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| Title | Currency Costs Analysis – Audit Item |
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Introduction

The purpose of this document is to detail analysis completed on Currency Costs issues arising from the Market Audit. During the 2008 Market Audit, it was noted that the implementation of the Billing Period Currency charges for Trading Payments and Charges were not compliant with the Trading and Settlement Code. The issue was with the apportioning of the calculation, as opposed to the core calculation itself. The Code was not absolutely clear in how to implement this calculation and was not implementable in its original form.

The original idea was that the apportioning of currency costs would occur on a daily basis, but the calculation that was implemented apportioned the costs on a weekly basis. Both calculations are based on total participant activity divided by total market activity, only the frequency (daily vs. weekly) differs. However the analysis completed will show that the original idea was not implementable. We would therefore maintain that the calculation that was implemented was a sensible approach.

Modification 19_09 (which became effective on 10 July 2009) has aligned the Trading and Settlement Code with apportioning of the calculation methodology on a weekly basis as discussed above.

Methodology

The approach taken was; to develop a system for automating the calculation, to validate the results and to perform analysis on the billing weeks in question. When looking at billing weeks to chose for analysis, it was decided to pick weeks that did not include Make Whole Payments. This decision was made to simplify the replication of the calculations. The Make Whole Payments calculation is done on a weekly basis and while daily values may appear in settlement statements for the settlement days chosen, the final weekly invoice total would be netted off to zero. A week was chosen before the change in the Code and a week after. Overall market currency costs can be a benefit, positive value, or a cost, negative value. Sample weeks were chosen which had a benefit and another which had a cost.

The billing weeks that were chosen to analyse were Week 26 of 2008 which covers settlement days 29th of June 2008 to 5th of July 2008 inclusive and Week 49 of 2009 which covers settlement days 6th of December 2009 to 12th December 2009 inclusive.

The following Initial settlement variables were extracted from the settlement database for the selected billing weeks:

| Description | Charge Code |
|----------------------------------|--|
| Uninstructed Imbalances Payments | UNIMPO_X, UNIMPU_X, UNIMPOIEU_X, UNIMPUIEU_X |
| Constraint Payments | CONP_X, CONPIU_X, CONPIU_X, CONPDPPT_X, CONPUPPT_X, CONPVPTG_X |
| Testing Charges | TCHAR_X |

| Description | Charge Code |
|-----------------------|----------------|
| Energy Payments | ENP_X, ENPIU |
| Energy Charges | ENC_X, ENCJ_X |
| Imperfections Charges | IMPC_X, IMPJ_X |

Table 1

The data gathered was exported to Access databases where the settlement calculations were replicated. The first calculation replicated was the calculation implemented in the settlement system:

6.136A The Billing Period Currency Charge (BPCCGpb) to Participant p in respect of its Generator Units for the relevant Billing Period b shall be calculated as follows:

$$\begin{aligned}
 & \text{if } \sum_{d \text{ in } b} (\text{DAYP}d + \text{DAYC}d) \neq 0 \text{ then} \\
 & \text{BPCCGpb} = \frac{\text{BPC}b}{\sum_{d \text{ in } b} (\text{DAYP}d + \text{DAYC}d)} \times \sum_{d \text{ in } b} \sum_{u^* \text{ in } p} \text{DAYPU}ud \\
 & \text{else BPCCGpb} = 0
 \end{aligned}$$

Where

1. BPCb is the Billing Period Currency Cost for the relevant Billing Period b as set out in more detail in Agreed Procedure 15 "Invoicing";
2. DAYPdd is the Total Payment made for all Generator Units for Settlement Day d;
3. DAYCdd is the Total Charge for all Supplier Units for Settlement Day d;
4. DAYPUud is the Total Payments, excluding Capacity Payments, made for Generator Unit u for Settlement Day d;
5. $\sum_{u^* \text{ in } p}$ is a summation over all Generator Units excluding any Interconnector Residual Capacity Units registered to Participant p;
6. $\sum_{d \text{ in } b}$ is a summation over Settlement Days d in Billing Period b.

In order to calculate the Billing Period Currency Charge the following calculation had to be completed first.

The Billing Period Currency Cost (BPCb) is calculated as follows (AP 15):

$$BPC_b = IPCC_b + PPCC_{b-1} - SRACCAE_b$$

Where

1. IPCCbis the Invoice Period Currency Cost for Billing Period b;
2. PPCCb-1 is the Payment Period Currency Cost for the previous Billing Period b-1;
3. SRACCAEb is the Settlement Reallocation Agreement Currency Cost Adjustment for Billing Period b.

Of these three variables (IPCC, PPCC, SRACCAE), only the IPCC was recalculated manually. This was due to the fact that there was a market rule to do so. The PPCC figure is calculated on total weekly invoices amounts and is not broken down into daily figures. The SRACCAE can be broken down to daily figures but the figure is produced as a weekly total.

The IPCC (Invoice Period Currency Costs) figure was determined using the rules outlined below, as per Agreed Procedure 15, implemented through an Access database.. The IPCC is calculated on the Invoice Date. The Invoice Date is classed as the first Friday after the Billing Period. The Billing Period is based on a billing week which runs from Saturday to Sunday, as shown in Diagram 1 below.

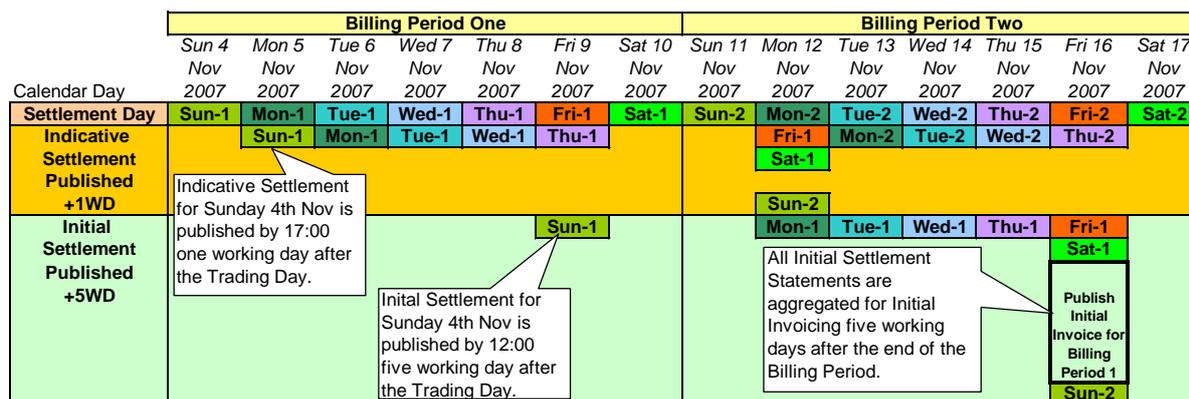


Diagram 1

According to Agreed Procedure 15 – Invoicing, to calculate the IPCC the following steps should be followed:

For each settlement day in the relevant Billing Period calculate the IPCC for each Trading Period:

1. Retrieve the Settlement Statement amounts for Pounds Sterling Participants as calculated for the current Invoice job.
2. Retrieve the Settlement Statement amounts for Pounds Sterling Participants as calculated for the previous Invoice job. (Note – if the current Invoice job is the Initial invoice, then this value will be zero).
3. Determine the net Settlement Statement amount, for each Trading Period, by deducting the Settlement Statements for Pounds Sterling Participants for the previous Invoice job from the Settlement Statement amounts for Pounds Sterling Participants for the current Invoice job.
4. Calculate the IPCC for each Trading Period by multiplying the net Settlement Statement amount by the current Invoice Day Exchange Rate minus the Trading Day Exchange Rate for that Trading Period.
5. Sum the Invoice Period Currency Cost for each Trading Period in the Billing Period to determine the Invoice Period Currency Cost.

