P326 'Introduction of a non-Working Day adjustment to the Credit Cover Percentage calculation'

Phase

Initial Written Assessment

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About This Document

This is Attachment A to the Assessment Consultation for P326 'Introduction of a non-Working Day adjustment to the Credit Cover Percentage calculation'. It provides additional detail of the Workgroup's analysis and discussions.

1 Overview of the P326 Analysis

This section covers the background to the analysis we carried out for the P326 Workgroup, and explains what the analysis covers and the calculations performed. The results and conclusions from the analysis are covered in Section 2.

Background

A Party's imbalance position in each Settlement Period is determined by comparing the Credited Energy Volumes (QCE) and the Account Bilateral Contract Volumes (QABC) for each Energy Account.

The Credited Energy Volumes for a Party are determined based on Balancing Mechanism (BM) Unit Metered Volumes, adjusted for any Metered Volume Reallocation Notifications (MVRNs) that may be in force. Any Bid-Offer Acceptances (BOAs) valid for a BM Unit will also be accounted for.

The Account Bilateral Contract Volumes are based on the Energy Contract Volume Notifications (ECVNs) that the Party entered into.

Metered Volumes for most BM Units are not available until the Interim Information (II) Settlement Run, which takes place five Working Days (WDs) after the relevant Settlement Date. Until this time, a substitute, or proxy, for the Credited Energy Volume is needed. This is referred to as the Credit Assessment Credited Energy Volume (CAQCE).

P326 contends that the accuracy of the Credit Assessment Credited Energy Volume estimates can be improved by accounting for the reduction in demand that some Supplier BM Units experience on non-Working Days (NWDs) compared to Working Days. The calculation of Credit Assessment Credited Energy Volume does not currently account for this, but provides a single flat value across all Settlement Periods in a BSC Season.

Please see the main P326 document for full details on P326 and on the current and proposed calculations.

Goal of this analysis

This analysis seeks to measure the accuracy of the Credit Assessment Credited Energy Volume estimate arising from the current arrangements and from the proposed P326 arrangements. These arrangements will be compared to determine which approach is the more accurate and by how much.

This analysis does not consider how P326 would impact on a Party's overall imbalance position or the amount of Credit Cover that they may require. P326's intent is to make the Credit Assessment Credited Energy Volume estimate more accurate. In certain situations, this may require a Party to lodge more Credit Cover, if inaccuracies in the current arrangements are resulting in too little being required.

P326 proposes only to amend the calculation of the BM Unit Credit Assessment Import Capability (BMCAIC) for Supplier BM Units. The rest of this section and the results in Section 2 therefore focus only on the BMCAIC calculation and on Supplier BM Units.

Calculation of CAQCE

Current calculation

The calculation of the Credit Assessment Credited Energy Volume for a non-Credit Qualifying Supplier BM Unit is based on the following parameters:

- Credit Assessment Load Factor (CALF)
- Demand Capacity (DC)
- Settlement Period Duration (SPD) – currently 0.5 hours

Excluding the accounting for MVRNs, each BM Unit's Credit Assessment Credited Energy Volume is determined as:

CAQCE = SPD * (CALF * DC)[1]

An exception to this rule is Supplier BM Units that are Supplier Export CALF (SECALF) qualifying.

Proposed calculations

P326 considered two alternative options.

Demand Capacity Factor values

The first option introduces a Demand Capacity Factor (DCF) into the Credit Assessment Credited Energy Volume calculation. This value measures the ratio of demand on a non-Working Day compared to that on a Working Day. This ratio would only be applied to non-Working Days, and would default to 1.0000 (no scaling) on a Working Day.

Each BM Unit's Credit Assessment Credited Energy Volume would be determined as:

CAQCE = SPD * (CALF * DC * DCF)

Separate Working Day and non-Working Day CALF values

The second option introduces two separate CALF values into the Credit Assessment Credited Energy Volume calculation. The Working Day CALF (WDCALF) value would be based on the expected level of demand on Working Days. The non-Working Day CALF (NWDCALF) value would be based on non-Working Days.

Each BM Unit's Credit Assessment Credited Energy Volume would be determined as:

On Working Days: CAQCE = SPD * (WDCALF * DC)

On non-Working Days: CAQCE = SPD * (NWDCALF * DC)

[1] BSC Sections M1.2.3 and M1.6.1.

Variants of the proposed calculations

Calculation of DCF values

For the DCF values solution, the DCF would be calculated based on data from the Reference Season (the equivalent BSC Season in the previous year) as:

DCF = non-Working Day Metered Volume / Working Day Metered Volume

This analysis looks at basing these two volumes on either the average, median or maximum values from the Reference Season.

Accounting for separate Scottish public holiday dates

There are five days in the calendar year where the English and Welsh public holiday dates and the Scottish public holiday dates do not align. This analysis assesses whether the Supplier BM Units from Scottish Grid Supply Point (GSP) Groups (GSP Groups _N and _P) should use the separate Scottish dates or the English and Welsh dates for determining non-Working Days.

Differing Scottish Public Holiday Dates		
Date	Scotland	England & Wales
2 January[2]	NWD	WD
Easter Monday	WD	NWD
First Monday in August	NWD	WD
Last Monday in August	WD	NWD
30 November[2] (St. Andrew's Day)	NWD	WD

Capping the values

This analysis assesses the differences between capping or not capping the DCF or WD/NWD CALF values to between 0.0000 and 1.0000.

Scenarios assessed by this analysis

Based on the solution variants and options set out above, this analysis looked at the following scenario permutations:

P326 Scenarios			
Scenario	Method	Scottish Holidays?	Capped?
00 Now	Current	N/A	N/A
01 DA	Average DCF	No	No
02 DD	Median DCF	No	No
03 DM	Maximum DCF	No	No
04 DCA	Average DCF	No	Yes
05 DCD	Median DCF	No	Yes

[2] This is moved to the first Working Day after if the original date is already a non-Working Day.

P326 Scenarios			
Scenario	Method	Scottish Holidays?	Capped?
06 DCM	Maximum DCF	No	Yes
07 DSA	Average DCF	Yes	No
08 DSD	Median DCF	Yes	No
09 DSM	Maximum DCF	Yes	No
10 DSCA	Average DCF	Yes	Yes
11 DSCD	Median DCF	Yes	Yes
12 DSCM	Maximum DCF	Yes	Yes
13 C	WD/NWD CALF	No	No
14 CC	WD/NWD CALF	No	Yes
15 CS	WD/NWD CALF	Yes	No
16 CSC	WD/NWD CALF	Yes	Yes

Scenario 10 has been progressed as the P326 Proposed Modification, under which:

- the DCF value is calculated for each BM Unit as the average non-Working Day Metered Volume as a ratio of the average Working Day Metered Volume from the Reference Season;
- there is a separate Scottish public holiday calendar in place for GSP Groups _N and _P; and
- the DCF value is capped between 0.000 and 1.000.

Time period covered by this analysis

The analysis looked at the period from 1 March 2013 (start of the Spring 2013 BSC Season) until 28 February 2015 (end of the Winter 2014 BSC Season). In each case, the results have been aggregated up to the two periods 1 March 2013 to 28 February 2014 (referred to as '2013') and 1 March 2014 to 28 February 2015 (referred to as '2014').

Calculation of ΔCAQCE

Under each scenario, the Credit Assessment Credited Energy Volume Delta (ΔCAQCE) has been determined for each Settlement Period as:

$$\Delta CAQCE = |CAQCE - QCE|$$

In each case, the Credit Assessment Credited Energy Volume has been determined based on the relevant scenario and compared to the BM Unit's recorded Credited Energy Volume for each Settlement Period.

The value this produces shows the absolute difference between the proxy value and the actual value, and therefore the level of error. The larger this value, the greater the inaccuracy. A value of zero would be the perfect outcome, indicating no difference between the proxy value and the actual value.

Calculation of Shift

To compare the relative accuracy of each proposed scenario to the current arrangements, a value of Shift has been calculated:

$$\text{Shift} = \Delta CAQCE_{00} - \Delta CAQCE_{xx}$$

$\Delta CAQCE_{00}$ represents the Credit Assessment Credited Energy Volume Delta from the current arrangements and $\Delta CAQCE_{xx}$ represents the Credit Assessment Credited Energy Volume Delta from the relevant proposed scenario.

A positive result indicates that the level of error from the proposed scenario is smaller than that from the current arrangements, while a negative result shows the level of error from the proposed scenario would be bigger than currently.

It is this measure that the conclusions of our analysis have been based on.

2 Results of the P326 Analysis

This section covers the results and conclusions of the analysis we carried out on behalf of the Workgroup. Please refer to Section 1 for an overview of the scenarios examined and the methods used.

Please note that we have been unable to produce any results for the 'Median DCF' scenarios (Scenarios 02, 05, 08 and 11), as explained in the main document. These scenarios have therefore been excluded from the results covered in this section.

Scenario 10 is being progressed as the Proposed Modification. These entries have been marked in bold in all the relevant tables in this section.

The DCF and WD/NWD CALF values (as applicable to the scenario) for each BM Unit for each BSC Season produced by this analysis can be found in Attachment B.

Assessment of total accuracy for each scenario

Table 1 shows the total Credit Assessment Credited Energy Volume Delta values across all Supplier BM Units across all Settlement Periods arising for each scenario for the two time periods examined. These values show the level of error from each calculation method, and so a smaller value denotes a greater level of accuracy.

