P215 Credit Cover and Energy Indebtedness Analysis

1. Introduction

Each BSC Party is responsible for deciding how much Credit Cover to lodge, therefore the amount of Credit Cover lodged by a Party only changes when that Party lodges additional funds or withdraws funds. The Credit Cover must cover 28 days worth of Energy Indebtedness, which is variable and changes each Settlement Period. Using more than 80% of the Credit Cover lodged results in the Credit Default process being invoked.

The reason for the Credit Cover arrangements is to cover the market against bad debt resulting from the failure or default of Parties; this is the basis of the Credit Cover calculation. More accurate estimation of Parties Energy Indebtedness would better reflect the actual value at risk. This would benefit the market by ensuring a more appropriate amount of Credit Cover is lodged by Parties.

In general it can be assumed that a generating Party will aim to match its contracted position with its actual output. The more accurate the estimation of this output is, compared with the real output, the more accurate the Energy Indebtedness will be.

2. Effect of Inaccurate Energy Indebtedness Estimation

The current process of estimating BM Units generation can give rise to overestimation or underestimation of Parties' actual output. Where Parties' output is overestimated those Parties are potentially able to lodge less Credit Cover than would be required if their Energy Indebtedness was based entirely on their actual metered volumes. Conversely, Parties whose generation is underestimated are obliged to lodge more Credit Cover than if their Energy Indebtedness was based entirely on their actual metered volumes.

All Parties would benefit from P215, because increased accuracy in the Energy Indebtedness estimation would reduce market risk to bad debt. Parties whose generation is currently overestimated may need to lodge more Credit Cover due to the increased accuracy of the reflection of their risk to the market. P215 may allow Parties with an underestimated generation to reduce the amount of Credit Cover that they lodge.

2.1 Underestimation of Generation

This example assumes a BSC Party with a single generation unit. The generator will try to sell all of its generation, and if it sells more than its actual output it will have an energy debt. The Party will need to lodge Credit Cover for this imbalance until it receives a bill to clear off the Imbalance Charge.

If the generator sells less than it actually outputs it will be owed for the excess energy that it has provided. This amount owed to the Party does not require Credit Cover to be lodged and reduces the overall Energy Indebtedness of the Party.

Because the metered information about what the Party has generated is not available for 5 working days the Party's generation is estimated for this period. The predicted generation is then compared to the energy that the Party has sold. The Party is required to lodge Credit Cover to secure against any amount of energy for which it is indebted because it has sold more energy than it is estimated to have generated.

The example below (Figure 1a) is for one Settlement Day (48 Settlement Periods), and shows a single generating Party's actual generation, estimated generation and amount of energy sold. The Party generates 10.5 units, sells 10 units and has an estimated generation of 8 units per Settlement Period.

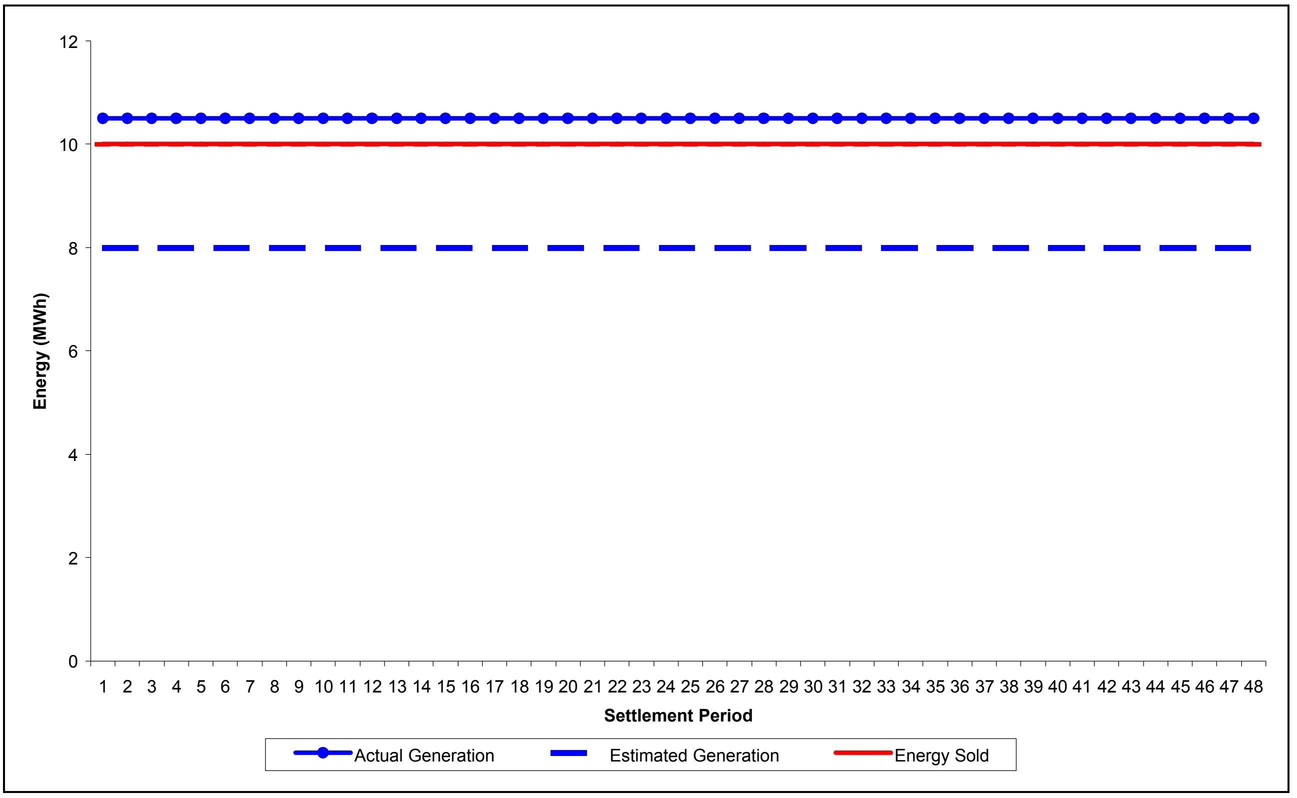

Figure 1a

Adding the cumulative Settlement Period estimated Energy Indebtedness and the cumulative actual Energy Indebtedness to the previous graph it is possible to see the effect of inaccuracy that results in underestimation of the actual generation (Figure 1b).