As Initial data was used in these examples, step three was not necessary, so was not completed. The Initial settlement variables (listed in Table 1) were imported into an Access database. The Sterling Participant amounts were separated out and multiplied by the Trading Day Exchange Rate. The Sterling Participant amounts were then also multiplied by the Invoice Day Exchange rate. These two amounts were subtracted from each other, giving a Currency Cost total by variable, by unit and by trading period. These values were then summed to produce currency costs by variable and by settlement day. The replicated values are shown in Appendix 2.

The recalculation of the IPCC was correct for Week 26 (Jun), 2008; the figure from the manual Access database matched the Settlement System value of €358.71 for this billing week.

The recalculation of the IPCC was correct for Week 49 (Dec), 2009; the figure from the manual Access database matched the Settlement System value of €4501 for this billing week.

The Static Data for Week 26 (Jun), 2008 was:

| Variable Name | Variable Code | Value |
|--|---------------|-------------|
| Payment Period Currency Cost | PPCC | €-14,587.44 |
| Settlement Reallocation Agreement Currency Cost Adjustment | SRACCAE | €-27,091.16 |
| Invoice Period Currency Cost | IPCC | €358.71 |
| Currency Day Exchange Rate | Inverse CDEX | €1.1242 |
| Currency Day Exchange Rate Northern Ireland | CDEX_NI | 1 |

Table 2

The Static Data for Week 49 (Dec), 2009 was:

| Variable Name | Variable Code | Value |
|--|----------------|------------|
| Payment Period Currency Cost | Manual PPCEN_I | €-5,132.92 |
| Settlement Reallocation Agreement Currency Cost Adjustment | RCCREN | €9,415.22 |
| Invoice Period Currency Cost | IPCC | €4,501.00 |
| Currency Day Exchange Rate | Inverse CDEX | €1.2553 |
| Currency Day Exchange Rate Northern Ireland | CDEX_NI | 1 |

Table 3

The BPCCGpb was recalculated as per 6.136A of the Trading and Settlement Code, see page 2. Following the above the BPCb was calculated as follows:

$$BPC_b = IPCC_b + PPCC_{b-1} - SRACCAE_b$$

After the BPCCGpb figure was recalculated, it was then broken down to a Participant level. All of the volumes per Participant per Initial Settlement variable were summed. As per the Trading and Settlement Code, these values were converted to absolute values to avoid netting of positive and negative figures. The variable totals per Participant were then added together. This resulted in a figure for the total volumes per Participant for the billing week.

The Participant currency costs were then recalculated and they were matched to the values that were in the Settlement System. Then the overall currency costs formula from section 6.136A was followed.

For Sterling Participants:

$$\frac{\text{CDEX NI} * (\text{IPCC} + \text{PPCC} - \text{SRACCAE}) * \text{Total Participant Volumes}}{\text{Total Market Volume}}$$

For Euro Participants:

$$\frac{\text{Inverse CDEX} * (\text{IPCC} + \text{PPCC} - \text{SRACCAE}) * \text{Total Participant Volumes}}{\text{Total Market Volume}}$$

The individual Participant currency costs were cross checked against the system values and these matched. This calculation was successfully replicated. This replication was important in this process, as it proves that the model works and that the calculations are correct. This tool could be used after any future release to verify the calculations if required

In order to compare results accurately, it was decided to omit the PPCC figure from further calculations as this figure can not be broken down to a daily value. Therefore the formulas were altered slightly to reflect this.

Daily Calculation Comparison

For Sterling Participants:

$$\frac{\text{CDEX NI} * (\text{Daily IPCC} - \text{Daily SRACCAE}) * \text{Daily Participant Volumes}}{\text{Daily Market Volume}}$$

For Euro Participants:

$$\frac{\text{Inverse CDEX} * (\text{Daily IPCC} - \text{Daily SRACCAE}) * \text{Daily Participant Volumes}}{\text{Daily Market Volume}}$$

Weekly Calculation Comparison

For Sterling Participants:

$$\frac{\text{CDEX NI} * (\text{Weekly IPCC} - \text{Weekly SRACCAE}) * \text{Weekly Total Participant Volumes}}{\text{Weekly Total Market Volume}}$$

For Euro Participants:

$$\frac{\text{Inverse CDEX} * (\text{Weekly IPCC} - \text{SRACCAE}) * \text{Weekly Total Participant Volumes}}{\text{Weekly Total Market Volume}}$$

Analysis

The formulae detailed in the Methodology section above were used when calculating weekly and daily currency costs figures for comparison purposes. Each individual participant amount was calculated and then summed to give total daily amounts and total weekly amounts. For the billing week, Week 26 (Jun), 2008, the weekly currency costs totalled a cost of -€4,916.23 and the sum of the daily figures was a cost of -€ 4,914.22. There was a slight variance of €2.02 attributable to rounding in the Central Market Systems versus the Access Database.. The -€4,916.23 represented a charge to Participants in terms of currency costs. There was one exception to the Weekly calculation; one Participant was paid for their currency costs. This was due to an Interconnector Unit exporting; the aggregate of the Participant activity was negative, which resulted in a positive payment (due to sign conventions in the calculation), this aligns with the Trading and Settlement Code requirements.

In terms of the daily calculations, two Participants were paid. This was because when the IPCC was negative and the Reallocations were zero, the currency costs were negative for those days. Over the course of the seven days, the Participants' daily amounts totalled to be positive, therefore; they were paid €0.23 and €0.05 respectively.

For the billing week, Week 49 (Dec), 2009, the weekly currency costs totalled a gain of €26,732.84 and the sum of the daily figures was a gain of €26,732.28. There was a variance of €0.56 again attributable to rounding as outlined above. The €26,732.84 represented a gain in terms of currency costs therefore all Participants were paid.

There were variances between how the daily and weekly currency costs were allocated. While the same total amounts were charged or paid, (within the rounding error) their apportionment on a daily versus weekly differed.

