

Title	MSP Demand Issue – Second Interim Report
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Author	SEMO

Introduction

The purpose of this document is to provide a second interim report on the analysis carried out by SEMO with respect to the issues noted in the determination of the Schedule Demand as used in the MSP software.

This interim report is prepared specifically to review the impact of the incorrect Schedule Demand with respect to Trading Dates which included SO-SO Trade on the Moyle Interconnector (excluding those which have been previously studied as part of the Dual Rating Modification process, reported on in the First Interim Report).

Background

After very large SO-SO Trades were observed on the Moyle Interconnector in October and November 2008, an investigation was undertaken by SEMO after large Energy Imbalances were noted on the same dates as these SO-SO Trades took place.

After this investigation and following up with the vendor of the SEM central market systems, it was discovered that there was an issue with how the system pre-processes data inputs for the MSP software. With regard to the derivation the Schedule Demand, it was observed that the Dispatch Quantity for the Interconnector Residual Capacity Unit was not being correctly calculated. This has led to an incorrect value of Schedule Demand being observed on dates where SO-SO Trades (managed in SEM as the IRCU) were encountered.

Further analysis determined that the full value of Interconnector Metered Generation was being included in the Schedule Demand. This meant that on days where SO-SO Trades existed, these trades would be counted twice in the derivation of Schedule Demand - once as Dispatch Quantity for the IRCU and again as part of the total Interconnector Metered Generation. However, as a result of this on days where no SO-SO Trades existed, the inclusion of the total Interconnector Metered Generation meant that the Metered Generation for the Interconnector Error Units was incorrectly included in the Schedule Demand.

As a result, all pricing runs since the start of the SEM are affected by this error.

SEMO has undertaken to deliver a body of analysis to assess the impact on SEM prices and schedules and to indicate the materiality of the issue. It is hoped that this analysis will be completed by the end of February 2009 and reported to Participants shortly after.

The analysis will comprise of -

- Complete offline studies for all days with SO Trades;
- Offline studies of dates with IEU volumes which are identified as possibly having material impact on the SEM;
- Complete offline studies for all days where the Kilroot step into its oil price is a greater MW value than the quantity of the error;
- Offline studies for other “unaffected” dates for use as control dates;
- Review of the dates studied for the Dual Rating Modification.

In each case, SEMO will re-run the SEM using the MSP software in offline mode and will do a comparative analysis between the original published schedule (the base-case) and the new study (the re-run case). This comparison will follow the process as set out in the report issued by SEMO on the calculation and application of the Settlement Recalculation Threshold. The report to be issued to the Participants will highlight major variances in System Marginal Price, noting where the re-run case showed that the SEM for that Trading Date would have changed by greater than the Settlement Recalculation Threshold.

A number of study dates have been identified based on the criteria above and the requirement to report for the Fourth Dual Rating Modification Working Group. The full list of dates and the reasons for their selection is included in [Appendix 1](#) to this document. They can be summarised in the following graph.

Taking account that all dates are affected by the incorrect inclusion of the Metered Generation of the Interconnector Error Unit, only dates with a significant quantity of MG for the IEU are considered “issue” dates. These dates are identified by observing the MG of the IEU taking note of peak quantities in a Trading Period, average quantities across a Trading Day, and total quantities across a Trading Day. Standard deviations have also been used to identify some dates but this was not the primary method.