Table 1: Credit Assessment Credited Energy Volume Delta (ΔCAQCE) values

Scenario	2013	2014
00 Now	81,972,618MWh	79,819,543MWh
01 DA	77,509,564MWh	74,675,116MWh
03 DM	83,385,794MWh	82,066,357MWh
04 DCA	77,014,262MWh	73,758,824MWh
06 DCM	79,769,581MWh	77,086,794MWh
07 DSA	77,508,854MWh	74,987,615MWh
09 DSM	83,763,526MWh	82,057,780MWh
10 DSCA	**77,011,792MWh**	**73,760,167MWh**
12 DSCM	79,775,237MWh	77,079,011MWh
13 C	77,670,220MWh	77,458,623MWh
14 CC	77,651,429MWh	77,435,788MWh
15 CS	77,670,189MWh	77,459,400MWh
16 CSC	77,646,649MWh	77,437,006MWh

Figure 1a: Credit Assessment Credited Energy Volume Delta (ΔCACQCE)

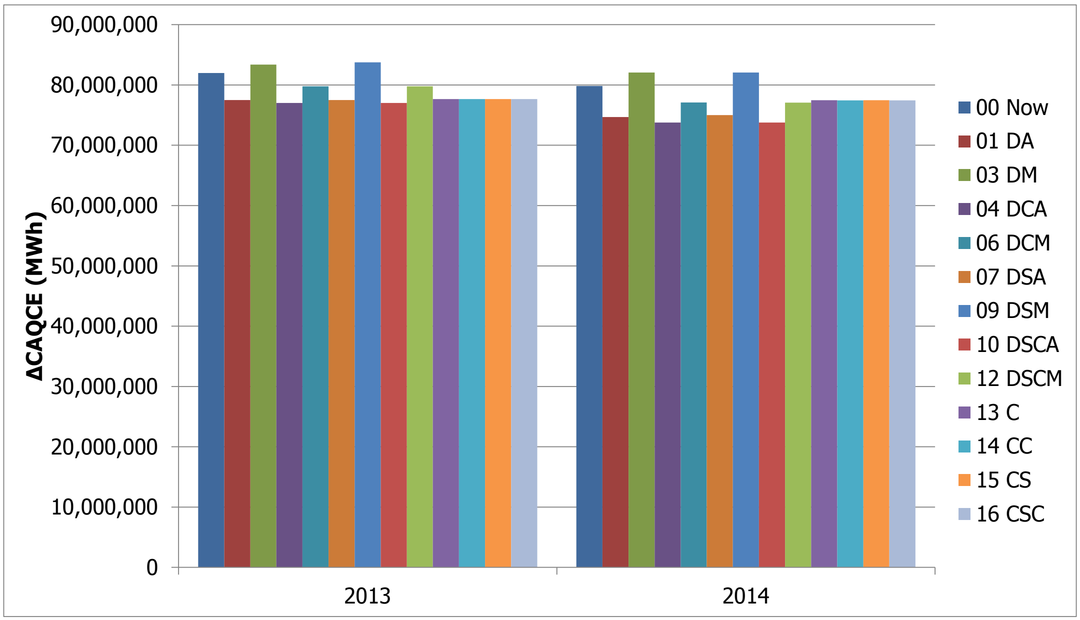
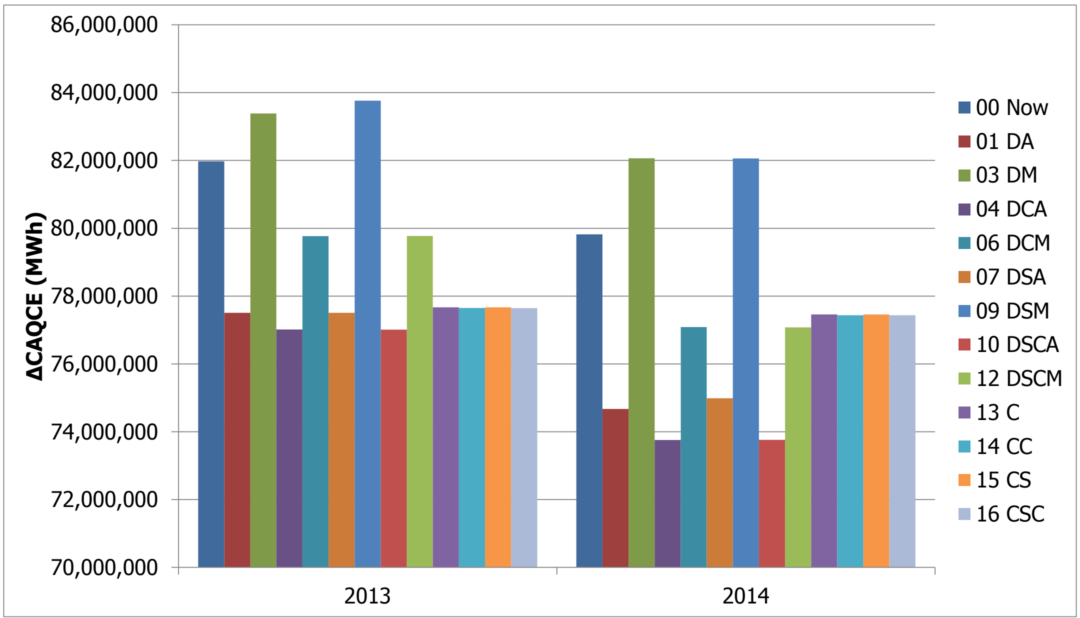


Figure 1b: Credit Assessment Credited Energy Volume Delta (ΔCAQCE) (zoomed in)



To illustrate the change in accuracy, the Shift for each proposed scenario against the current arrangements are shown in Table 2 below. A positive value denotes an improvement in accuracy (less error) while a negative value shows a worsening in the accuracy (more error). These are also shown as percentage values measured against the level of error from the current arrangements.

Table 2: Shift from the error in the current arrangements

Scenario	2013		2014	
01 DA	4,463,054MWh	5.44%	5,144,427MWh	6.45%
03 DM	-1,413,176MWh	-1.72%	-2,246,814MWh	-2.81%
04 DCA	4,958,357MWh	6.05%	6,060,719MWh	7.59%
06 DCM	2,203,037MWh	2.69%	2,732,749MWh	3.42%

Table 2: Shift from the error in the current arrangements				
Scenario	2013		2014	
07 DSA	4,463,764MWh	5.45%	4,831,927MWh	6.05%
09 DSM	-1,790,907MWh	-2.18%	-2,238,237MWh	-2.80%
10 DSCA	**4,960,826MWh**	**6.05%**	**6,059,376MWh**	**7.59%**
12 DSCM	2,197,381MWh	2.68%	2,740,532MWh	3.43%
13 C	4,302,398MWh	5.25%	2,360,920MWh	2.96%
14 CC	4,321,190MWh	5.27%	2,383,755MWh	2.99%
15 CS	4,302,429MWh	5.25%	2,360,143MWh	2.96%
16 CSC	4,325,970MWh	5.28%	2,382,537MWh	2.98%

Figure 2a: Shift from the error in the current arrangements

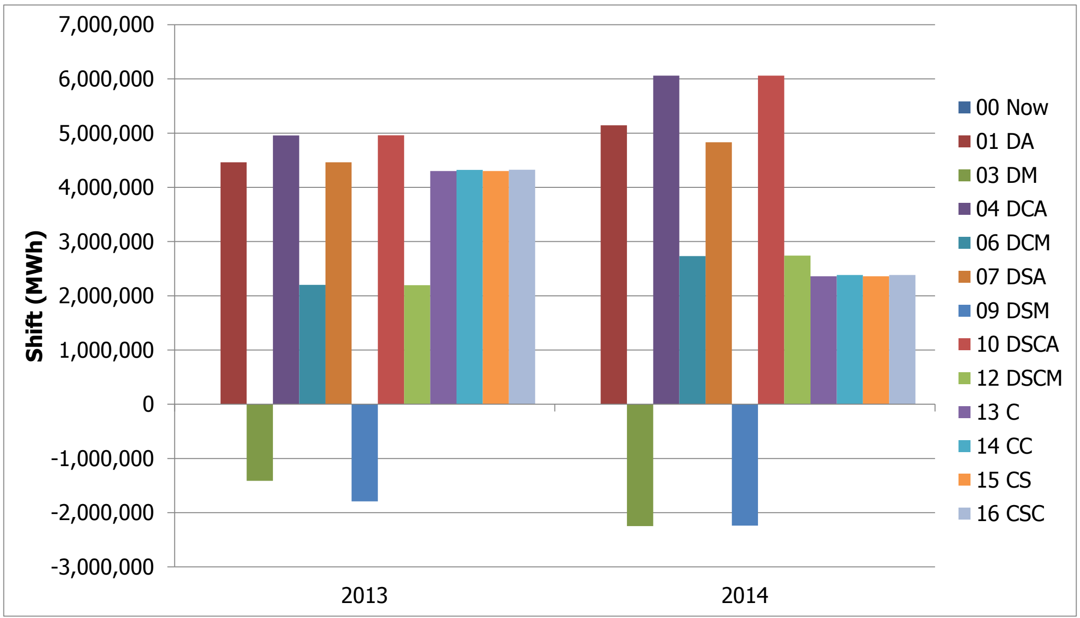
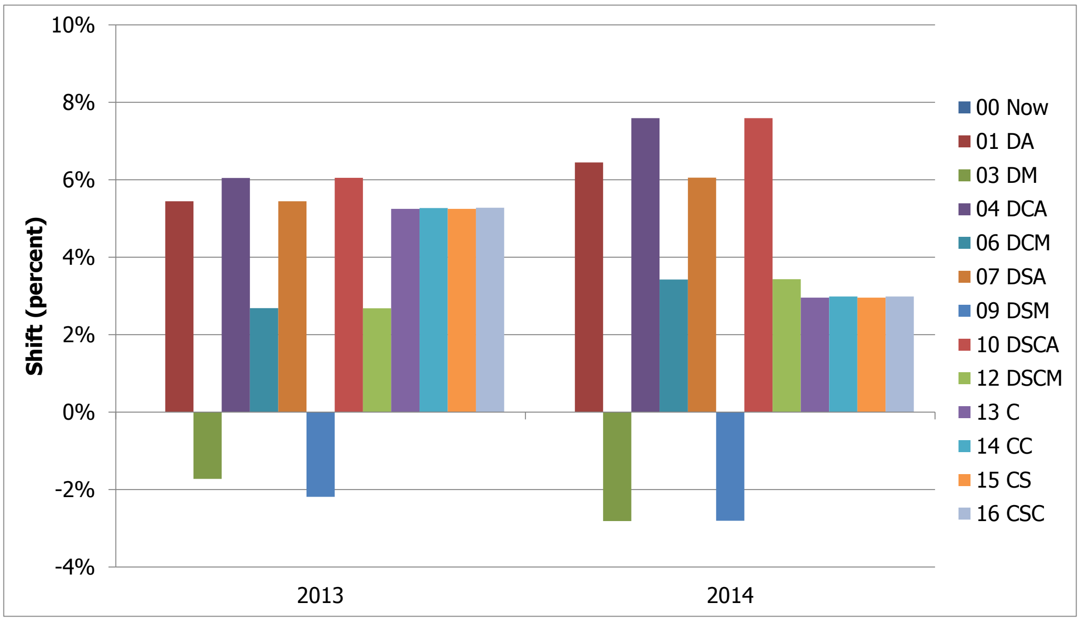


Figure 2b: Shift as a percentage of the error in the current arrangements



Conclusions

Across the two years, Scenarios 04 and 10, representing the 'DCF Average Capped' options showed the biggest improvement in accuracy compared to the current arrangements. It is clear that using the 'DCF Average' method is more accurate than using the 'DCF Maximum' method. It is difficult to assess the benefit arising from including the 'Scottish Calendar' option from this data, and more in-depth analysis has been carried out below.