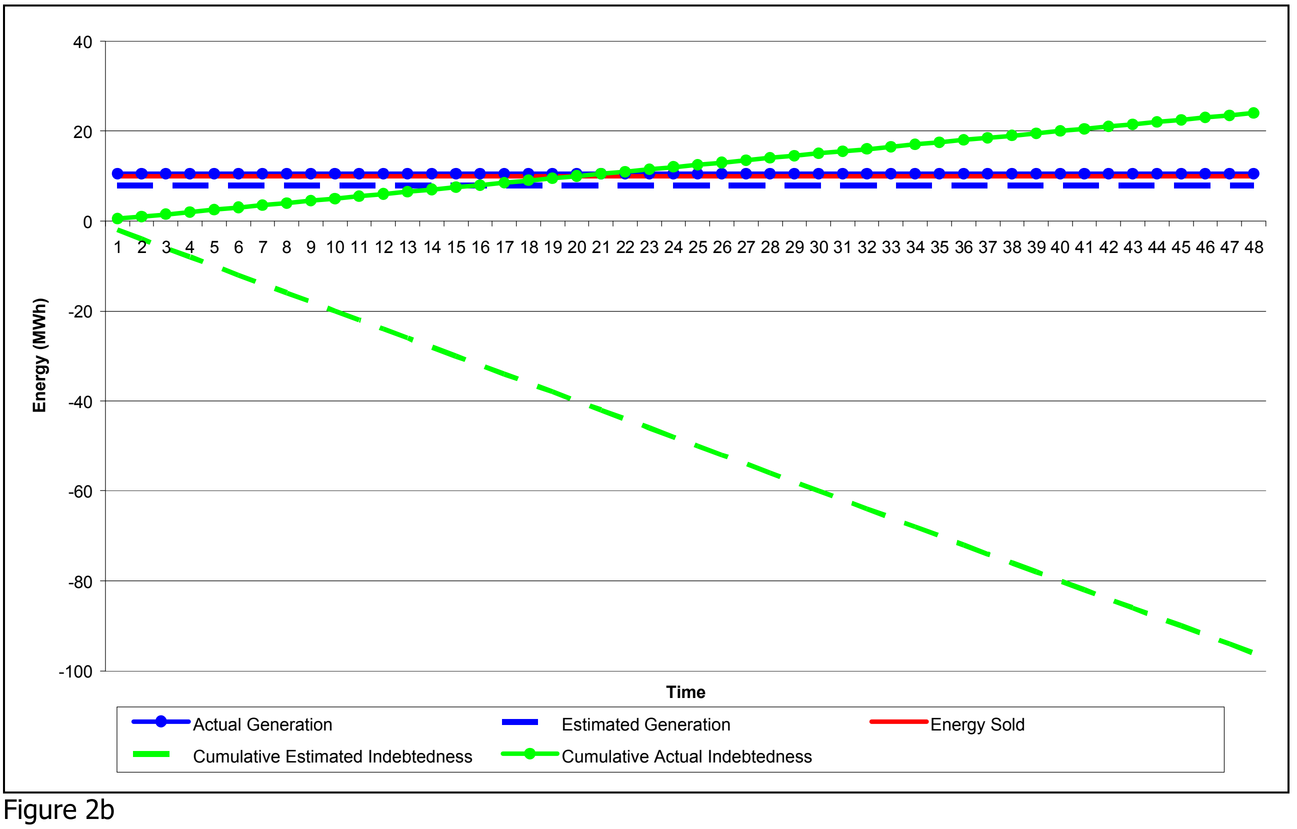

Figure 2b

At the end of the day the Party owes 96 units because of the inaccuracy of the estimation. The Party would need to lodge Credit Cover to secure against this amount until the bill is generated and paid 29 days later. Conversely, if the real volumes had been available the Party would be owed 24 units and the Party would not be required to lodge Credit Cover as it would have a negative Energy Indebtedness (i.e. it would be owed energy).

2.2 Overestimation of Generation

This example again assumes a BSC Party with a single generation unit. However, in this example the generator sells more energy than its actual output, so it has an Energy Imbalance. The Party should lodge Credit Cover funds to cover this imbalance until it receives a bill to clear off the Imbalance Charge.

The example below (Figure 2a) shows a single generating Party's actual generation, estimated generation and amount of energy sold over one day (48 Settlement Periods). The Party has an estimated generation of 8 units per Settlement Period as in the previous example. However it generates 6 units and sells 7 units per Settlement Period.