The top nine variances in Euro amounts for Week 26 (Jun), 2008 shown below in Table 4:

| PARTICIPANT | Daily Charges | Weekly Charges | Largest variances | COST |
|-------------|---------------|----------------|-------------------|------------------|
| PT_400030 | -€ 1,303.12 | -€ 1,168.43 | -€ 134.69 | Charge Decreased |
| PT_500027 | -€ 453.09 | -€ 399.14 | -€ 53.96 | Charge Decreased |
| PT_400022 | -€ 133.12 | -€ 120.00 | -€ 13.11 | Charge Decreased |
| PT_500036 | -€ 286.00 | -€ 303.57 | € 17.57 | Charge Increased |
| PT_500024 | -€ 192.95 | -€ 212.35 | € 19.40 | Charge Increased |
| PT_400037 | -€ 265.35 | -€ 291.99 | € 26.64 | Charge Increased |
| PT_400044 | -€ 233.23 | -€ 262.86 | € 29.63 | Charge Increased |
| PT_400032 | -€ 10.43 | -€ 54.18 | € 43.75 | Charge Increased |
| PT_400021 | -€ 20.75 | -€ 67.19 | € 46.44 | Charge Increased |

Table 4

Of the remaining, 22 had a variance of less than €10 while 12 had a variance of less than €1, including three Participants who had a 0.1 cent variance.

The percentage changes for Week 26 (Jun), 2008 were:

| PARTICIPANT | % Variance | Daily | Weekly | Variance in Daily vs Weekly |
|-------------|------------|----------|----------|-----------------------------|
| PT_400036 | -5436% | -€ 0.07 | -€ 3.95 | € 3.88 |
| PT_400048 | -1117% | -€ 0.16 | -€ 1.99 | € 1.83 |
| PT_400055 | -521% | -€ 0.81 | -€ 5.05 | € 4.24 |
| PT_400032 | -420% | -€ 10.43 | -€ 54.18 | € 43.75 |
| PT_400042 | -364% | -€ 0.23 | -€ 1.06 | € 0.83 |
| PT_400050 | -340% | -€ 0.82 | -€ 3.61 | € 2.79 |
| PT_400054 | -316% | -€ 0.44 | -€ 1.85 | € 1.40 |
| PT_400056 | 1164% | € 0.23 | -€ 2.45 | € 2.68 |
| PT_500028 | 5715% | € 0.05 | -€ 2.70 | € 2.75 |

Table 5

Although these percentage changes were very high, the actual Euro amounts were small. The largest difference showed for PT_400032 which went from a charge of €10.43 to €54.18. The remaining variances were all under five euro.

The largest variances in Euro amounts for Week 49 (Dec), 2009 were:

| PARTICIPANT | Billing Period Currency Daily Charges | Billing Period Currency Weekly Charges | Variations | GAIN |
|-------------|--|---|------------|-------------------|
| PT_400040 | € 4,496.89 | € 4,724.62 | -€ 227.74 | Payment Increased |
| PT_400030 | € 4,277.38 | € 4,472.28 | -€ 194.89 | Payment Increased |
| PT_500036 | € 1,955.27 | € 2,034.12 | -€ 78.85 | Payment Increased |
| PT_400037 | € 1,115.70 | € 1,185.29 | -€ 69.59 | Payment Increased |
| PT_500024 | € 954.82 | € 1,017.33 | -€ 62.51 | Payment Increased |
| PT_400035 | € 860.59 | € 921.27 | -€ 60.68 | Payment Increased |
| PT_500040 | € 1.27 | € 35.48 | -€ 34.21 | Payment Increased |
| PT_400044 | € 1,074.51 | € 1,096.01 | -€ 21.50 | Payment Increased |
| PT_400042 | € 28.99 | € 6.29 | € 22.70 | Payment Decreased |
| PT_400021 | € 494.86 | € 469.79 | € 25.07 | Payment Decreased |
| PT_400045 | € 25.39 | € 0.12 | € 25.27 | Payment Decreased |
| PT_500028 | € 109.97 | € 82.47 | € 27.50 | Payment Decreased |
| PT_400023 | € 47.68 | € 19.07 | € 28.61 | Payment Decreased |
| PT_400029 | € 36.44 | € - | € 36.44 | Payment Decreased |
| PT_400038 | € 75.68 | € 37.60 | € 38.08 | Payment Decreased |
| PT_400041 | € 1,093.11 | € 1,054.20 | € 38.91 | Payment Decreased |
| PT_400034 | € 65.05 | € 24.21 | € 40.84 | Payment Decreased |
| PT_500021 | € 444.33 | € 399.85 | € 44.48 | Payment Decreased |
| PT_500037 | € 274.55 | € 227.53 | € 47.02 | Payment Decreased |
| PT_400031 | € 89.09 | € 0.08 | € 89.02 | Payment Decreased |
| PT_400064 | € 519.82 | € 374.69 | € 145.13 | Payment Decreased |

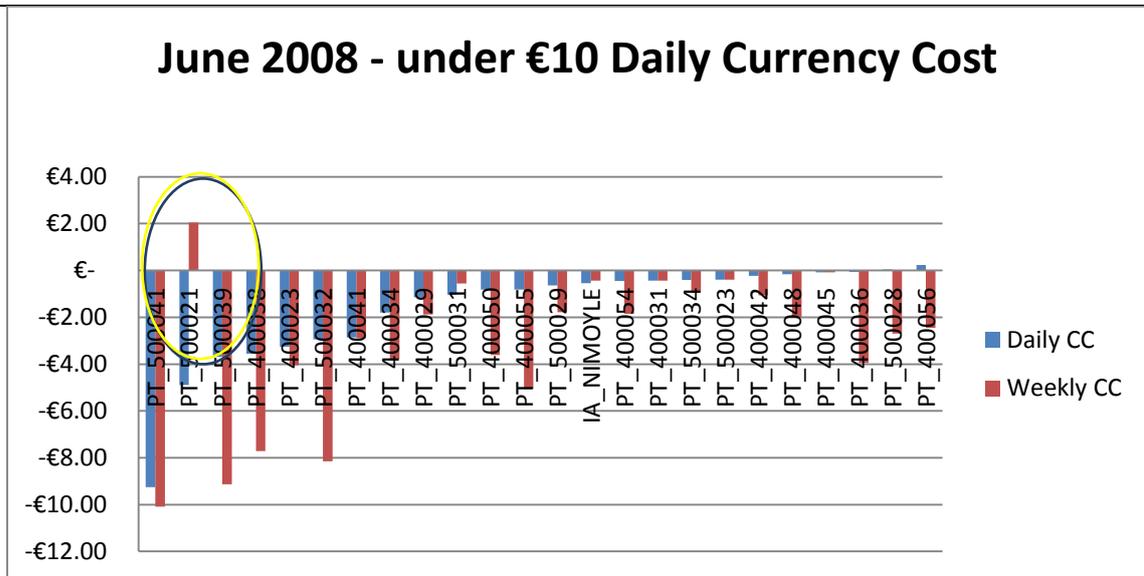
Table 6

Of the remaining 44 Participants from a total of 65 which had currency amounts, 35 had a variance of less than 20 euro and 16 had a variance of less than one euro.