The improvements arising from all four 'WD/NWD CALF' scenarios were comparable to the 'DCF Average' scenarios in 2013. However, the level of improvement from the 'WD/NWD CALF' scenarios in 2014 was smaller in comparison to the 'DCF Average' scenarios.

Assessment of impact of a separate Scottish calendar

Noting the results from the overall analysis above, this analysis focuses on just the 'DCF Average Capped' scenario.

Accounting for the separate Scottish public holidays within the DCF values method has two effects:

- Treating each day as a Working Day or non-Working Day will impact which part of the DCF calculation the Settlement Day's Metered Volumes are allocated to. This will impact the DCF value itself, and will therefore have an impact, albeit an incredibly minor one, on all Settlement Periods.
- Treating each day as a Working Day or non-Working Day will determine whether or not the DCF value is applied when calculating Credit Assessment Credited Assessment Volumes for those specific dates. This will have a much larger impact on the five Settlement Days in question, as examined below.

Table 3 shows the improvement in accuracy realised across all Scottish BM Units (BM Units in GSP Groups _N and _P) for the five specific dates each year when the Scottish and the English and Welsh calendars are different. A positive result denotes an improvement in accuracy from applying a separate Scottish calendar to these dates, while a negative result denotes a worsening in accuracy.

Table 3: Impact on the differing Scottish public holiday dates

Year	Date	Scottish calendar	E&W calendar	Accuracy improvement from correct Scottish holiday dates
2013	01 Apr 13	WD	NWD	-1,521MWh
	05 Aug 13	NWD	WD	941MWh
	26 Aug 13	WD	NWD	644MWh
	02 Dec 13	NWD	WD	1,294MWh
	02 Jan 14	NWD	WD	6,206MWh
	Total	-	-	**7,564MWh**
2014	21 Apr 14	WD	NWD	-1,155MWh
	04 Aug 14	NWD	WD	3,796MWh
	25 Aug 14	WD	NWD	-3,508MWh
	01 Dec 14	NWD	WD	-230MWh

Table 3: Impact on the differing Scottish public holiday dates				
Year	Date	Scottish calendar	E&W calendar	Accuracy improvement from correct Scottish holiday dates
	02 Jan 15	NWD	WD	5,645MWh
	Total	**-**	**-**	**4,548MWh**

Table 4 compares these improvements in accuracy to the total Credit Assessment Credited Energy Volume Delta (over all BM Units) across the relevant five dates in each year.

Table 4: Scale of Scottish public holiday impact			
Year	Total ΔCAQCE across relevant dates with incorrect holiday dates	Additional Shift from correct holiday dates	Additional percentage Shift
2013	1,103,682MWh	7,564MWh	6.85%
2014	1,159,008MWh	4,548MWh	3.92%

Conclusions

There is an overall improvement in accuracy from applying a separate Scottish public holiday calendar to P326. By applying the Scottish public holidays, there is a further improvement in accuracy across the relevant five calendar days of around 5%. The most notable benefit is for the public holiday on 2 January each year. However, there is no clear pattern for the rest of the key dates, with some dates showing a worsening in accuracy from correctly applying Scottish public holiday dates. This may be due to some Scottish organisations still working to the English and Welsh dates. In particular, the Scottish Clearing Banks decided to harmonise the days on which Scottish banks closed with those in England and Wales from Easter 1996 onwards. This decision to harmonise with England and Wales was taken for business reasons. Harmonisation such as this is likely to be impacting the results of this analysis.

Assessment of impact on different types of Supplier

For this analysis, we have grouped together each Lead Party ID based on the type of Supplier. We have used the same groupings for this analysis as was used for P305 'Electricity Balancing Significant Code Review Developments', except that all renewable Suppliers have been grouped together into a single group as there were only three such Suppliers that featured in the P326 analysis output.

Please note that we have not been able to account for MVRNs in this analysis. It is therefore possible for some BM Units to have been allocated to the incorrect group. However, these results can still be taken as an indication of the overall picture.

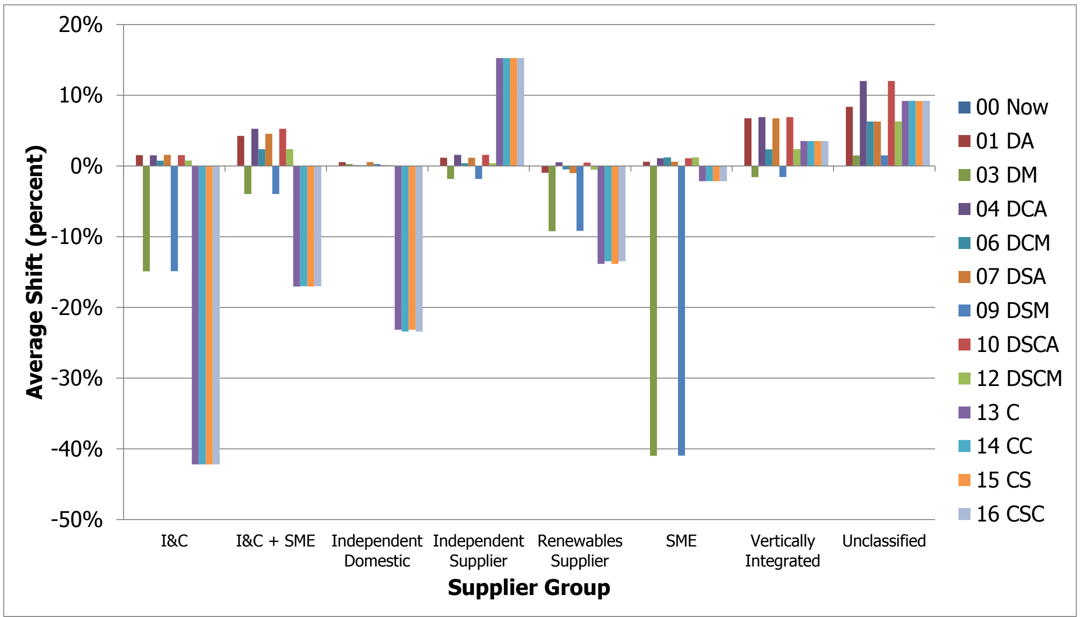
This data has only been produced for the 2014 period.

Table 5 shows the average percentage Shift across all Party IDs within each Supplier group for each of the P326 scenarios against the current arrangements. Negative results are marked in red, while improvements of 5% or greater are shown in blue. Table 6 shows the standard deviation within each group.

Scenario	I&C	I&C + SME[3]	Independent Domestic	Independent Supplier	Renewables Supplier	SME	Vertically Integrated	Unclassified
01 DA	1.54%	4.27%	0.56%	1.16%	-0.95%	0.59%	6.75%	8.38%
03 DM	-14.89%	-3.95%	0.27%	-1.82%	-9.21%	-40.98%	-1.57%	1.50%
04 DCA	1.51%	5.27%	0.12%	1.58%	0.53%	1.10%	6.92%	12.03%
06 DCM	0.76%	2.39%	0.11%	0.40%	-0.48%	1.21%	2.37%	6.30%
07 DSA	1.58%	4.56%	0.56%	1.16%	-1.00%	0.60%	6.75%	6.30%
09 DSM	-14.86%	-3.95%	0.27%	-1.82%	-9.17%	-40.97%	-1.55%	1.51%
10 DSCA	**1.55%**	**5.26%**	**0.12%**	**1.58%**	**0.49%**	**1.11%**	**6.91%**	**12.02%**
12 DSCM	0.79%	2.39%	0.11%	0.39%	-0.51%	1.22%	2.39%	6.30%
13 C	-42.19%	-17.04%	-23.16%	15.27%	-13.84%	-2.15%	3.53%	9.20%
14 CC	-42.19%	-17.01%	-23.40%	15.27%	-13.48%	-2.15%	3.53%	9.23%
15 CS	-42.19%	-17.04%	-23.16%	15.27%	-13.84%	-2.15%	3.53%	9.20%
16 CSC	-42.19%	-17.00%	-23.40%	15.27%	-13.48%	-2.14%	3.53%	9.22%

Table 5: Average percentage Shift from the error in the current arrangements

Figure 5a: Average percentage Shift from the error in the current arrangements within each Supplier group



[3] SME – Small or Medium Enterprise

Figure 5b: Average percentage Shift from the error in the current arrangements within each Supplier group (zoomed in)