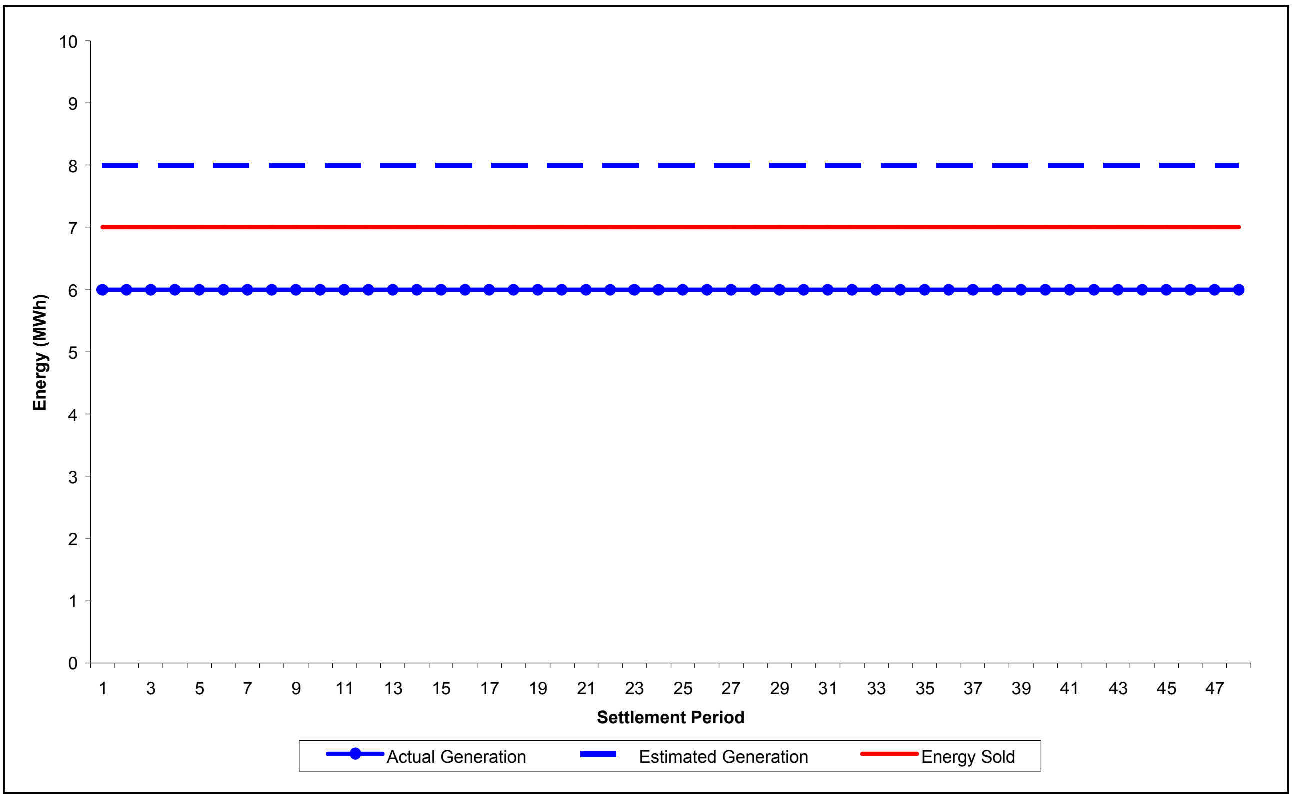

Figure 2a

Adding the cumulative Settlement Period estimated Energy Indebtedness and the cumulative actual Energy Indebtedness to the previous graph it can possible to see the effect of inaccuracy that results in overestimation of the actual generation (Figure 2b).

At the end of the day the Party is owed 48 units because of the inaccuracy of the estimation (the Party would not be required to any lodge Credit Cover against this because it is a negative Energy Indebtedness). However, if the real volumes had been available the Party would owe 48 units, and would need to lodge Credit Cover to secure against this amount until the bill is generated and paid.

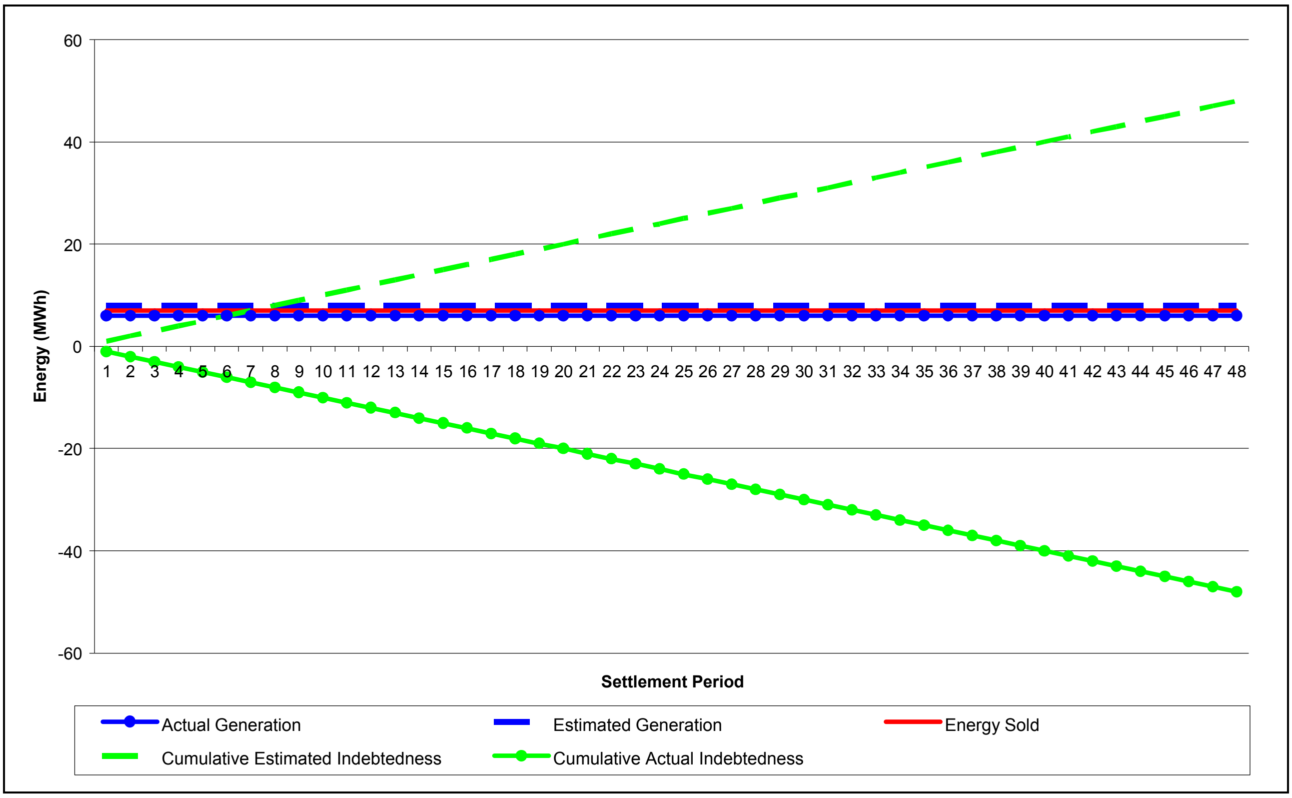

Figure 2b

2.3 Effect of Increased Accuracy of Estimation

Over the 5 working days of the CEI period the estimation errors described above accumulate. Depending upon the manner of the inaccuracy of the estimation this accumulated error may result in either systematic over- or underestimation of Parties' indebtedness.

The graph below (Figure 3a) shows the effect of inaccurate estimation of a Party's output on its indebtedness. The Party has lodged 10 units of credit cover (the green area), and is allowed to use a maximum of 8 units (the red line - 80%). Where the estimation process underestimates their position they are considered in debt, which consumes some of the Credit Cover that they have lodged (the orange area).

The blue area shows a situation where the estimation procedure over estimates the output and this does not use any of their credit cover, the estimated volumes would make the calculation believe that the Party is owed. The hatched blue area is to indicate that Credit Cover is not required where the Party's Energy Indebtedness is negative.

More accurate estimation would reduce systematic over- or underestimation of the output of generating units. This is illustrated in the graph below (Figure 3b). The Energy Indebtedness is closer to the zero line.

The Energy Indebtedness area (orange) now takes up a reduced proportion of the Credit Cover available, allowing the Party to reduce the Credit Cover lodged. The reduction of the blue area, the negative Energy Indebtedness reduces the exposure of the market if the Party went into default.