| PARTICIPANT | % Variance | Daily CC Totals | Weekly CC Totals | Variance in Daily vs Weekly |
|-------------|---------------|-----------------|------------------|-----------------------------|
| PT_400045 | 100% | € 25.39 | € 0.12 | € 25.27 |
| PT_400031 | 100% | € 89.09 | € 0.08 | € 89.02 |
| PT_400029 | 100% | € 36.44 | € - | € 36.44 |
| PT_400058 | 100% | € 0.17 | € - | € 0.17 |
| PT_400071 | 100% | € 0.08 | € - | € 0.08 |
| PT_400073 | 100% | € 0.05 | € - | € 0.05 |
| PT_400075 | 100% | -€ 0.02 | € - | -€ 0.02 |
| PT_500026 | 100% | € 10.15 | € - | € 10.15 |
| PT_500035 | 100% | -€ 0.19 | € - | -€ 0.19 |

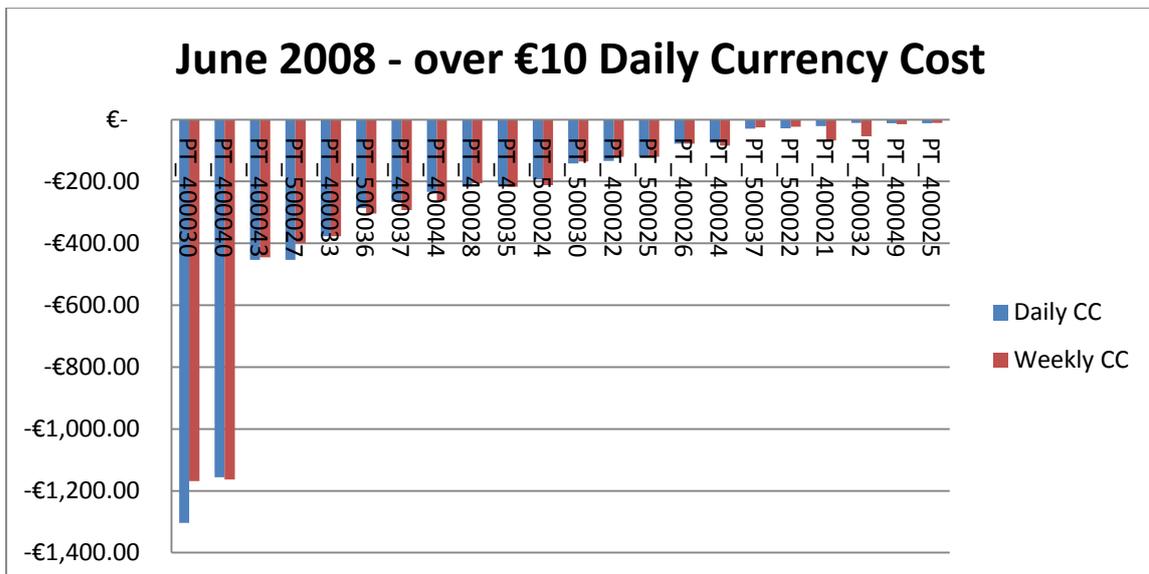
Table 7

It is clear from the graphs below that, apart from a couple of outliers, the amounts (either payments or charges) do not vary greatly.



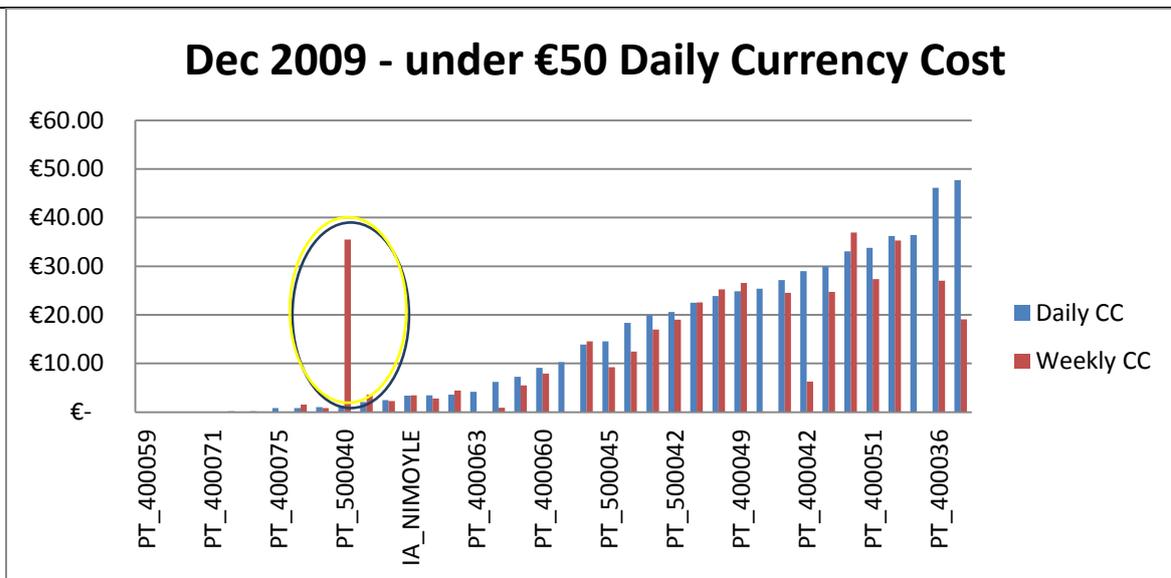
Graph 1

The payment above has been explained above where it was noted that PT_500021 had an interconnector unit that was exporting throughout this billing period leading to an overall negative participant activity amount.