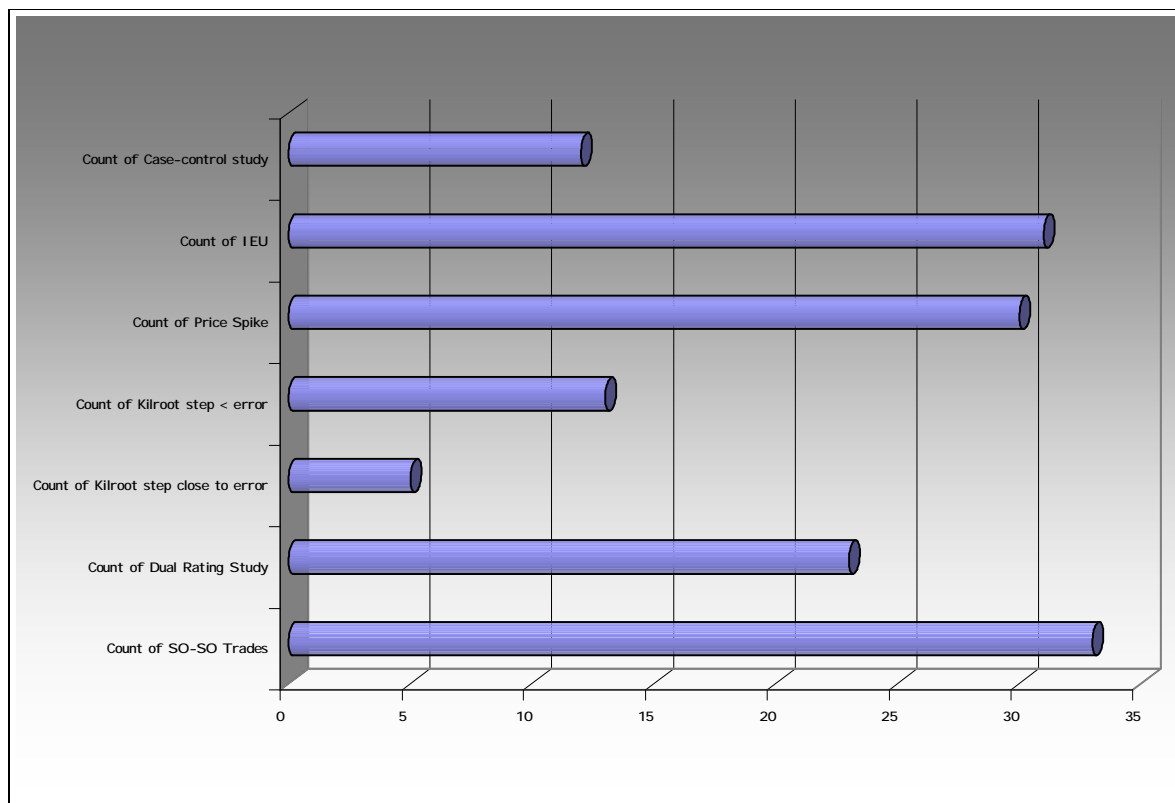


Figure 1 - Study Days

Process

SEMO identified 33 dates from Nov 1st 2007 through to Dec 1st 2008 where SO-SO Trades had been observed on the Moyle Interconnector. After Dec 1st 2008, SEMO put in place a manual workaround to ensure that the value considered in the MSP Schedule Demand was limited to the summed Metered Generation of the trading Interconnector Units (the equivalent of the sum of the Modified Interconnector User Nominations) which means that SO-SO Trades after this date have not impacted on the derivation of the Schedule Demand.

Of the 33 dates identified, 4 had already been included in the studies completed as part of the first interim report for the Dual Rating Modification Working Group. This left a further 29 dates not covered that required a review.

The full list of the 33 dates is shown in Table 2 below, including the study cases already included in the interim report for the Dual Rating Modification Working Group.

Dates	SO-SO Trades	Dual Rating Study	Kilroot step close to error	Kilroot step < error	Price Spike	IEU
02/11/2007	x					
14/11/2007	x					
14/12/2007	x					
20/12/2007	x					
28/12/2007	x				x	
20/01/2008	x					
21/01/2008	x	x		x		
22/01/2008	x					
29/01/2008	x					
30/01/2008	x			x	x	
01/02/2008	x					
04/02/2008	x	x			x	
26/02/2008	x					x
21/03/2008	x					
29/03/2008	x	x			x	
30/03/2008	x					
31/03/2008	x					x
01/04/2008	x					
22/04/2008	x					
08/05/2008	x					
27/05/2008	x					x
13/06/2008	x	x		x		
20/06/2008	x					
10/07/2008	x					x
31/07/2008	x					
20/08/2008	x					x
14/09/2008	x					x
14/10/2008	x			x		
19/10/2008	x			x		
15/11/2008	x			x		x
16/11/2008	x			x		x
17/11/2008	x			x		
19/11/2008	x			x		

Table 1 - Full List of SO-SO Trades

To complete this analysis, original savecase files of the published runs of the SEM for these dates were restored. The inputs to the MSP software were edited in that the value of Interconnector Metered Generation was replaced by the summed quantity of all the Modified Interconnector Unit Nominations for each Interconnector Unit. The result of this change was that the SO-SO Trade was only included once in the calculation and there was no inclusion of the Metered Generation of the Interconnector Error Unit in the calculation. The MSP software was run using the Lagrangian Relaxation in all of these studies.