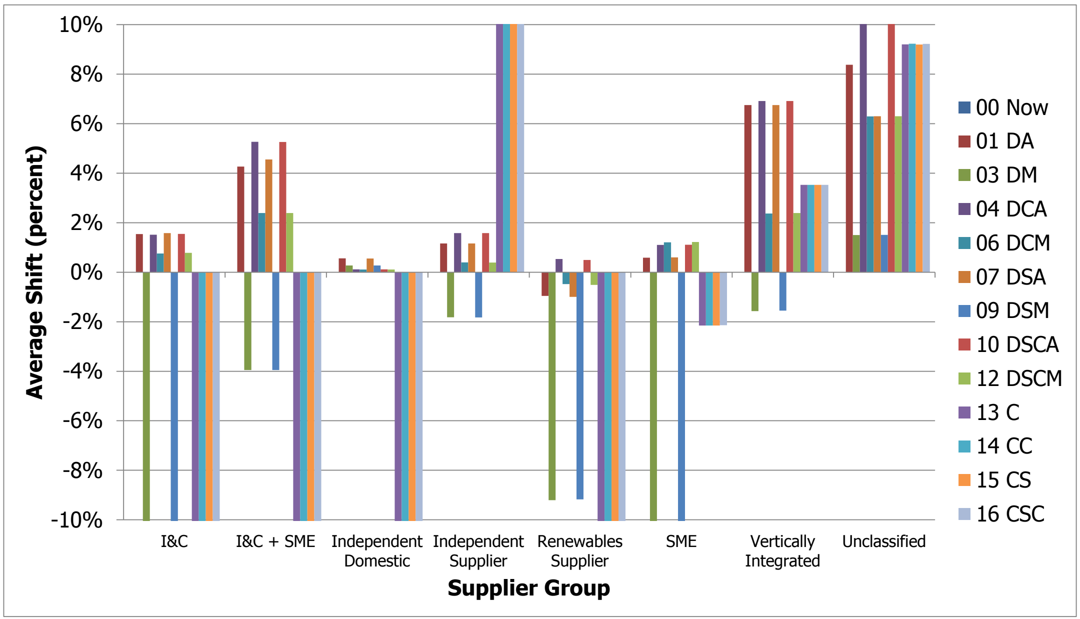


Table 6: Standard deviation of values in Table 5

Scenario	I&C	I&C + SME	Independent Domestic	Independent Supplier	Renewables Supplier	SME	Vertically Integrated	Unclassified
01 DA	1.95%	5.63%	0.96%	3.37%	2.20%	4.96%	3.98%	4.06%
03 DM	27.73%	9.10%	0.92%	3.66%	3.53%	93.41%	6.02%	8.96%
04 DCA	2.02%	6.49%	0.38%	3.13%	3.14%	4.68%	3.73%	5.61%
06 DCM	1.04%	4.17%	0.84%	1.53%	0.78%	0.64%	1.49%	2.23%
07 DSA	2.02%	5.83%	0.96%	3.36%	2.24%	4.96%	3.98%	6.39%
09 DSM	27.67%	9.10%	0.92%	3.67%	3.40%	93.41%	6.04%	8.95%
10 DSCA	**2.08%**	**6.49%**	**0.38%**	**3.13%**	**3.17%**	**4.68%**	**3.73%**	**5.61%**
12 DSCM	1.10%	4.16%	0.84%	1.53%	0.82%	0.65%	1.51%	2.22%
13 C	52.90%	48.71%	52.08%	33.77%	25.45%	8.81%	3.06%	7.00%
14 CC	52.90%	48.73%	52.31%	33.77%	25.10%	8.81%	3.06%	7.04%
15 CS	52.90%	48.71%	52.08%	33.77%	25.45%	8.81%	3.06%	7.00%
16 CSC	52.90%	48.75%	52.31%	33.77%	25.09%	8.81%	3.06%	7.04%

Figure 6a: Standard deviation of values in Table 5

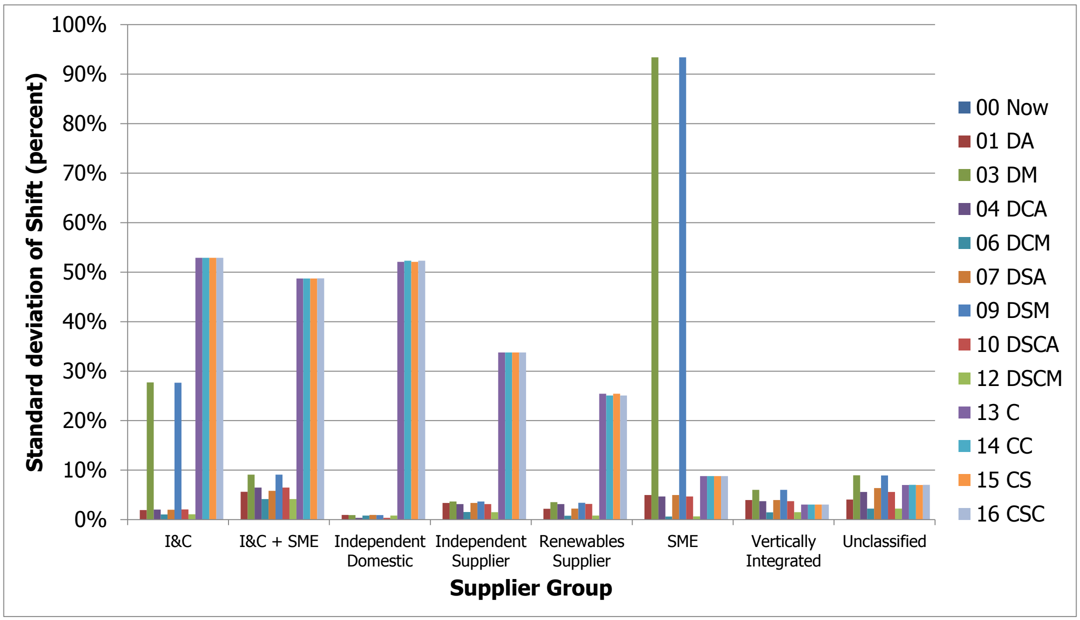
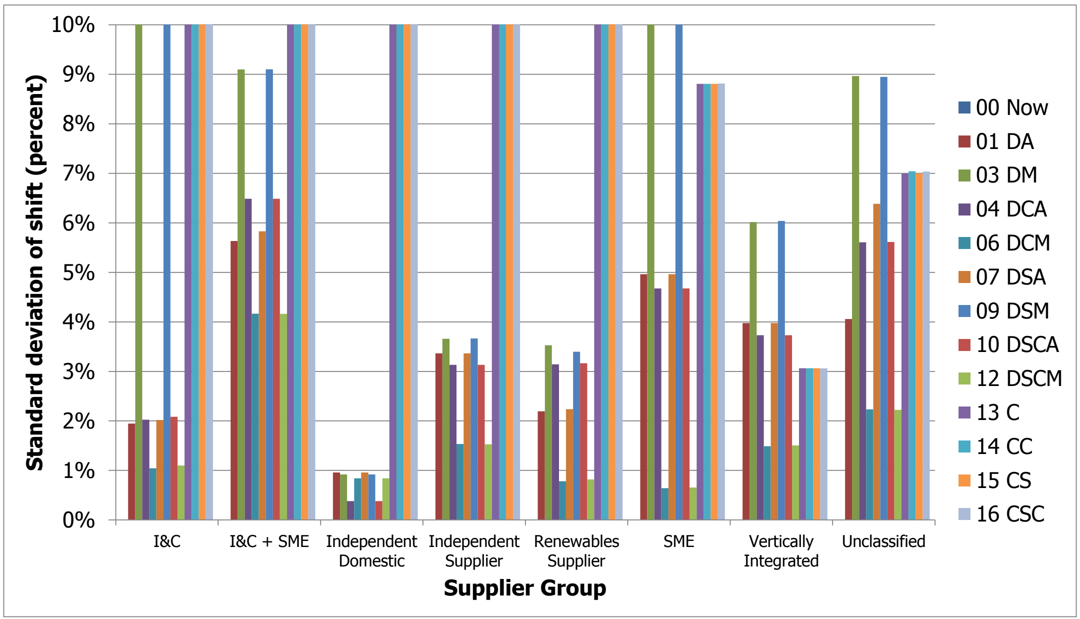


Figure 6b: Standard deviation of values in Table 5 (zoomed in)



Conclusions

For the DCF method, each Supplier group generally sees a net increase in accuracy. For the 'DCF Average Capped' scenarios, all Supplier groups see an overall average increase in accuracy. It is generally the Industrial and Commercial (I&C) and the Vertically Integrated Parties that see the greatest benefit from this option, and it was the I&C Suppliers that P326 was originally intended to target.

Though most groups contain at least one Party that would realise an increase in error, there is no group that shows any clear overall reduction in accuracy (increase in error) from P326. It can therefore be concluded that there would be no systematic bias arising from P326.

Assessment of DCF values' impact on Working Day accuracy

Having opted to progress Scenario 10 as the P326 Proposed Modification, the Workgroup sought to understand whether any adjustments needed to be made to how Working Day Metered Volumes were represented. It was concerned that, as the CALF value is based on both Working Day and non-Working Day Metered Volumes, this approach may result in Working Days being under-securitised.

For this analysis, Scenario 10 has been re-run as before, except that the CALF values have been replaced with the WDCALF values that would have been produced under the 'Capped WD/NWD CALF' scenarios. This will assess whether an adjustment needs to be made to the CALF values to account for the application of DCF values for non-Working Days.

Table 7 shows the total Credit Assessment Credited Energy Volume Delta values for the two time periods examined across all Supplier BM Units across all Settlement Periods arising for:

- the current arrangements (Scenario 00),
- the Proposed Modification solution (Scenario 10); and
- the Proposed Modification with WDCALF values applied (Scenario 10a).

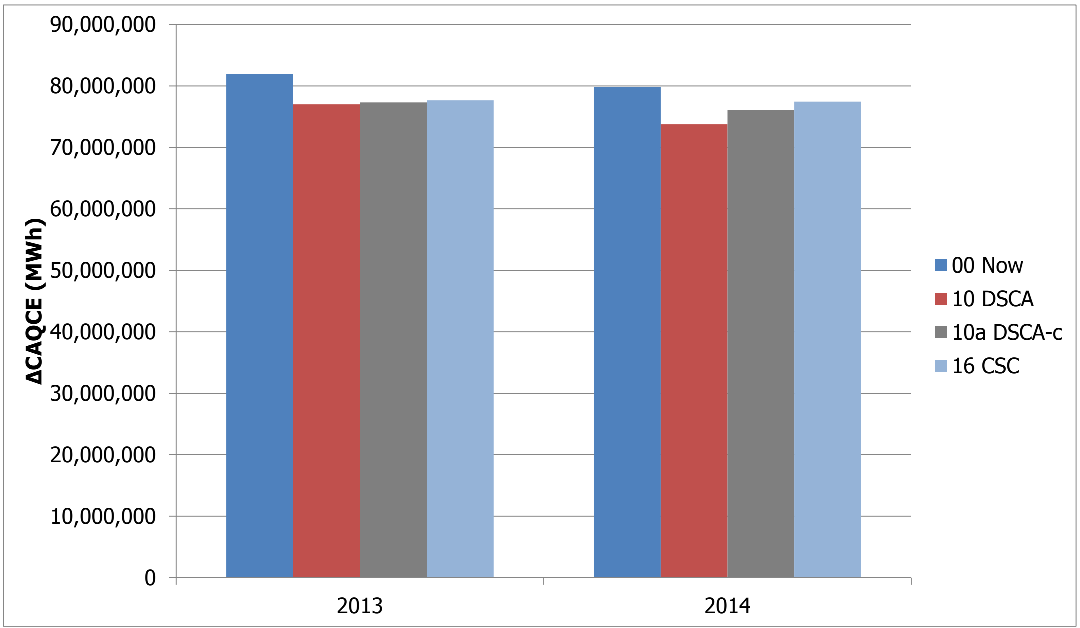
For comparison, Scenario 16 has also been shown.

These values show the level of error from each calculation method, and so a smaller value denotes a greater level of accuracy.