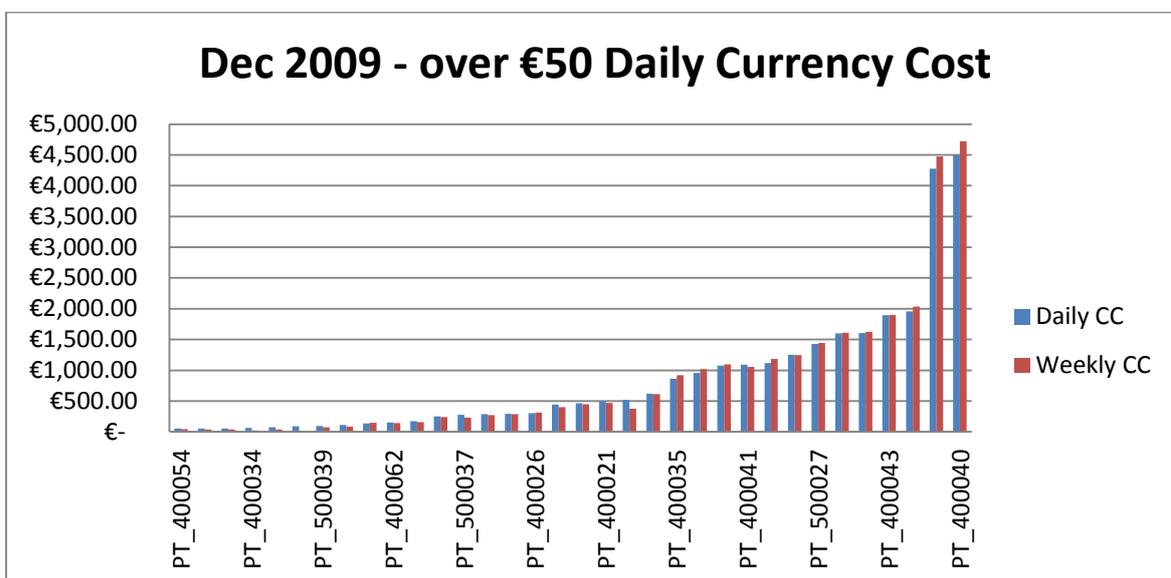


Graph 2

PT_500040 is an outlier Graph 3. This is an example of how daily and weekly costs would differ if a unit was not on every day. In this example, PT_500040 generates the majority of its weekly total in one day, and the only other day it is active it exports. This highlights that there is a difference with Participants who do not operate every day or who significantly change their behaviour daily..



Graph 3



Graph 4

In terms of overall Currency Costs from the start of the market (November 2007) until 10th July 2009, when the mod was implemented, the overall figure was a net benefit of €75,945.52. This figure was derived over 88 billing weeks. There is a 50/50 split in terms of costs and benefits, 44 weeks had costs and 44 had gains. The majority of the costs fell between the €5,000 to €15,000 bracket, while the majority of gains fell between €500 to €5,000. A full breakdown is listed in Appendix 4.

| Cost (-) | | Benefit (+) | |
|-------------------------|-----------|-------------------------|-----------|
| Between €10 - €100 | 2 | Between €10 - €100 | 0 |
| Between €100 - €500 | 6 | Between €100 - €500 | 1 |
| Between €500 - €5,000 | 13 | Between €500 - €5,000 | 22 |
| Between €5000 - €15,000 | 17 | Between €5000 - €15,000 | 12 |
| Greater than €15,000 | 6 | Greater than €15,000 | 9 |
| Total Weeks | 44 | Total Weeks | 44 |

Table 8

Conclusions

The main conclusions from this analysis are:

- The original calculation in the Trading and Settlement Code was unclear and not implementable in its original form.
- Although the apportionment by participant would vary if the calculation was daily, the changes are relatively small.
- The changes in the euro amounts were relatively small, as can be seen in the graphs.
- The monetary value from the start of the market to the time the Code change was implemented is an overall benefit of €76K.
- If the calculation was to go to a daily calculation the PPCC value would have to be addressed as it is currently a weekly value only.
- The variances noted in this analysis do not represent “errors” in the calculation of settlement amounts for Participants. This is because the Trading & Settlement Code as it existed for this period did not include a full solution for the smearing of all currency costs. It would therefore not be possible to demonstrate that values calculated were incorrect because no correct method could be applied.
- The code and the system are now in sync so there should be no need to amend either at this stage.
- The methodology could be used for future changes in Currency Costs.

Appendix 1 - List of Exchange Rates

The exchange rates for the relevant weeks were:

Week 26 (Jun), 2008

| Trade Date | TDEX_NI |
|------------|---------|
| 29/06/2008 | 0.7924 |
| 30/06/2008 | 0.7924 |
| 01/07/2008 | 0.7924 |
| 02/07/2008 | 0.7923 |
| 03/07/2008 | 0.7909 |
| 04/07/2008 | 0.7952 |
| 05/07/2008 | 0.7992 |

Week 49 (Dec), 2009

| Trade Date | TDEX_NI |
|------------|---------|
| 06/12/2009 | 0.9048 |
| 07/12/2009 | 0.9048 |
| 08/12/2009 | 0.9048 |
| 09/12/2009 | 0.9051 |
| 10/12/2009 | 0.907 |
| 11/12/2009 | 0.9046 |
| 12/12/2009 | 0.9043 |

Appendix 2 – IPCC calculation replicated

Week 26 (Jun), 2008

| SETTLEDAY | Sum CONPCC | | SETTLEDAY | Sum ENPCC |
|-----------|--------------------|--|-------------------------|---------------------|
| 29-Jun-08 | -€ 528.84 | | 29-Jun-08 | -€ 7,436.96 |
| 30-Jun-08 | -€ 570.74 | | 30-Jun-08 | -€ 10,338.84 |
| 01-Jul-08 | € 436.13 | | 01-Jul-08 | -€ 10,304.90 |
| 02-Jul-08 | € 683.45 | | 02-Jul-08 | -€ 13,607.07 |
| 03-Jul-08 | € 650.03 | | 03-Jul-08 | -€ 15,990.71 |
| 04-Jul-08 | € 182.65 | | 04-Jul-08 | -€ 4,838.69 |
| 05-Jul-08 | -€ 189.60 | | 05-Jul-08 | € 4,479.28 |
| | € 663.07 | | | -€ 58,037.88 |
| SETTLEDAY | Sum ENCCC | | SETTLEDAY | Sum IMPCC |
| 29-Jun-08 | € 6,936.44 | | 29-Jun-08 | € 255.28 |
| 30-Jun-08 | € 10,083.46 | | 30-Jun-08 | € 298.31 |
| 01-Jul-08 | € 9,272.65 | | 01-Jul-08 | € 304.49 |
| 02-Jul-08 | € 11,009.72 | | 02-Jul-08 | € 309.08 |
| 03-Jul-08 | € 13,348.40 | | 03-Jul-08 | € 402.39 |
| 04-Jul-08 | € 3,981.70 | | 04-Jul-08 | € 153.66 |
| 05-Jul-08 | -€ 3,562.28 | | 05-Jul-08 | -€ 113.96 |
| | € 51,070.09 | | | € 1,609.25 |
| SETTLEDAY | Sum UNIMPCC | | TOTAL | -€ 4,501.00 |
| 29-Jun-08 | € 19.92 | | | |
| | | | Settlement System Value | -€ 4,501.00 |
| 30-Jun-08 | € 14.25 | | | |
| 01-Jul-08 | € 38.62 | | | |
| 02-Jul-08 | € 9.03 | | | |
| 03-Jul-08 | € 174.99 | | | |
| 04-Jul-08 | -€ 18.83 | | | |
| 05-Jul-08 | -€ 43.50 | | | |
| | € 194.47 | | | |