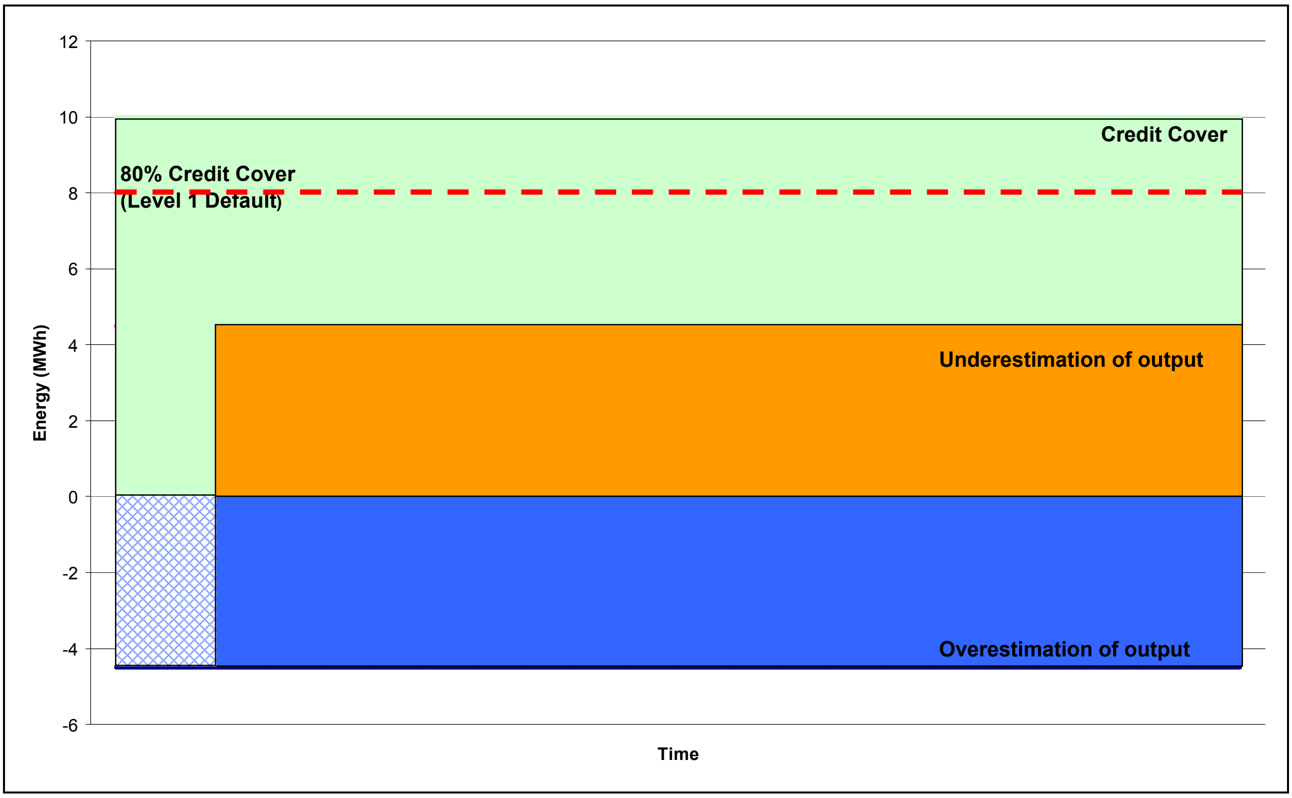

Figure 3a

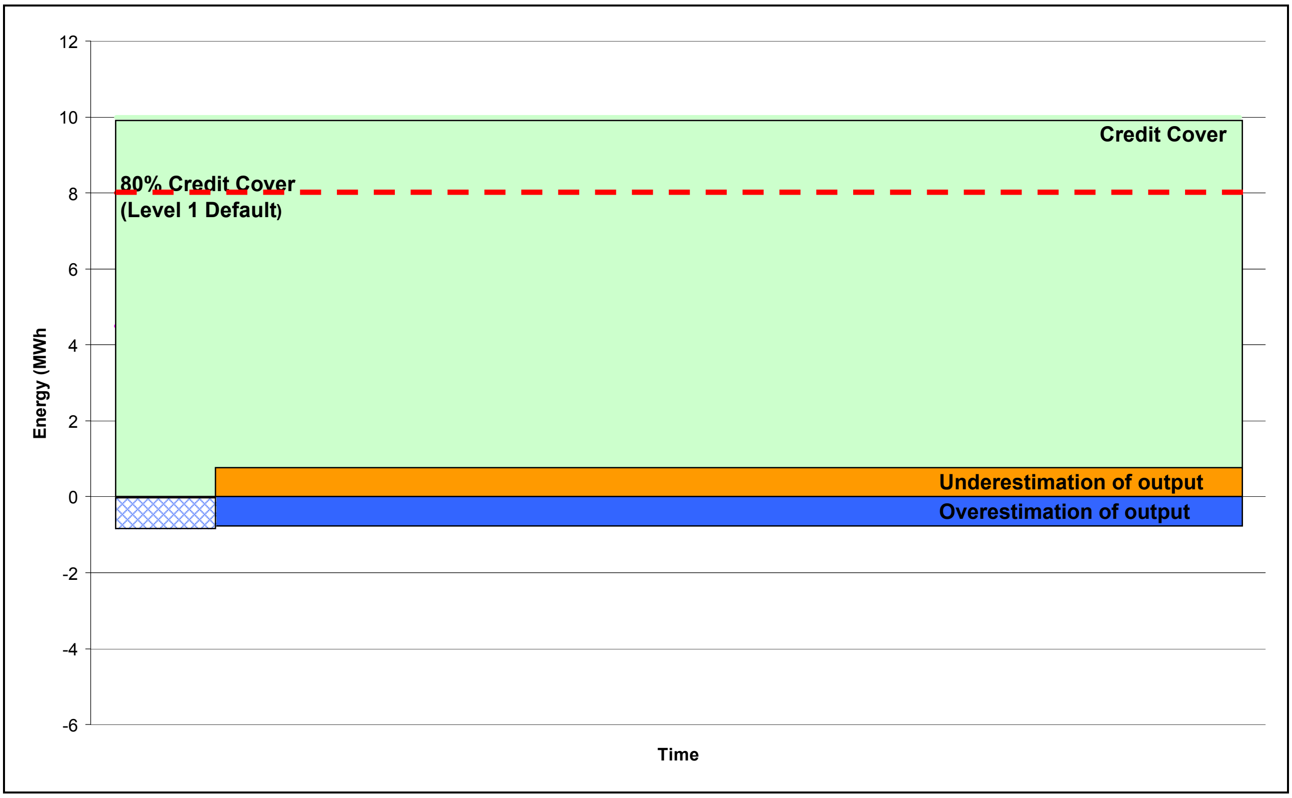

Figure 3b

2.4 Conclusions

Considering the entire live calculation in light of the above examples, if accuracy of estimation was increased (e.g. by P215) **some Parties may be required to lodge additional Credit Cover in comparison to the current credit calculation process, due to the removal (or reduction) of a systematic underestimation of their output. Parties whose generation is currently underestimated would experience a reduction in their Energy Indebtedness, and may be able to consider reducing the amount of Credit Cover they lodge.**

3. Generator Failure Analysis

This analysis looks at the failure of a BSC Party with a single generation unit. The example assumes that the generator is large (800MW), is contracted to operate at full capacity and has a CALF value of 0.75; CAP is assumed to be £50/MWh.

