from BSC Spring 2018 has shown that a large proportion of BM Units with a 0 MW DC is not breaching and belongs to smaller Suppliers. ELEXON will perform some analysis for the next reporting period by measuring how many BM Units would breach if the 2 MW limit were lowered (e.g. to 1MW).

4. Next steps

4.1 ELEXON will present the second quarterly GC/DC KPI report at ISG's January 2019 meeting. This will be done using Settlement data from BSC Summer 2018. Any comments made by the ISG on the content of this paper will be taken into consideration for future reporting papers.

4.2 ELEXON will perform additional analysis to help the ISG to determine whether limits are set too high/low. The ISG will be invited to comment on the data but also to recommend supplementary information.

5. Recommendations

5.1 We invite you to:

a) **NOTE** the contents of the paper;

b) **NOTE** the attachment; and

c) **COMMENT** on our analysis.

Attachments

Attachment A – GC/DC KPIs Dashboard – Spring 2018

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