Week 49 (Dec), 2009

| SETTLEDAY | Sum CONPCC | | SETTLEDAY | Sum ENPCC |
|-----------|---------------|--|--------------------------------|------------------|
| 06-Dec-09 | € 2,220.44 | | 06-Dec-09 | € 11,824.98 |
| 07-Dec-09 | € 1,561.22 | | 07-Dec-09 | € 19,985.78 |
| 08-Dec-09 | € 1,089.01 | | 08-Dec-09 | € 17,102.17 |
| 09-Dec-09 | € 2,385.92 | | 09-Dec-09 | € 24,570.08 |
| 10-Dec-09 | € 1,732.54 | | 10-Dec-09 | € 21,512.78 |
| 11-Dec-09 | € 1,463.42 | | 11-Dec-09 | € 19,905.03 |
| 12-Dec-09 | € 1,297.24 | | 12-Dec-09 | € 15,881.42 |
| | € 11,749.78 | | | € 130,782.24 |
| | | | | |
| SETTLEDAY | Sum ENCCC | | SETTLEDAY | Sum IMPCC |
| 06-Dec-09 | -€ 14,129.35 | | 06-Dec-09 | -€ 1,015.59 |
| 07-Dec-09 | -€ 20,204.02 | | 07-Dec-09 | -€ 1,149.68 |
| 08-Dec-09 | -€ 16,729.28 | | 08-Dec-09 | -€ 1,151.52 |
| 09-Dec-09 | -€ 24,156.55 | | 09-Dec-09 | -€ 1,163.82 |
| 10-Dec-09 | -€ 22,073.92 | | 10-Dec-09 | -€ 1,319.93 |
| 11-Dec-09 | -€ 19,891.66 | | 11-Dec-09 | -€ 1,131.51 |
| 12-Dec-09 | -€ 16,941.34 | | 12-Dec-09 | -€ 1,000.20 |
| | -€ 134,126.13 | | | -€ 7,932.26 |
| | | | | |
| SETTLEDAY | Sum UNIMPCC | | SETTLEDAY | Sum TCHARCC |
| 06-Dec-09 | € 205.11 | | 06-Dec-09 | € - |
| 07-Dec-09 | -€ 141.67 | | 07-Dec-09 | € - |
| 08-Dec-09 | € 0.05 | | 08-Dec-09 | € - |
| 09-Dec-09 | -€ 9.25 | | 09-Dec-09 | € - |
| 10-Dec-09 | -€ 83.66 | | 10-Dec-09 | -€ 0.94 |
| 11-Dec-09 | -€ 54.91 | | 11-Dec-09 | € - |
| 12-Dec-09 | -€ 29.66 | | 12-Dec-09 | € - |
| | -€ 113.99 | | | -€ 0.94 |
| | | | | |
| | | | TOTAL | -€ 358.71 |
| | | | Settlement System Value | -€ 358.71 |
| | | | | |

Appendix 3 – Daily Currency Costs vs Weekly Currency Costs

| COST | | | | Jun-08 |
|-------------|------------|-------------|-------------|-----------------------------|
| PARTICIPANT | % Variance | Daily CC | Weekly CC | Variance in Daily vs Weekly |
| IA_NIMOYLE | 19% | -€ 0.54 | -€ 0.44 | -€ 0.10 |
| PT_400021 | -224% | -€ 20.75 | -€ 67.19 | € 46.44 |
| PT_400022 | 10% | -€ 133.12 | -€ 120.00 | -€ 13.11 |
| PT_400023 | -24% | -€ 3.26 | -€ 4.04 | € 0.79 |
| PT_400024 | -12% | -€ 75.13 | -€ 84.25 | € 9.12 |
| PT_400025 | 4% | -€ 11.39 | -€ 10.90 | -€ 0.49 |
| PT_400026 | -1% | -€ 77.56 | -€ 78.23 | € 0.66 |
| PT_400028 | 5% | -€ 215.54 | -€ 205.79 | -€ 9.75 |
| PT_400029 | -65% | -€ 1.14 | -€ 1.88 | € 0.74 |
| PT_400030 | 10% | -€ 1,303.12 | -€ 1,168.43 | -€ 134.69 |
| PT_400031 | -1% | -€ 0.43 | -€ 0.44 | € 0.01 |
| PT_400032 | -420% | -€ 10.43 | -€ 54.18 | € 43.75 |
| PT_400033 | 0% | -€ 377.39 | -€ 377.02 | -€ 0.37 |
| PT_400034 | -110% | -€ 1.80 | -€ 3.77 | € 1.97 |
| PT_400035 | -4% | -€ 208.61 | -€ 217.21 | € 8.60 |
| PT_400036 | -5436% | -€ 0.07 | -€ 3.95 | € 3.88 |
| PT_400037 | -10% | -€ 265.35 | -€ 291.99 | € 26.64 |
| PT_400038 | -117% | -€ 3.56 | -€ 7.72 | € 4.16 |
| PT_400040 | -1% | -€ 1,155.92 | -€ 1,163.60 | € 7.68 |
| PT_400041 | -1% | -€ 2.86 | -€ 2.89 | € 0.03 |
| PT_400042 | -364% | -€ 0.23 | -€ 1.06 | € 0.83 |
| PT_400043 | 2% | -€ 453.51 | -€ 444.60 | -€ 8.91 |
| PT_400044 | -13% | -€ 233.23 | -€ 262.86 | € 29.63 |
| PT_400045 | 6% | -€ 0.08 | -€ 0.08 | -€ 0.01 |
| PT_400048 | -1117% | -€ 0.16 | -€ 1.99 | € 1.83 |
| PT_400049 | -19% | -€ 12.16 | -€ 14.50 | € 2.34 |
| PT_400050 | -340% | -€ 0.82 | -€ 3.61 | € 2.79 |
| PT_400054 | -316% | -€ 0.44 | -€ 1.85 | € 1.40 |
| PT_400055 | -521% | -€ 0.81 | -€ 5.05 | € 4.24 |
| PT_400056 | 1164% | € 0.23 | -€ 2.45 | € 2.68 |
| PT_500021 | 142% | -€ 4.89 | € 2.05 | -€ 6.94 |
| PT_500022 | 17% | -€ 27.86 | -€ 22.98 | -€ 4.88 |
| PT_500023 | -1% | -€ 0.39 | -€ 0.39 | € 0.01 |
| PT_500024 | -10% | -€ 192.95 | -€ 212.35 | € 19.40 |
| PT_500025 | -1% | -€ 119.44 | -€ 120.32 | € 0.88 |
| PT_500027 | 12% | -€ 453.09 | -€ 399.14 | -€ 53.96 |
| PT_500028 | 5715% | € 0.05 | -€ 2.70 | € 2.75 |
| PT_500029 | -177% | -€ 0.64 | -€ 1.78 | € 1.13 |
| PT_500030 | 5% | -€ 142.22 | -€ 135.35 | -€ 6.87 |
| PT_500031 | 46% | -€ 1.04 | -€ 0.56 | -€ 0.48 |
| PT_500032 | -177% | -€ 2.94 | -€ 8.15 | € 5.21 |
| PT_500034 | -131% | -€ 0.40 | -€ 0.93 | € 0.53 |
| PT_500036 | -6% | -€ 286.00 | -€ 303.57 | € 17.57 |
| PT_500037 | 16% | -€ 29.43 | -€ 24.71 | -€ 4.71 |
| PT_500039 | -147% | -€ 3.70 | -€ 9.13 | € 5.43 |
| PT_500041 | -9% | -€ 9.26 | -€ 10.09 | € 0.83 |