This example assumes that the worst case scenario occurs and the generator completely runs out of money and fuel. The Party's energy contracts (i.e. 400MWh each Settlement Period) cannot be met, so it accrues an actual energy imbalance of 400 MWh each Settlement Period. Over a Settlement Day (i.e. 48 Settlement Periods) this equates to an actual energy imbalance of 19,200MWh.

Under the current method of calculating energy indebtedness, the generators production is estimated, using the CALF value of 0.75, to be 600MW over the 5 Working Day CEI period. After this AEI is calculated using actual metered volume data, and therefore resolves the inaccuracy. The CEI period of 5 Working Days can last for a maximum of 8 Settlement Days, so the maximum value of the inaccuracy of the generator's energy indebtedness is 115200MWh. Multiplying by CAP, this equates to an error of £5,760,000.

Assuming ideal operation of the P215 provisions, under both P215 Proposed and Alternative the Party would submit correct FPNs when its supply of fuel runs out. This would result in accurate estimation of its Metered Volumes, and hence indebtedness, in the CEI period (or CEI period and MEI period under P215 Alternative). The error is therefore assumed to be zero.

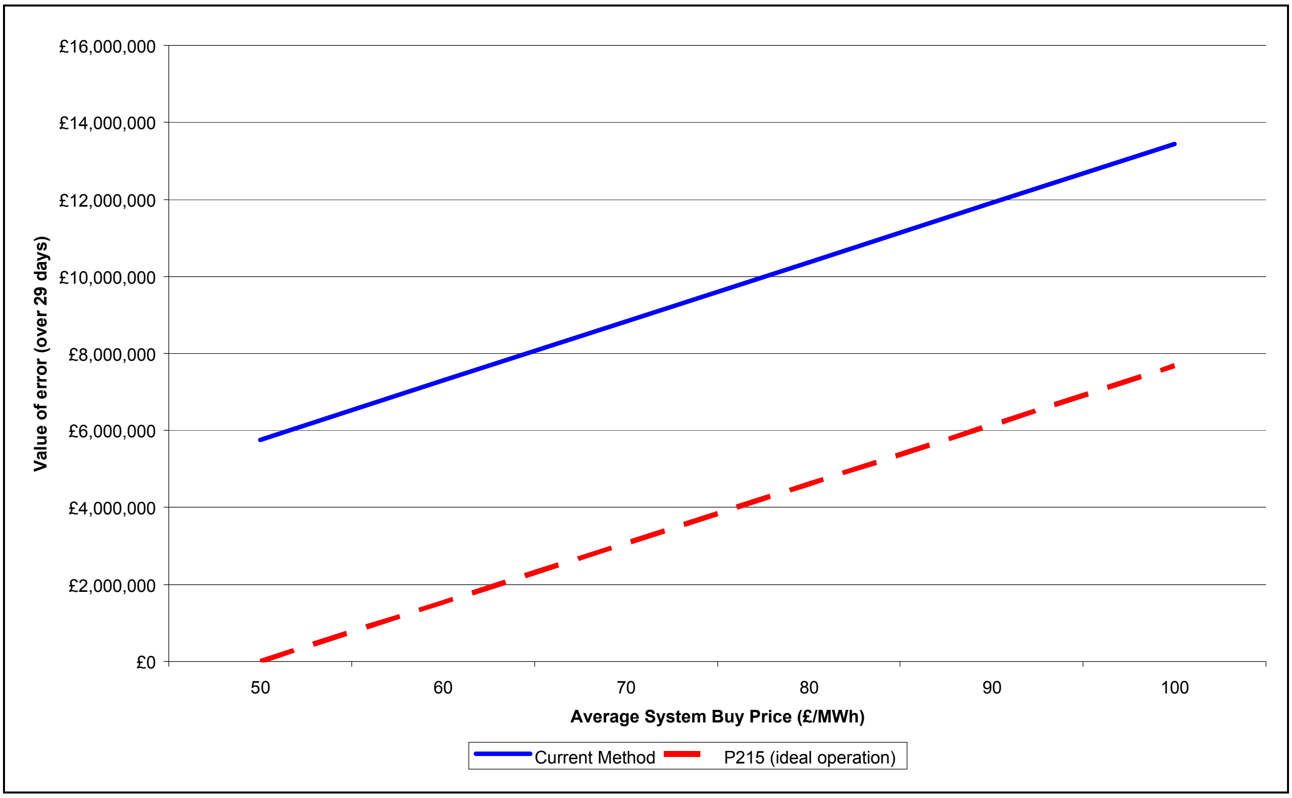

Figure 4

However, both the scenarios assume that the value of CAP is an accurate reflection of the average System Buy Price. Any inaccuracy in the CAP introduces additional inaccuracy into the estimation of the Parties indebtedness. This is illustrated in the graph above (Figure 4), which shows how error under both the baseline and P215 increases as the underestimation of the System Buy Price by CAP increases.

3.1 Conclusions

In the worst case scenario of generator failure examined, P215 performs significantly better than the current baseline. Though the accuracy of the estimation of Parties' Energy Indebtedness has an impact, **the absolute impact on accuracy, in financial terms, depends to a large extent on the accuracy of CAP** compared with the prevailing System Price.

4. Rolling Indebtedness Analysis

This analysis examines the rolling indebtedness of a generator in order to model the effect of the baseline methodology, P215 Proposed methodology and P215 Alternative methodology in financial terms. For the baseline the estimation period is six days' indebtedness based on CEI calculated using CALF*GC and for the P215 Proposed is six days' indebtedness based on CEI calculated using FPNs. For the P215 Alternative the estimation period of six days' indebtedness constitutes 3 days of CEI calculated using FPNs and 3 days based on Metered Volumes (i.e. MEI). The prevailing value of CAP was used to calculate the financial value of the Energy Indebtedness. The generator's AEI is included for comparison, though it should be noted that the AEI uses actual pricing information, rather than CAP.