Table 7: Credit Assessment Credited Energy Volume Delta (ΔCAQCE) values

Scenario	2013	2014
00 Now	81,972,618MWh	79,819,543MWh
10 DSCA	77,011,792MWh	73,760,167MWh
10a DSCA-c	77,331,245MWh	76,079,801MWh
16 CSC	77,646,649MWh	77,437,006MWh

Figure 7a: Credit Assessment Credited Energy Volume Delta (ΔCAQCE)



To illustrate the change in accuracy, the Shift for each scenario against the current arrangements are shown in Table 8 below. A positive value denotes an improvement in accuracy (less error) while a negative value shows a worsening in the accuracy (more error). These are also shown as percentage values measured against the level of error from the current arrangements.

Table 8: Shift from the error in the current arrangements

Scenario	2013		2014	
10 DSCA	4,960,826MWh	6.05%	6,059,376MWh	7.59%
10a DSCA-c	4,641,318MWh	5.66%	3,743,630MWh	4.69%
16 CSC	4,325,970MWh	5.28%	2,382,537MWh	2.98%

Figure 8a: Shift from the error in the current arrangements

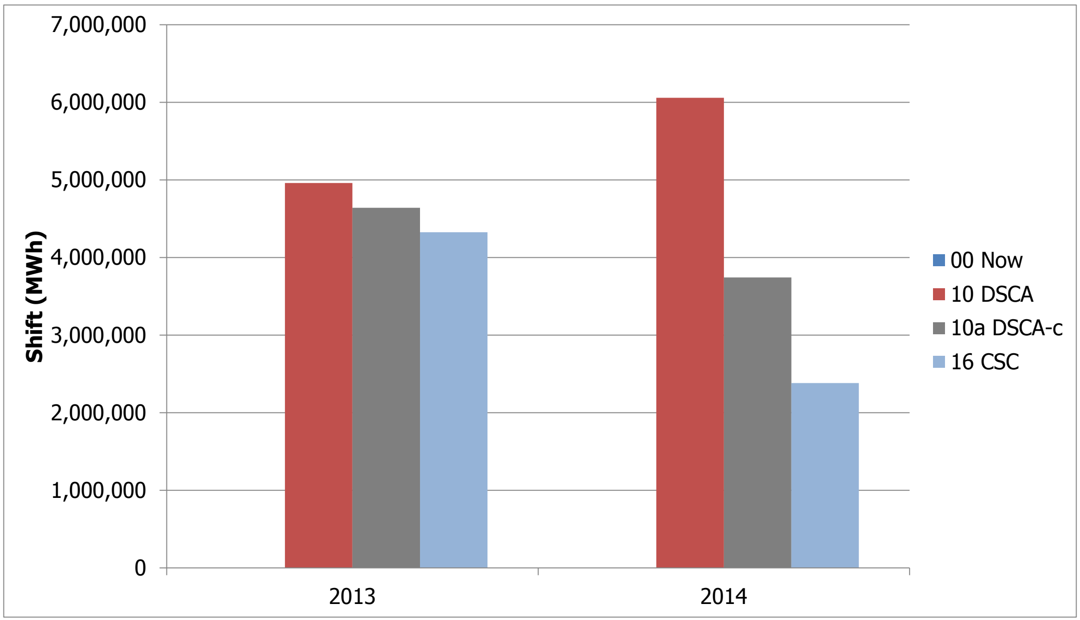
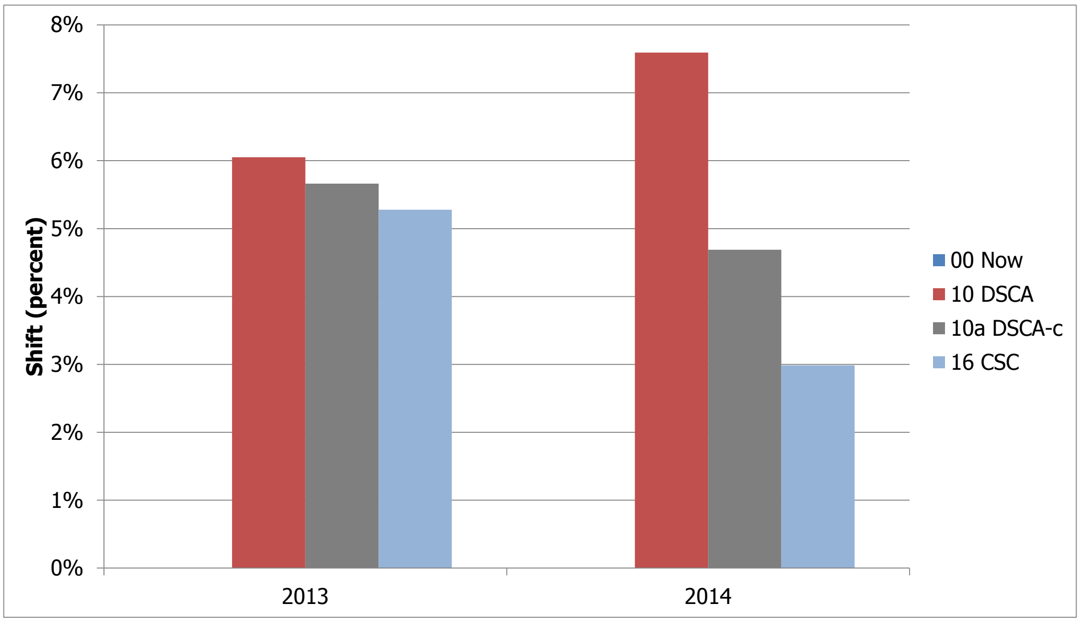


Figure 8b: Shift as a percentage of the error in the current arrangements



Conclusions

Using a WDCALF value and a DCF value gives a greater improvement in accuracy than using a WD/NWD CALF value approach. However, the improvement is less than if the CALF calculation is left unchanged and only a DCF value is applied. This implies that no change is required under P326 to how CALF values are calculated.

Analysis on accuracy of DC values

The Workgroup wanted to assess the impact that potentially too-high DC values could be having on the accuracy of the Credit Assessment Credited Energy Volume values. Although P326 cannot do anything about this, the Workgroup wanted to assess if too-high DC values were impacting the outcomes of the above analysis.

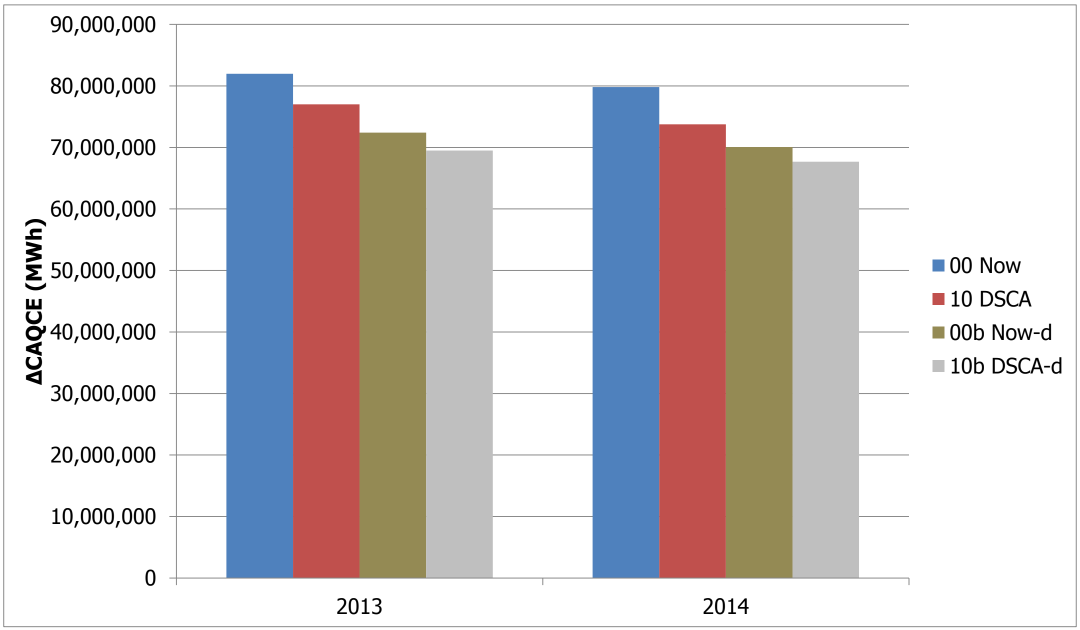
For this analysis, Scenarios 00 and 10 have been re-run as before, except that the DC values declared for each BM Unit have been replaced by the maximum demand the BM Unit experienced during the relevant live Season. This simulates the potential improvements in accuracy that could be realised should each BM Unit's DC values have been declared absolutely accurately prior to the Season beginning (though in practice this would not be likely).

Table 9 shows the total Credit Assessment Credited Energy Volume Delta values across all Supplier BM Units across all Settlement Periods arising for the current scenario, the original Scenario 10 and the revised versions of each for the two time periods examined. These values show the level of error from each calculation method, and so a smaller value denotes a greater level of accuracy.

Table 9: Credit Assessment Credited Energy Volume Delta (ΔCAQCE) values

Scenario	2013	2014
00 Now	81,972,618MWh	79,819,543MWh
10 DSCA	77,011,792MWh	73,760,167MWh
00b Now-d	72,410,715MWh	70,079,957MWh
10b DSCA-d	69,491,967MWh	67,680,895MWh

Figure 9a: Credit Assessment Credited Energy Volume Delta (ΔCAQCE)



To illustrate the change in accuracy, the Shift for each scenario against the current arrangements are shown in Table 10 below. A positive value denotes an improvement in accuracy (less error) while a negative value shows a worsening in the accuracy (more error). These are also shown as percentage values measured against the level of error from the current arrangements.