| GAIN | | | | Dec-09 |
|--------------------|-------------------|-----------------|------------------|------------------------------------|
| PARTICIPANT | % Variance | Daily CC | Weekly CC | Variance in Daily vs Weekly |
| IA_NIMOYLE | -22% | € 2.87 | € 3.49 | -€ 0.62 |
| PT_400021 | 5% | € 494.86 | € 469.79 | € 25.07 |
| PT_400022 | 0% | € 1,252.35 | € 1,247.78 | € 4.57 |
| PT_400023 | 60% | € 47.68 | € 19.07 | € 28.61 |
| PT_400024 | 5% | € 287.36 | € 273.24 | € 14.12 |
| PT_400025 | 30% | € 54.96 | € 38.56 | € 16.40 |
| PT_400026 | -4% | € 302.74 | € 315.27 | -€ 12.52 |
| PT_400028 | -1% | € 1,607.25 | € 1,627.19 | -€ 19.94 |
| PT_400029 | 100% | € 36.44 | € - | € 36.44 |
| PT_400030 | -5% | € 4,277.38 | € 4,472.28 | -€ 194.89 |
| PT_400031 | 100% | € 89.09 | € 0.08 | € 89.02 |
| PT_400032 | 0% | € 289.50 | € 289.13 | € 0.37 |
| PT_400033 | -1% | € 1,601.09 | € 1,611.80 | -€ 10.71 |
| PT_400034 | 63% | € 65.05 | € 24.21 | € 40.84 |
| PT_400035 | -7% | € 860.59 | € 921.27 | -€ 60.68 |
| PT_400036 | 41% | € 46.10 | € 27.01 | € 19.09 |
| PT_400037 | -6% | € 1,115.70 | € 1,185.29 | -€ 69.59 |
| PT_400038 | 50% | € 75.68 | € 37.60 | € 38.08 |
| PT_400040 | -5% | € 4,496.89 | € 4,724.62 | -€ 227.74 |
| PT_400041 | 4% | € 1,093.11 | € 1,054.20 | € 38.91 |
| PT_400042 | 78% | € 28.99 | € 6.29 | € 22.70 |
| PT_400043 | 0% | € 1,896.31 | € 1,901.24 | -€ 4.93 |
| PT_400044 | -2% | € 1,074.51 | € 1,096.01 | -€ 21.50 |
| PT_400045 | 100% | € 25.39 | € 0.12 | € 25.27 |
| PT_400048 | -5% | € 13.92 | € 14.57 | -€ 0.65 |
| PT_400049 | -7% | € 24.88 | € 26.54 | -€ 1.67 |
| PT_400050 | -8% | € 135.32 | € 145.87 | -€ 10.55 |
| PT_400054 | 16% | € 51.69 | € 43.58 | € 8.11 |
| PT_400055 | -12% | € 33.04 | € 36.94 | -€ 3.90 |
| PT_400056 | 10% | € 27.18 | € 24.52 | € 2.66 |
| PT_500021 | 10% | € 444.83 | € 399.85 | € 44.98 |
| PT_500022 | 4% | € 249.69 | € 240.67 | € 9.02 |
| PT_500023 | 83% | € 5.37 | € 0.89 | € 4.48 |
| PT_500024 | -6% | € 956.74 | € 1,017.33 | -€ 60.59 |
| PT_500025 | 3% | € 461.02 | € 448.48 | € 12.54 |
| PT_500027 | -1% | € 1,432.76 | € 1,443.06 | -€ 10.29 |
| PT_500028 | 24% | € 108.88 | € 82.47 | € 26.42 |
| PT_500029 | 31% | € 18.03 | € 12.43 | € 5.60 |
| PT_500030 | 2% | € 621.73 | € 611.58 | € 10.15 |
| PT_500031 | 11% | € 173.50 | € 154.79 | € 18.71 |
| PT_500032 | 27% | € 55.01 | € 40.21 | € 14.80 |
| PT_500034 | -60% | € 3.45 | € 5.52 | -€ 2.08 |
| PT_500036 | -4% | € 1,958.98 | € 2,034.12 | -€ 75.14 |
| PT_500037 | 17% | € 274.47 | € 227.53 | € 46.95 |
| PT_500039 | 20% | € 93.82 | € 75.19 | € 18.63 |
| PT_500041 | -6% | € 23.88 | € 25.26 | -€ 1.38 |
| PT_500042 | 8% | € 20.57 | € 19.02 | € 1.55 |
| PT_500044 | 15% | € 19.96 | € 16.97 | € 2.98 |
| PT_500045 | 36% | € 14.51 | € 9.22 | € 5.29 |
| PT_500046 | 3% | € 36.31 | € 35.29 | € 1.02 |
| PT_500047 | 18% | € 30.03 | € 24.74 | € 5.30 |
| PT_500048 | 19% | € 1.02 | € 0.83 | € 0.19 |

| GAIN | | | | Dec-09 |
|--------------------|-------------------|-----------------|------------------|------------------------------------|
| PARTICIPANT | % Variance | Daily CC | Weekly CC | Variance in Daily vs Weekly |
| PT_500049 | 100% | € 0.05 | € - | € 0.05 |
| PT_400047 | 0% | € 0.00 | € 0.00 | € - |
| PT_400057 | -24% | € 3.57 | € 4.44 | -€ 0.86 |
| PT_400058 | 100% | € 0.17 | € - | € 0.17 |
| PT_400059 | 73% | € 0.02 | € 0.01 | € 0.02 |
| PT_400060 | 13% | € 9.13 | € 7.90 | € 1.22 |
| PT_400062 | 8% | € 154.14 | € 142.36 | € 11.78 |
| PT_400063 | 98% | € 4.20 | € 0.07 | € 4.13 |
| PT_400064 | 28% | € 519.82 | € 374.69 | € 145.13 |
| PT_400065 | -75% | € 2.05 | € 3.58 | -€ 1.53 |
| PT_400066 | 0% | € 22.46 | € 22.54 | -€ 0.08 |
| PT_400070 | 20% | € 3.49 | € 2.79 | € 0.70 |
| PT_400071 | 100% | € 0.08 | € - | € 0.08 |
| PT_400072 | 8% | € 2.48 | € 2.29 | € 0.20 |
| PT_400073 | 100% | € 0.05 | € - | € 0.05 |
| PT_400075 | 100% | -€ 0.02 | € - | -€ 0.02 |
| PT_400076 | -35% | € 1.15 | € 1.56 | -€ 0.41 |
| PT_400051 | 19% | € 33.79 | € 27.36 | € 6.43 |
| PT_500026 | 100% | € 10.15 | € - | € 10.15 |
| PT_500035 | 100% | -€ 0.19 | € - | -€ 0.19 |
| PT_500040 | -1965% | € 1.72 | € 35.48 | -€ 33.76 |