Because of an issue with the savecase file for September 14th 2008, this study run for this date has not been completed at this time. It is expected that this date will be included in the final report when all remaining study runs have been completed.

Analysis

Dates	Variance	% Variance	Average Price Base Case	Average Price Re-Run	Peak SMP Base Case	Peak SMP Re-Run	Above SRT	IRCU Volume
02/11/2007	-€43,485.31	-0.68%	€58.56	€58.93	€102.26	€106.77	No	7.126
14/11/2007	€760,276.97	8.14%	€7.68	€71.83	€72.82	€11.76	Yes	-256.178
14/12/2007	€86,848.71	11.07%	€67.37	€60.78	€450.92	€226.22	Yes	10.813
20/12/2007	-€97,376.29	-1.96%	€79.90	€81.32	€82.74	€82.74	No	7.917
28/12/2007	-€19,860.32	-0.38%	€52.24	€52.63	€136.58	€151.27	No	27.063
20/01/2008	-€15,119.80	-0.16%	€73.38	€76.67	€32.80	€32.80	No	369.996
22/01/2008	-€7,749.02	-1.13%	€71.47	€72.24	€84.20	€35.82	No	29.125
29/01/2008	€15,246.98	0.15%	€2.37	€2.23	€46.09	€48.14	No	27.478
30/01/2008	€792,287.42	8.13%	€80.84	€74.73	€17.61	€17.61	Yes	37.19
01/02/2008	€9,176.03	0.92%	€55.58	€84.73	€14.20	€14.24	No	35.667
26/02/2008	-€70,366.03	-4.39%	€72.64	€76.35	€403.53	€267.53	Yes	56.276
21/03/2008	-€6,381.56	-1.30%	€67.01	€67.81	€19.03	€205.61	No	25.833
30/03/2008	€636,518.51	5.97%	€116.31	€103.92	€61.72	€45.97	Yes	27.497
31/03/2008	€456,648.01	4.27%	€68.81	€92.94	€247.68	€237.42	Yes	578.042
01/04/2008	€16,890.31	0.21%	€75.63	€75.62	€101.96	€106.28	No	29.27
22/04/2008	-€269,696.95	-3.19%	€79.14	€81.31	€98.66	€108.90	Yes	30.916
08/05/2008	€97.42	0.00%	€75.58	€77.71	€34.40	€30.89	No	143.125
27/05/2008	-€1,320,178.55	11.52%	€107.08	€95.62	€45.66	€28.47	Yes	-51.994
20/06/2008	€3,644.68	0.04%	€93.43	€93.59	€38.07	€38.09	No	266.658
10/07/2008	-€123,465.04	-3.31%	€27.86	€32.04	€99.90	€15.88	Yes	117.062
31/07/2008	€1,329.27	0.76%	€80.15	€79.16	€28.90	€16.71	No	30.788
20/08/2008	€2,066.75	0.84%	€2.36	€1.83	€22.82	€22.82	No	59.916
14/10/2008	€186,334.21	1.48%	€103.49	€105.14	€405.66	€293.45	No	2737.234
19/10/2008	€490,281.50	8.08%	€5.24	€1.78	€20.55	€68.15	Yes	3950.766
15/11/2008	€25,585.63	12.29%	€5.92	€1.61	€57.94	€45.45	Yes	8899.586
16/11/2008	€1,256,499.87	17.73%	€64.88	€57.48	€87.44	€81.93	Yes	8072.042
17/11/2008	€299,119.14	4.23%	€60.63	€59.37	€81.30	€62.48	Yes	3109.298
19/11/2008	€33,544.36	8.05%	€8.71	€4.85	€24.02	€12.42	Yes	1621.548

Table 2 - Summary of analysis

As noted above, only 28 of the study runs could be completed at this point. Based on the results of the analysis, it was found that on 14 of the 28 dates studied, the application of the correct value of Schedule Demand would have resulted in market outcomes in the SEM that would have differed from the original outcomes by a value greater than the Settlement Recalculation Threshold. Of these dates, five had extremely high volumes of SO-SO- Trade (19th Oct 2008 and the four dates in Nov 2008) which were expected to have impacted on the market outcomes. (Note, the four dates in November 2008 occurred after SEMO became aware of the issue. As a result, SEMO had already arranged for formal Data Queries to be lodged against these dates. These have been assessed and the SEM has been repriced and resettled for these dates.)