Table 10: Shift from the error in the current arrangements

Scenario	2013		2014	
10 DSCA	4,960,826MWh	6.05%	6,059,376MWh	7.59%
00b Now-d	9,561,902MWh	11.66%	9,739,585MWh	12.20%
10b DSCA-d	12,480,651MWh	15.23%	12,138,647MWh	15.21%

Figure 10a: Shift from the error in the current arrangements

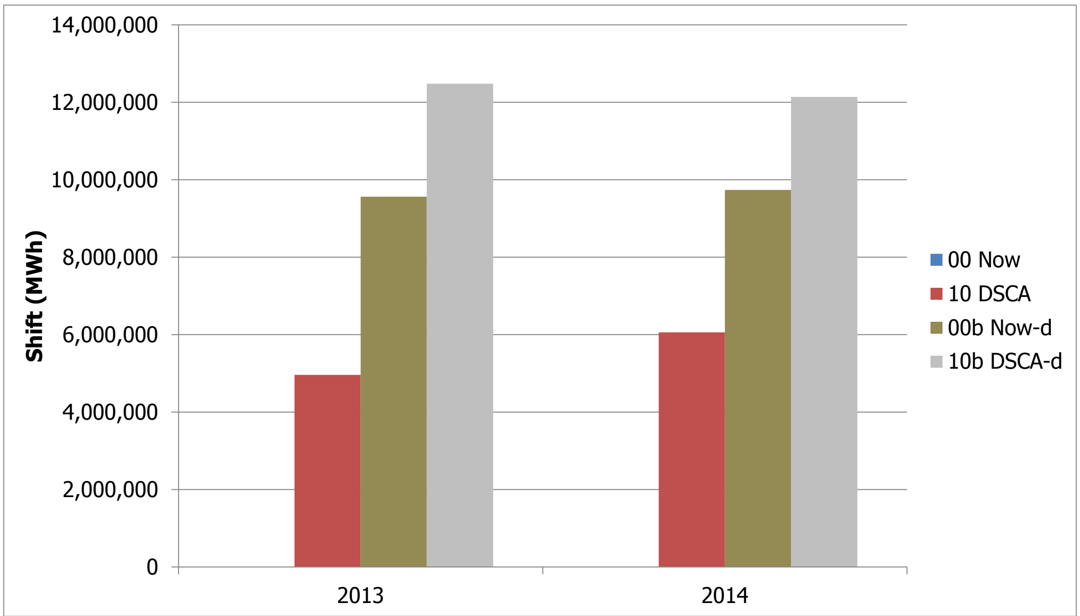
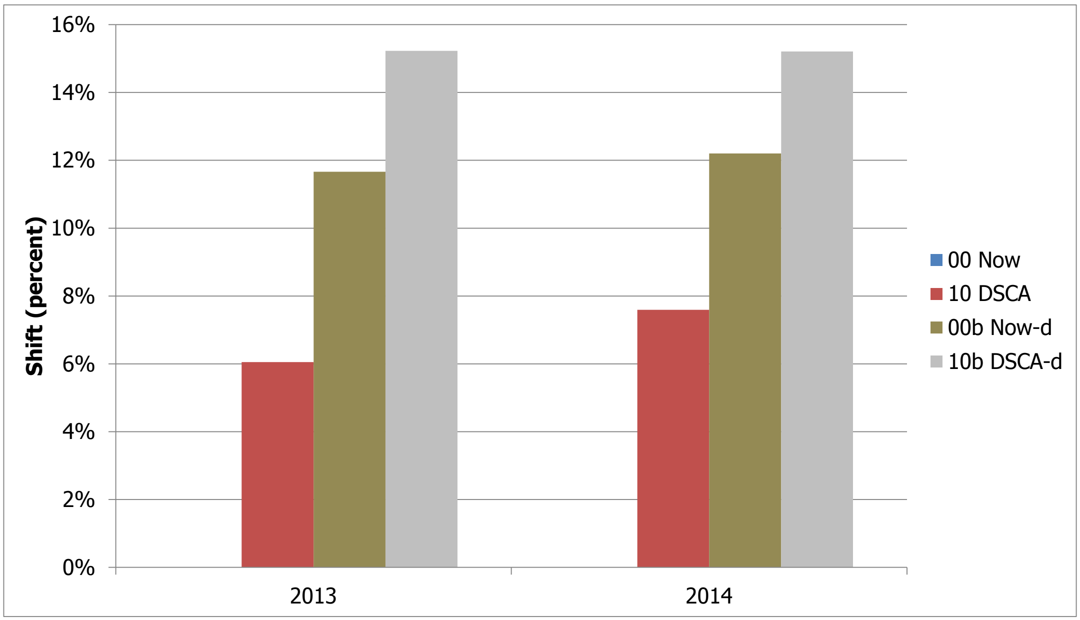


Figure 10b: Shift as a percentage of the error in the current arrangements



Conclusions

The potential improvement in accuracy seen solely from Lead Parties declaring more accurate DC values is larger than under any other scenario examined under P326, and suggests that Parties could see significant improvements from this action alone. It should be highlighted though that this shows the maximum theoretical improvement that could have been realised, as it assumes Parties would have known and submitted their exact value of maximum demand for a given BSC Season before it began. In reality, the actual improvement would be less, with the exact improvement depending in part on Parties' accuracy in forecasting their demand.

Applying the P326 Proposed Modification on top of this shows further improvement in the overall accuracy, though the magnitude is reduced compared to that seen without applying the amended DC values.

This analysis will be extended to assess the impact when absolutely accurate DC values are applied under the WD/NWD CALF values solution, to assess whether over-estimated DC values may be affecting the relative accuracy of each solution option. This analysis will be carried out in parallel with the Assessment Procedure Consultation.

Analysis of Holiday CALF

The Workgroup wanted to assess the impact that arises from applying DCF values during the holiday period to Supplier BM Units that have requested Holiday CALF values. This will determine whether it is appropriate to apply DCF values and Holiday CALF values together.

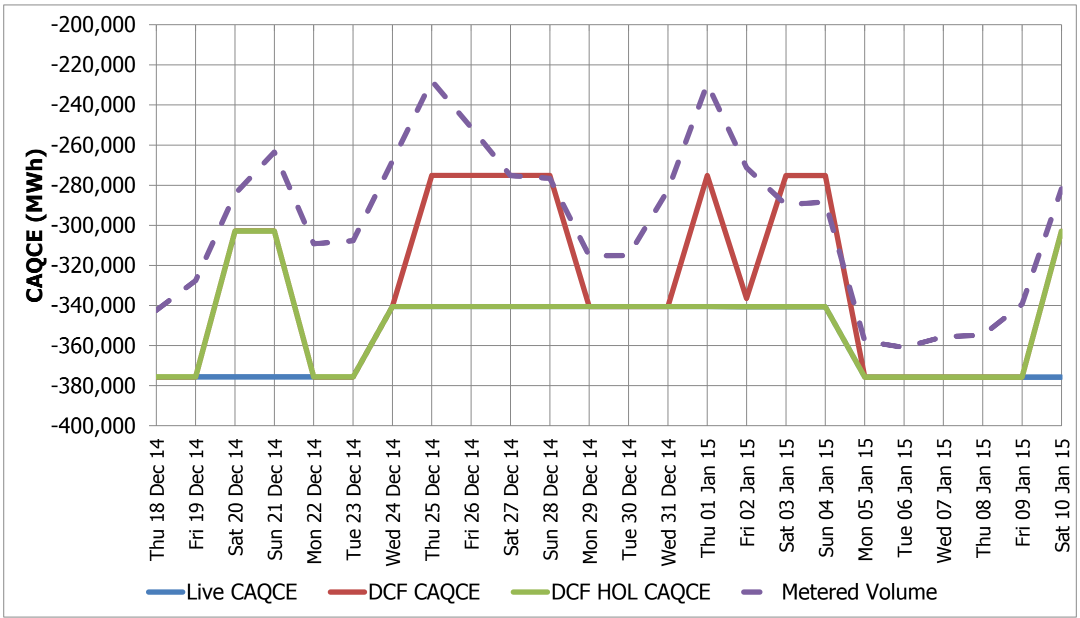
Table 11 shows the total Metered Volume across all of the 108 Supplier BM Units that requested Holiday CALF values for the Winter 2014 BSC Season (when the holiday period ran from 24 December 2014 to 4 January 2015 inclusive). It also shows the total Credited Assessment Credited Energy Volume across these 108 BM Units calculated under the following three scenarios:

- **Live CAQCE** – no DCF values applied (current arrangements)

- **DCF CAQCE** – DCF values applied to all non-Working Days, both inside and outside the holiday period
- **DCF HOL CAQCE** – DCF values applied to non-Working Days outside the holiday period, but not within the holiday period

Table 11: Impact of different DCF Holiday CALF arrangements		
Scenario	Total CAQCE across holiday period	Total metered volume across holiday period
Live CAQCE	-4,086,760MWh	-3,290,714MWh
DCF CAQCE	-3,624,815MWh	-3,290,714MWh
DCF HOL CAQCE	-4,086,760MWh	-3,290,714MWh

Figure 11a: Credit Assessment Credited Energy Volumes for different Holiday CALF arrangements



Where not visible in Figure 11a, the blue and red lines follow the green line

When the DCF value is applied as well as the Holiday CALF values, an improvement in accuracy (Shift) of 222,426MWh is realised across all Holiday CALF BM Units across the duration of the holiday period (24 December 2014 to 4 January 2015 inclusive). This equates to 15.28% of the 1,455,259MWh total Shift across all BM Units across the whole of the Winter 2014 BSC Season. However, if the DCF value is set to 1.0000 when a Holiday CALF value is in force then no difference is seen compared to the current arrangements.

Conclusions

The original Holiday CALF provisions assumed little difference between Working Days and non-Working Days during a holiday period. However, this assessment demonstrates that there is still a notable difference. An improvement in accuracy is shown when the DCF value is applied on top of a Holiday CALF value when compared to setting the DCF to

1.0000 during this time. Furthermore, the Metered Volume profile during the holiday period more closely follows that of the Credit Assessment Credited Energy Volume profile when the DCF value is applied. This suggests that the DCF value should still be applied even when a Holiday CALF has been requested for a Supplier BM Unit.

The Workgroup elected to apply the 'DCF HOL CAQCE' scenario as the Proposed Modification prior to this analysis being completed. It will re-visit this solution element following the Assessment Procedure Consultation, and may change its view as a result.

Detailed solution requirements

The P326 solution will only apply to Supplier BM Units (those denoted by BM Unit IDs starting 2_). The solution applies equally to Base BM Units and Additional BM Units.

P326 only applies to the calculation of the BMCAIC value. The BM Unit Credit Assessment Export Capacity (BMCAEC) value for all BM Unit types will be unaffected by P326 and will continue to be calculated and applied as it is now.

Any Supplier BM Unit that is SECALF qualifying (it has a DC of zero and a GC that is greater than zero) will continue to use the BMCAEC value as implemented under P310 'Revised Credit Cover for Exporting Supplier BM Units'. However, the P326 solution will still be applied to these BM Units for use in the event they should revert to using the BMCAIC value (for example due to the DC value being re-declared mid-Season to a non-zero value).

All Central Volume Allocation (CVA) BM Units (BM Unit IDs starting T_, E_, I_ or M_) and all Electricity Market Reform (EMR) BM Units (BM Unit IDs starting C_) will be unaffected by P326 and will continue to have their BMCAIC values calculated as now.