Appendix 4 – Weekly Costs and Benefits

| Date | IPCC Cost |
|--------------|----------------------|
| 10/11/2007 | -€ 5,379.56 |
| 24/11/2007 | -€ 39.47 |
| 01/12/2007 | -€ 1,125.18 |
| 08/12/2007 | -€ 3,649.27 |
| 22/12/2007 | -€ 493.89 |
| 29/12/2007 | -€ 8,611.08 |
| 12/01/2008 | -€ 47.26 |
| 19/01/2008 | -€ 2,174.57 |
| 09/02/2008 | -€ 7,987.06 |
| 26/04/2008 | -€ 13,436.04 |
| 24/05/2008 | -€ 4,887.64 |
| 31/05/2008 | -€ 4,447.79 |
| 07/06/2008 | -€ 8,344.49 |
| 21/06/2008 | -€ 367.61 |
| 19/07/2008 | -€ 9,960.45 |
| 26/07/2008 | -€ 3,469.14 |
| 23/08/2008 | -€ 528.16 |
| 06/09/2008 | -€ 6,502.01 |
| 13/09/2008 | -€ 13,286.31 |
| 20/09/2008 | -€ 2,951.70 |
| 04/10/2008 | -€ 10,002.81 |
| 18/10/2008 | -€ 356.95 |
| 25/10/2008 | -€ 37,776.57 |
| 01/11/2008 | -€ 9,168.89 |
| 08/11/2008 | -€ 17,472.55 |
| 15/11/2008 | -€ 33,712.94 |
| 29/11/2008 | -€ 14,835.16 |
| 06/12/2008 | -€ 121.08 |
| 03/01/2009 | -€ 6,058.06 |
| 17/01/2009 | -€ 36,296.77 |
| 24/01/2009 | -€ 9,037.11 |
| 31/01/2009 | -€ 31,147.58 |
| 07/02/2009 | -€ 5,261.75 |
| 28/02/2009 | -€ 265.89 |
| 07/03/2009 | -€ 10,728.29 |
| 21/03/2009 | -€ 211.52 |
| 28/03/2009 | -€ 903.27 |
| 04/04/2009 | -€ 1,579.49 |
| 11/04/2009 | -€ 6,818.93 |
| 18/04/2009 | -€ 2,721.95 |
| 02/05/2009 | -€ 4,928.38 |
| 16/05/2009 | -€ 8,066.46 |
| 23/05/2009 | -€ 16,709.10 |
| 20/06/2009 | -€ 2,454.45 |
| TOTAL | -€ 364,324.63 |

| Date | IPCC Benefit |
|--------------|---------------------|
| 03/11/2007 | € 1,646.50 |
| 17/11/2007 | € 3,383.75 |
| 15/12/2007 | € 631.15 |
| 05/01/2008 | € 1,727.79 |
| 26/01/2008 | € 3,626.09 |
| 02/02/2008 | € 3,406.43 |
| 16/02/2008 | € 2,684.19 |
| 23/02/2008 | € 2,811.03 |
| 01/03/2008 | € 5,312.14 |
| 08/03/2008 | € 1,226.94 |
| 15/03/2008 | € 28,153.78 |
| 22/03/2008 | € 14,636.49 |
| 29/03/2008 | € 19,699.20 |
| 05/04/2008 | € 15,178.77 |
| 12/04/2008 | € 55,241.52 |
| 19/04/2008 | € 5,539.25 |
| 03/05/2008 | € 639.38 |
| 10/05/2008 | € 6,650.70 |
| 17/05/2008 | € 4,209.40 |
| 14/06/2008 | € 2,325.47 |
| 28/06/2008 | € 5,463.44 |
| 05/07/2008 | € 4,501.00 |
| 12/07/2008 | € 128.23 |
| 02/08/2008 | € 1,973.25 |
| 09/08/2008 | € 10,405.29 |
| 16/08/2008 | € 1,143.17 |
| 30/08/2008 | € 24,211.50 |
| 27/09/2008 | € 539.56 |
| 11/10/2008 | € 5,021.04 |
| 22/11/2008 | € 12,548.12 |
| 13/12/2008 | € 4,888.22 |
| 20/12/2008 | € 26,657.88 |
| 27/12/2008 | € 18,849.87 |
| 10/01/2009 | € 23,286.65 |
| 14/02/2009 | € 3,313.52 |
| 21/02/2009 | € 63,477.80 |
| 14/03/2009 | € 7,534.38 |
| 25/04/2009 | € 11,714.98 |
| 09/05/2009 | € 889.60 |
| 30/05/2009 | € 2,850.31 |
| 06/06/2009 | € 3,396.92 |
| 13/06/2009 | € 4,562.41 |
| 27/06/2009 | € 8,412.73 |
| 04/07/2009 | € 12,785.59 |
| TOTAL | € 437,285.43 |

Appendix 5 – Item from the Audit Report

1. Calculation of Currency Charge

(First reported in 2008)

During the 2008 Market Audit, we noted that the calculation of the Billing Period and Capacity Period Currency charges was not compliant with the Code which required the charge to be based on the total of the apportioned daily currency cost, made up of the invoice, payment and resettlement currency cost. We understand that the actual calculation performed by SEMO was to apportion the total billing period / capacity period currency cost over the whole of the billing / capacity period.

Modification 19_09 (which became effective on 10 July 2009) has aligned the TSC with the calculation methodology outlined above. However SEMO have not yet completed their work to analyse the currency charge that would be calculated under the Code that was effective prior to this date in order to quantify the magnitude of any adjustments required.

Two related issues have been addressed during 2010 and will be corrected through the resettlement schedule, namely:

- Inclusion of Settlement Reallocation Agreements (“SRAs”) that have been cancelled by the Market Operator pursuant to paragraph 6.245A in the calculation of the Settlement Reallocation Agreement Currency Cost Adjustment.
- Manual errors in the calculation of the payment period currency cost (“PPCC”).

In addition a further manual error was noted in the calculation of PPCC during our 2010 testing whereby an incorrect payment date was used in the calculation, leading to the use of an exchange rate of zero for a specific invoice.

The Currency Charge has been incorrectly calculated throughout the period prior to 10 July 2009 due to misalignment between the Settlement system and the TSC. Individual participants may have been under or over charged, although quantification of the difference is hindered by the lack of clear definition of the payment period currency cost prior to the implementation of modification 19_09.

In respect of the resolved items the impact of these issues, quantified at approximately €300k in our 2009 report, is to be fully corrected within the Market.

The specific manual error noted had an immaterial impact on the calculation of the overall PPCC for the date noted.

SEMO will complete the analysis by November 2011.

This issue has been resolved in the May 2011 release, the manual calculation of PPCC has been removed for all timetabled resettlements.

For ad-hoc resettlements we have taken steps to avoid a reoccurrence of the issue. These steps are:

- Double-checking of calculations (sign-off needed from two controllers).
- Changes to the PPCC calculation template to flag up missing FX rates.