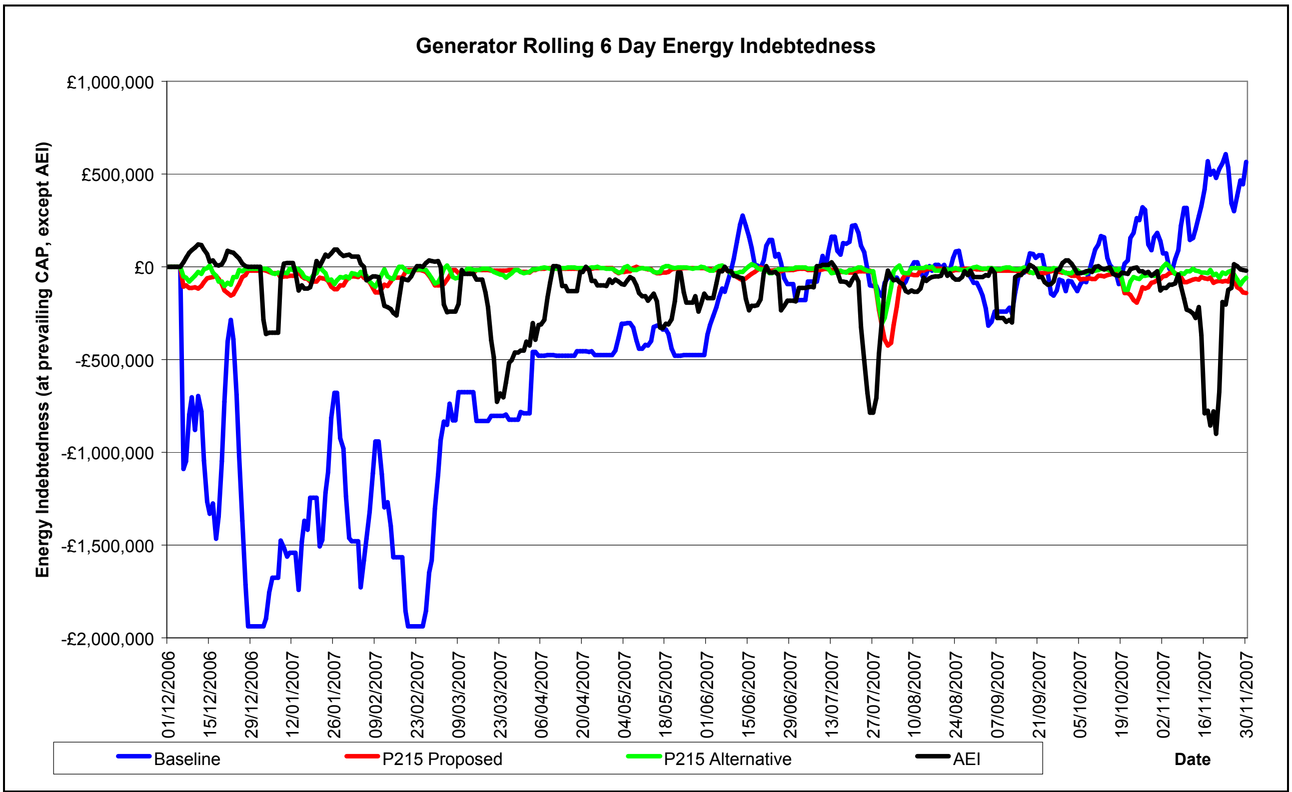

Figure 5

The graph above (Figure 5) shows the generator's rolling Energy Indebtedness over a one year period (December 2006 – November 2007). The baseline calculation systematically underestimates generators indebtedness in Winter 2006 and Spring 2007, delivers a fair approximation of indebtedness (except peaks/troughs) in Summer 2007, and systematically overestimates indebtedness in Autumn 2007.

Over the year the general effect of both the P215 Proposed and Alternative is a systematic underestimation of the generator's indebtedness. The approximation of the generator's activity under the P215 solutions is more accurate than under the baseline. The calculated indebtedness, and thus the Credit Cover requirement, is more stable compared with the baseline, and does not show seasonal fluctuation.

Figure 6 shows the effect of an outage of the generator on a particular day. During the period of this analysis the baseline methodology systematically underestimates the generators indebtedness. The analysis models a complete generator trip on 11 December 2006 (effect shown black sections on all 3 plots); the generator has zero Metered Volumes for this Settlement Day. FPNs for Settlement Periods 1-3 have already been submitted (and cannot be corrected), but FPNs for Settlement Periods 4-48 are set to zero. The generator's contracted volumes are not amended, so the Party is exposed to complete imbalance at the prevailing CAP. The dashed lines denote the period of six Settlement Days within which Energy Indebtedness is calculated using CEI which is affected by the generator outage.