Requirement 1	
The calculation of BMCAIC values for Supplier BM Units will be scaled by a DCF value in any Settlement Period that falls on a non-Working Day.	
1.1	Effective from the P326 Implementation Date, the BMCAIC value for Supplier BM Units will be calculated as follows: $BMCAIC_i = DC_i * CALF_i * DCF_i$
1.2	The DCF value calculated under Requirement 2 will be used in the calculation of BMCAIC for all Settlement Periods that fall on a non-Working Day. For all Settlement Periods that fall on a Working Day, the DCF value will be deemed to be 1.0000.

Requirement 2	
BSCCo will calculate DCF values for each Supplier BM Unit for each BSC Season and will pass these to the CRA.	
2.1	At the same time as it calculates CALF values for all BM Units for a given BSC Season, and by three months before the BSC Season begins, BSCCo will calculate and publish DCF values for all Supplier BM Units (including SECALF-qualifying BM Units) for that BSC Season.
2.2	The method by which BSCCo will determine a DCF value for each Supplier BM Unit will be based on the following calculation: DCF = Average NWD Metered Volume / Average WD Metered Volume

What are the different types of BM Unit?

T_	BM Units connected to the Transmission System
E_	BM Units connected to a Distribution System
I_	BM Units related to an Interconnector
2_	BM Units containing a Supplier's SVA-registered Metering Systems
C_	BM Units registered for use under the EMR arrangements
M_	BM Units that do not fit another category (new BM Units cannot be registered under this category)

Further information can be found on the BM Units page of our website.

Requirement 2	
2.3	The source data that BSCCo will use for calculating DCF values will be the BM Unit Metered Volumes in the corresponding BSC Season in the preceding calendar year (the Reference Season). *For example, the DCF value for a Supplier BM Unit for the Spring 2017 BSC Season would be based on its Metered Volumes from the Spring 2016 BSC Season.*
2.4	If there is no Metered Volume data available for a Supplier BM Unit in the Reference Season, BSCCo will apply a Default DCF value to this BM Unit. The Default DCF value will be the average of the DCF values across all Supplier BM Units in the relevant GSP Group for which individual values could be calculated.
2.5	DCF values will be capped such that any value that falls outside the range 0.0000 to 1.0000 inclusive will be set to 0.0000 or 1.0000 as applicable. Any value that is less than 0.0000 will be set to 0.0000. Any value that is greater than 1.0000 will be set to 1.0000.
2.6	The full calculation method will be documented either within the CALF Guidance Document or in a new DCF Guidance Document to sit alongside the CALF Guidance Document and be subject to the same governance.
2.7	Once it has calculated DCF values for a given BSC Season, BSCCo will submit these values to the Central Registration Agent (CRA). It will also publish them alongside the CALF values and issue a notification to the industry of this publication.
2.8	The Lead Party of a Supplier BM Unit will be entitled to appeal the DCF value calculated for it within two months of the value's initial publication. The appeal process and governance and subsequent actions will be the same as that currently applied to appeals against CALF values.

Requirement 3	
The CRA and the ECVAA will use the DCF values in the calculation of BMCAIC and CAQCE values.	
3.1	The CRA will enter the DCF values it receives from BSCCo into the CRA systems. The CRA systems will need to be amended to hold these values. Should an updated DCF value be received from BSCCo for a Supplier BM Unit then the CRA will enter this into the system as a new record, and end-date the previous record.
3.2	The CRA will use the DCF values to calculate a Working Day BMCAIC value and a non-Working Day BMCAIC value for each Supplier BM Unit in accordance with the current timescales for such calculations. It will pass these values to the Energy Contract Volume Allocation Agent (ECVAA) and to BSC Parties and other relevant participants via the CRA-I014 data flow.
3.3	The CRA-I014 sub flow 5 will be amended to include a new 'DCF' field to store the DCF value for each BM Unit. No other variants of the CRA-I014 data flow should be impacted.
3.4	The ECVAA will use the appropriate BMCAIC value for each Settlement Period when calculating the CAQCE value for a Supplier BM Unit.

Requirement 3	
3.5	To future-proof the solution, any systems and flows that are modified to store DCF values should set the DCF field to allow values of, as a minimum, up to ±9999.9999.
3.6	The ECVAA will hold two calendars of which days are Working Days and which days are non-Working Days, in accordance with Requirement 4. It will apply the appropriate calendar to the appropriate Supplier BM Units when determining each BM Unit's BMCAIC under Requirement 3.4.

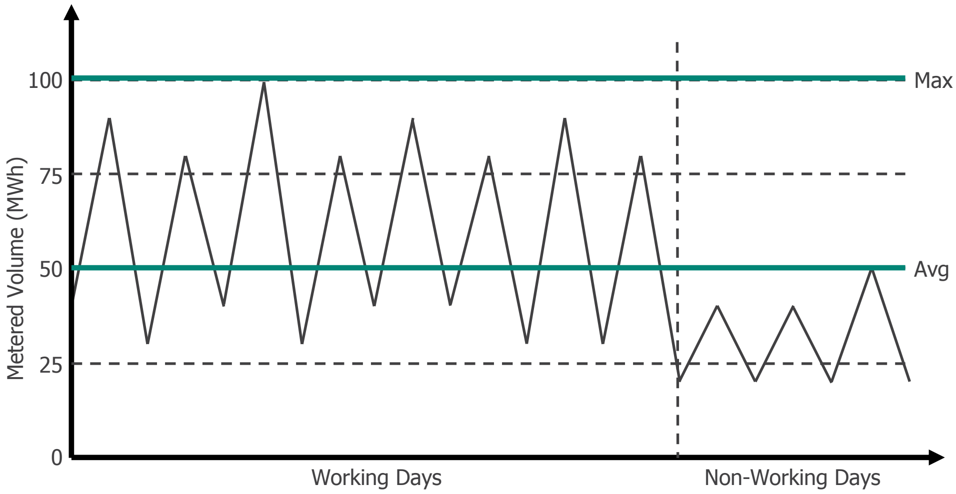
Requirement 4	
Separate definitions of 'Working Day' will be applied to Supplier BM Units for English and Welsh GSP Groups and to Supplier BM Units for Scottish GSP Groups.	
4.1	The ECVAA will hold two calendars of which days are Working Days and which days are non-Working Days.
4.2	The ECVAA will hold one calendar for English and Welsh GSP Groups in which Saturdays, Sundays and public holidays applicable to England and Wales are deemed as non-Working Days. This calendar will be applied to any Supplier BM Unit registered to a GSP Group other than GSP Groups _N and _P.
4.3	The ECVAA will hold one calendar for Scottish GSP Groups in which Saturdays, Sundays and public holidays applicable to Scotland are deemed as non-Working Days. This calendar will be applied to any Supplier BM Unit registered to GSP Group _N or _P.

Current arrangements

Under the current arrangements, a CALF value is calculated by taking the average Metered Volume for a BM Unit across the Reference Season and dividing this by the BM Unit's maximum Metered Volume within the Reference Season.

CALF = Avg. Metered Volume / Max. Metered Volume

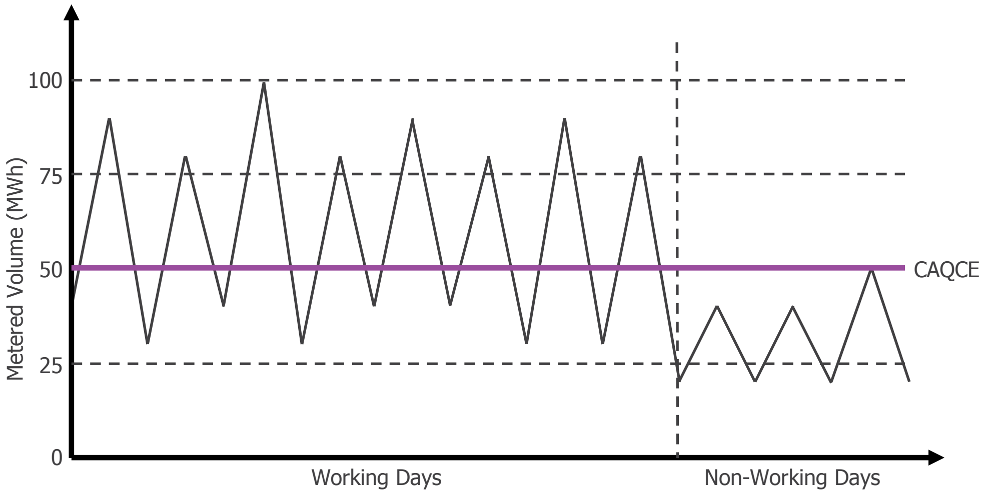
In this example, the average Metered Volume is 50MWh and the maximum Metered Volume is 100MWh. This gives a CALF value of 0.5000.



BMCAIC in the live Season is taken by multiplying the CALF value by the DC value that has been submitted for the BM Unit for the live Season.

BMCAIC = CALF * DC

In this example, the Supplier BM Unit has a DC of 200MW for the live Season. This results in a BMCAIC of 100MW. Multiplying by the SPD gives a CAQCE of 50MWh. This has been laid over the Reference Season data for the purpose of providing a comparison.



Relative accuracy of each option

Please note that the examples in this section are simple examples intended only to illustrate the current method and the two methods discussed under P326. **They should not be taken as any indication of the relative accuracy of each option**. Please refer to the analysis results in Section 2 for a full assessment of the relative accuracy of each method.

MW or MWh? Application of the SPD

The DC value for a BM Unit is submitted by the Lead Party in MW. The BMCAIC is subsequently measured in MW. This is multiplied by the SPD (currently 0.5 hours) to produce the CAQCE value in MWh. It is the CAQCE value that is used in lieu of actual Metered Volumes in the credit calculations.

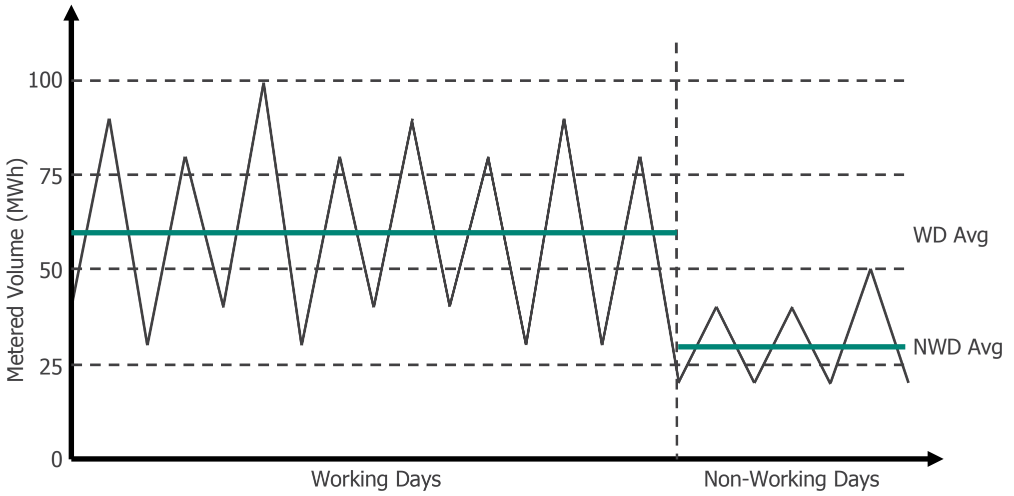
In these examples, the 200MW DC value submitted by the Supplier equates to an expected maximum Metered Volume of 100MWh in any given Settlement Period.