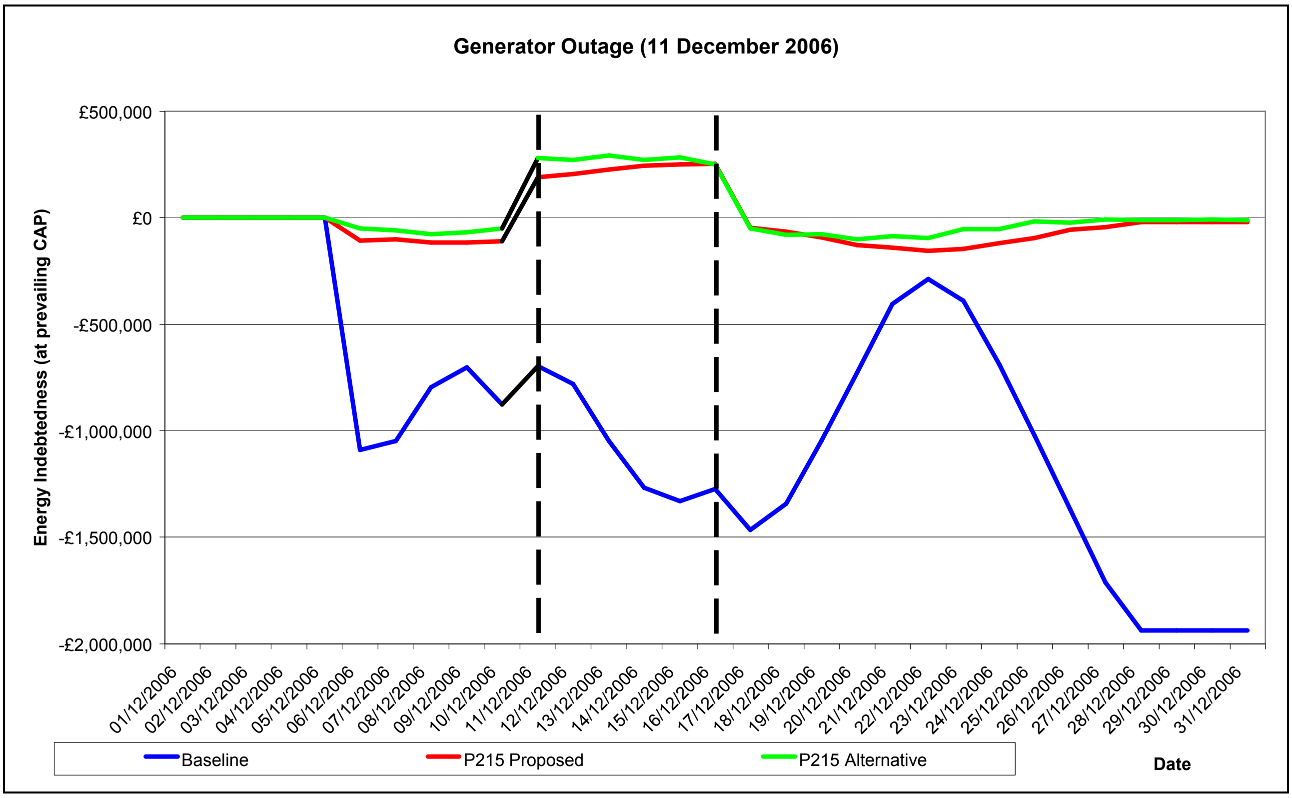

Figure 6

The outage causes an increase in the generator's Energy Indebtedness under the P215 Proposed and Alternative methodologies, and it can be seen that the Energy Indebtededness is at a steady elevated level for the six Settlement Days affected by the outage. Though the Energy Indebtedness of the baseline methodology shows an increase on the day of the outage, this is an arbitrary variation. This is shown by the baseline plot for the Settlement Days, which varies and exhibits no effect of the outage.

If the Credit Cover lodged by the Party is insufficient, the Party would need to lodge additional funds to avoid entering Credit Default. However, under the baseline methodology the generator's indebtedness is unaffected by the outage, and is actually negative; therefore, even though the generator is in complete imbalance relative to its contracted volumes, the baseline would not require it to have any Credit Cover funds lodged.

Figure 7 shows the effect of an outage of the generator on a Settlement Day during a period of systematic overestimation of the generator's indebtedness by the baseline methodology. The effect of the complete generator trip on 18 November 2007 is again shown by a black section on the plots, and the dashed lines denote the six Settlement Days where Energy Indebtedness is calculated using CEI affected by the outage.

Under the P215 methodologies the outage causes an increase in the generator's Energy Indebtedness, such that its indebtedness becomes positive. The Credit Cover requirement under the P215 methodologies would be less than that under the baseline, but more accurate. This demonstrates the potential under P215 provisions for Parties to reduce the amount of Credit Cover that they lodge.

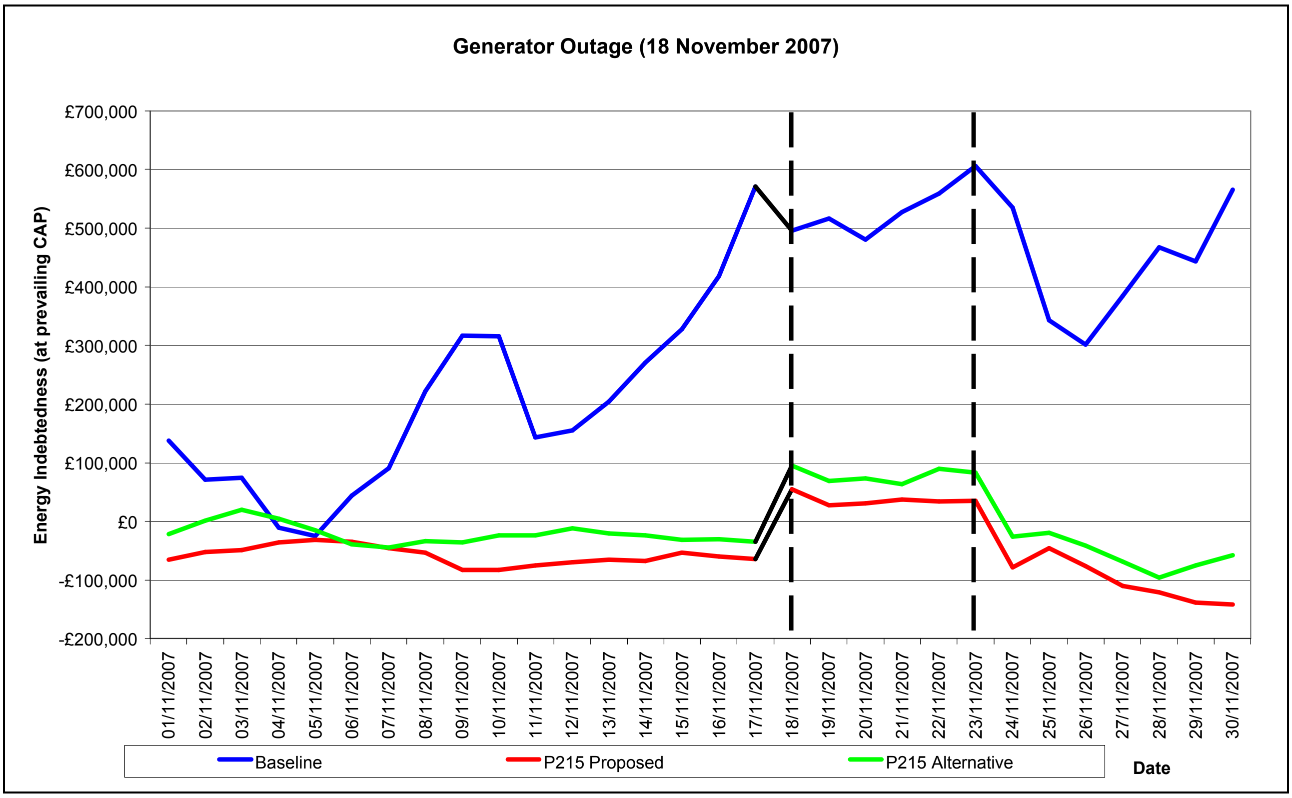

Figure 7

4.1 Conclusions

Both P215 Proposed and Alternative **remove the systematic over- or underestimation of the generators Energy Indebtedness caused by the baseline** methodology. For generators whose indebtedness is currently systematically overestimated, the increased accuracy of the P215 provisions would **reduce the requirement for oversecuritisation**. The P215 provisions would also **reduce market exposure to risk due to undersecuritisation**.

5. Indebtedness Modelling and Generator Trip

This analysis compares the performance of the current methodology and the P215 methodology in calculating the Energy Indebtedness of particular generator. Energy Imbalance information for the generator from November 2007 was used, and contract volume information was generated to make the model as realistic as possible.

Ideal operation of the P215 provisions is assumed, i.e. that the Party will redeclare its FPNs in the case of a generator trip. The analysis is therefore valid for both P215 Proposed and Alternative. The CEI period shown in Figure 8 and Figure 9 is equivalent to the CEI + MEI period of the Alternative.

Figure 8 shows the generator's indebtedness over the entire 29 day EI period. It can be seen that both the baseline and P215 indebtedness match the actual indebtedness exactly in the AEI period. However, in the CEI period the baseline indebtedness alternates between under- and overestimation of the generator's actual indebtedness. This pattern is due to the night/day operating pattern of this particular generator. The P215 indebtedness is a more accurate estimation of the generator's actual indebtedness.

The CEI period is shown isolation in Figure 9. A generator trip has been modelled during the 26 November. It is assumed that when the generator trips the Party adjusts the energy contracts of the generator to align with its zero output. There is a spike in the actual indebtedness when the trip occurs, because the generators output of zero is in imbalance with the energy it has contracted to produce. A secondary spike occurs due to a failed attempt by the generator to come back on-line.

During normal operation of the generator, the baseline calculated indebtedness over- and underestimates the generators actual indebtedness in alternating periods, as the generator's energy contracts vary. However, in the trip period the baseline method assigns a large negative indebtedness to the generator, because the methodology assumes the generator is still producing energy (i.e. as approximated by GC*CALF) but its contracted volumes have decreased. This means the generator is effectively 'owed' Credit Cover.

The P215 indebtedness tracks the actual indebtedness relatively accurately during both normal operation and the trip period. It follows the initial actual indebtedness spike in the generator trip period, though it does not reflect the secondary spike because of the delay in updating FPNs.

5.1 Conclusions

The **indebtedness calculated using the P215 methodology is significantly more accurate than the current methodology**, compared with the actual Energy Indebtedness based on Metered Volumes, when the generator is operating normally. However, **particularly during periods of generator trip, the P215 methodology represents the actual value at risk much more accurately than the baseline**.

Figure 8: Generator trip in CEI period (November 2007)

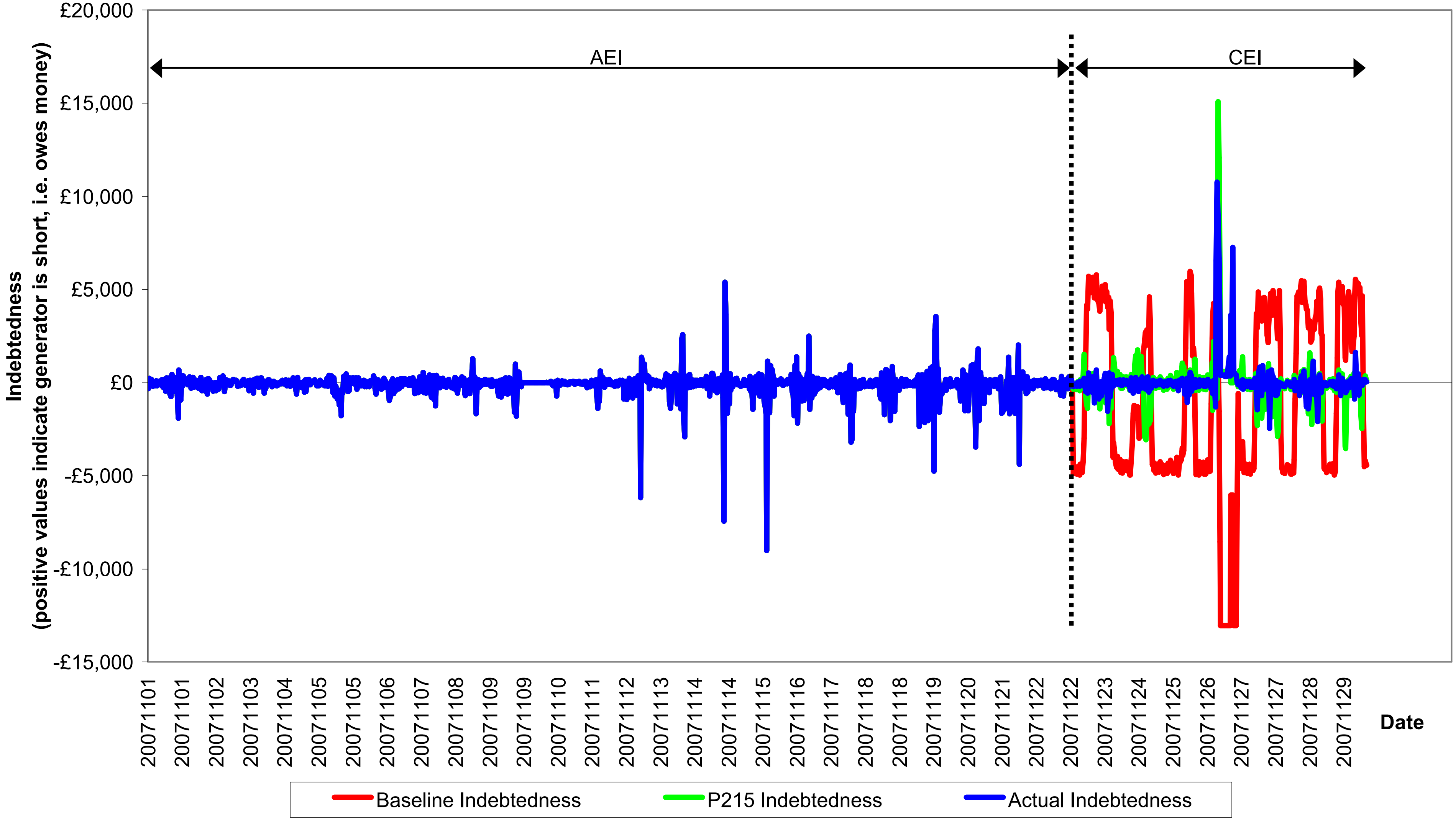

Figure 9: Generator trip in CEI period (November 2007) - CEI period only shown