DCF values solution

Under this solution, the CALF value will continue to be calculated as above. A DCF value will also be calculated. For this example, the DCF value will be calculated by dividing the BM Unit's average Metered Volume over non-Working Days in the Reference Season by its average Metered Volume across Working Days.

DCF = Avg. NWD Metered Volume / Avg. WD Metered Volume

In this example, the average Working Day Metered Volume is 60MWh and the average non-Working Day Metered Volume is 30MWh. This gives a DCF value of 0.5000. The CALF value remains 0.5000, as before.

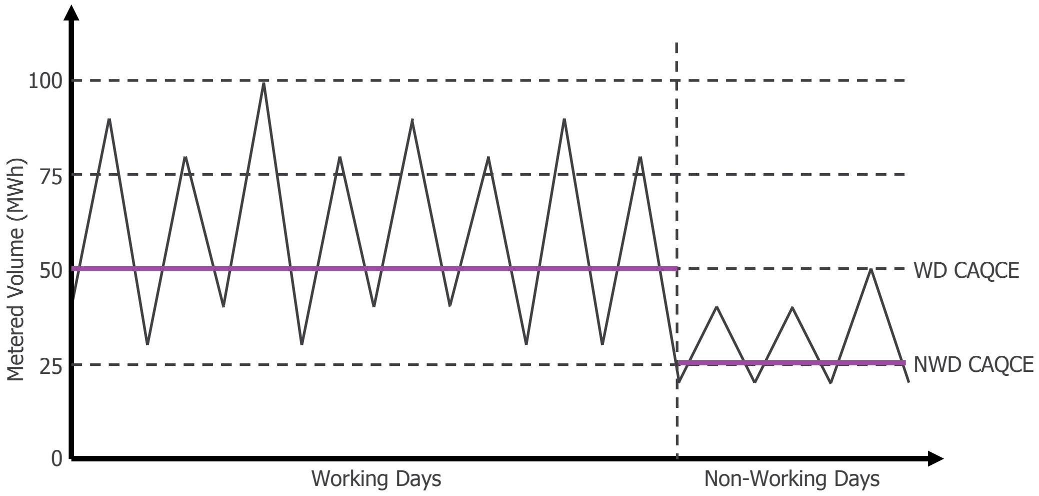


BMCAIC in the live Season is taken by multiplying the CALF value by the DC value that has been submitted for the BM Unit for the live Season. For non-Working Days, this will also be multiplied by the DCF value.

WD BMCAIC = CALF * DC

NWD BMCAIC = CALF * DC * DCF

In this example, the Supplier BM Unit has a DC of 200MW for the live Season. This results in a Working Day BMCAIC of 100MW and a non-Working Day BMCAIC of 50MW. Multiplying by the SPD gives a Working Day CAQCE of 50MWh and a non-Working Day CAQCE of 25MWh. This has been laid over the Reference Season data for the purpose of providing a comparison.



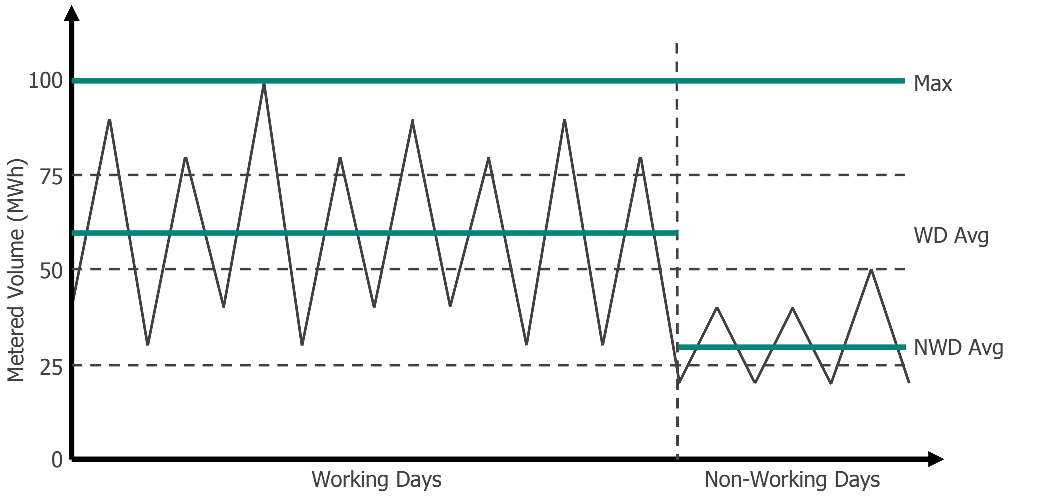
WD/NWD CALF values solution

Under this solution, two CALF values will be calculated. A WDCALF value will be calculated by taking the average Metered Volume across Working Days in the Reference Season and dividing this by the maximum Metered Volume across all days within the Reference Season. A NWDCALF value will be calculated in the same way but with non-Working Days.

WDCALF = Avg. WD Metered Volume / Max. Overall Metered Volume

NWDCALF = Avg. NWD Metered Volume / Max. Overall Metered Volume

In this example, the average Working Day Metered Volume is 60MWh, the average non-Working Day Metered Volume is 30MWh and the maximum overall Metered Volume is 100MWh. This gives a WDCALF value of 0.6000 and a NWDCALF value of 0.3000.

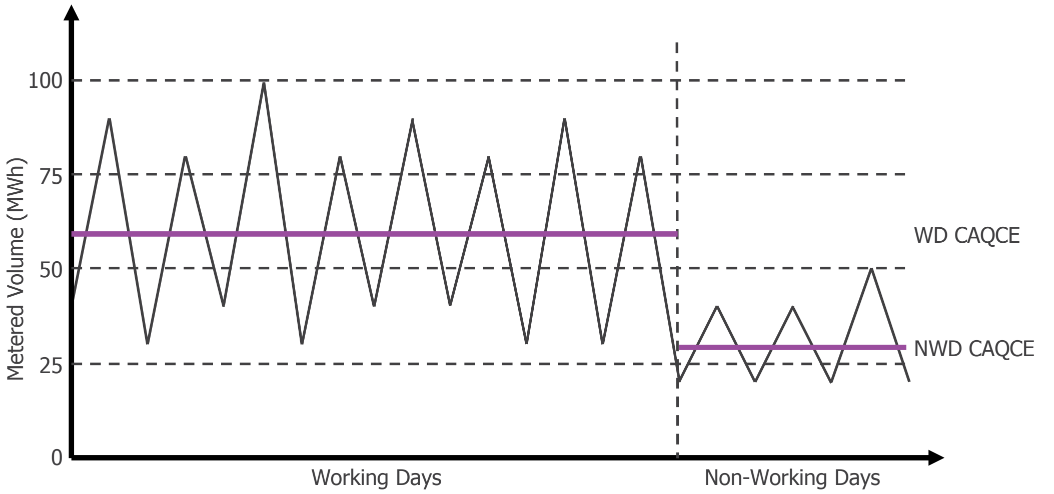


BMCAIC in the live Season would be taken by multiplying the relevant WDCALF or NWDCALF value by the DC value that has been submitted for the BM Unit for the live Season. Which CALF value is used is determined by whether the Settlement Period falls on a Working Day or a non-Working Day.

WD BMCAIC = WDCALF * DC

NWD BMCAIC = NWDCALF * DC

In this example, the Supplier BM Unit has a DC of 200MW for the live Season. This results in a Working Day BMCAIC of 120MW and a non-Working Day BMCAIC of 60MW. Multiplying by the SPD gives a Working Day CAQCE of 60MWh and a non-Working Day CAQCE of 30MWh. This has been laid over the Reference Season data for the purpose of providing a comparison.



Acronyms

Acronyms used in this document are listed in the table below.

Acronyms	
Acronym	Definition
BM	Balancing Mechanism
BMCAEC	BM Unit Credit Assessment Export Capability *(parameter)*
BMCAIC	BM Unit Credit Assessment Import Capability *(parameter)*
BOA	Bid-Offer Acceptance
CALF	Credit Assessment Load Factor *(parameter)*
CAQCE	Credit Assessment Credited Energy Volume
CRA	Central Registration Agent *(BSC Agent)*
CVA	Central Volume Allocation
DC	Demand Capacity *(parameter)*
DCF	Demand Capacity Factor *(parameter)*
ECVAA	Energy Contract Volume Allocation Agent *(BSC Agent)*
ECVN	Energy Contract Volume Notification *(notification)*
EMR	Electricity Market Reform
GSP	Grid Supply Point
I&C	Industrial and Commercial
II	Interim Information *(Settlement Run)*
MEI	Metered Energy Indebtedness
MVRN	Metered Volume Reallocation Notification *(notification)*
NWD	non-Working Day
NWDCALF	non-Working Day Credit Assessment Load Factor *(parameter)*
QABC	Account Bilateral Contract volume
QCE	Credited Energy Volume
SECALF	Supplier Export Credit Assessment Load Factor *(parameter)*
SME	Small or Medium Enterprise
SPD	Settlement Period Duration *(parameter; 0.5 hours)*
WD	Working Day
WDCALF	Working Day Credit Assessment Load Factor *(parameter)*

External links

A summary of all hyperlinks used in this document are listed in the table below.

All external documents and URL links listed are correct as of the date of this document.

External Links		
Page(s)	Description	URL
1	P326 page on the ELEXON website	https://www.elexon.co.uk/mod-proposal/p326/
4	UK Bank Holidays page on the GOV.UK website	https://www.gov.uk/bank-holidays
11	P305 page on the ELEXON website	https://www.elexon.co.uk/mod-proposal/p305/
22	P310 page on the ELEXON website	https://www.elexon.co.uk/mod-proposal/p310/
22	Balancing Mechanism Units page on the ELEXON website	https://www.elexon.co.uk/reference/technical-operations/balancing-mechanism-units/