SEMO is investigating the study run completed for 14/10/2008 as it would have been our expectation that such a significant volume of SO-SO Trade as appears on this date should have

driven a change greater than the SRT. We intend to confirm or update the findings for this date in the final report.

Noting the above exceptional cases, the study cases identify 9 out of 22 cases with normal SO-SO Trade that are above the SRT.

Taking the overall study runs completed, this means that 15 of the 32 cases resulted in outcomes that differed by a value greater than the SRT. Excluding the exception cases noted above, this indicates 10 out of 26 cases with normal SO-SO Trade that are above the SRT.

The graphs below demonstrate the issues observed on the SO-SO Trade study runs. Cases above and below the SRT are represented separately.

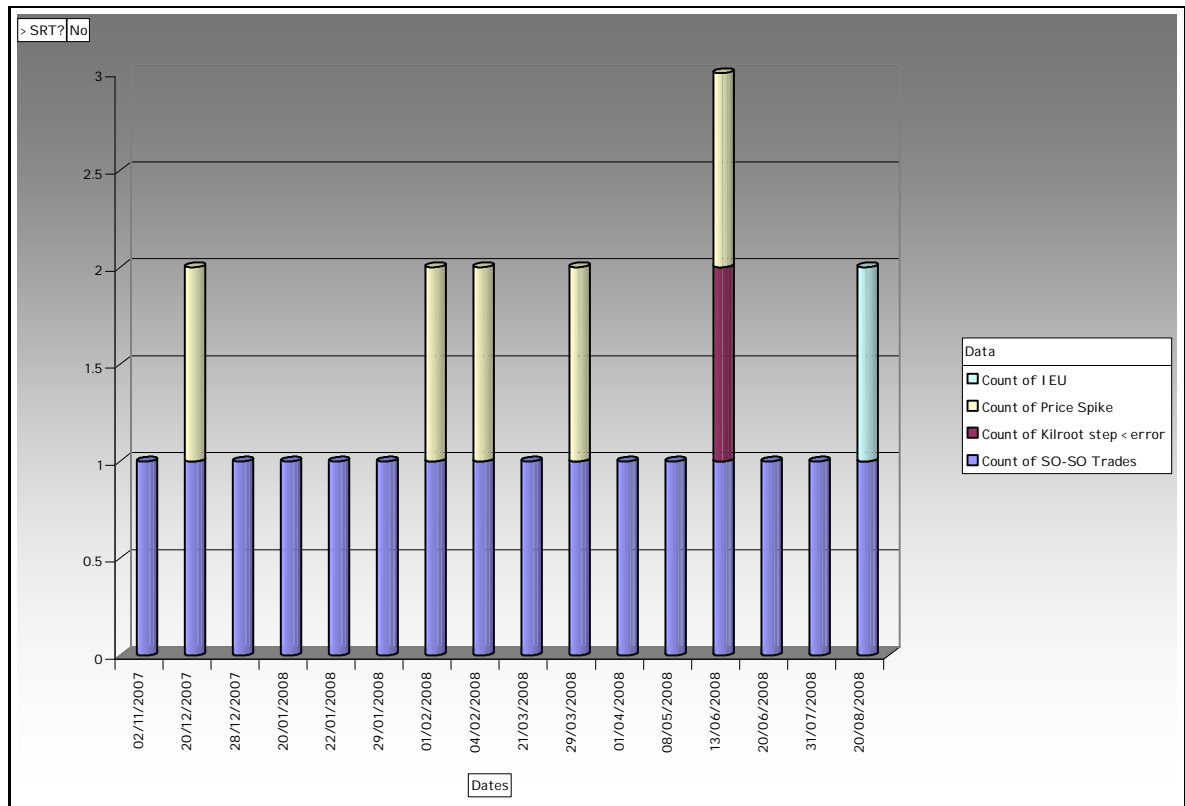


Figure 2 - Study Cases < SRT

In the above graph, it can be noted that of 16 cases that fall below the SRT, in 10 of these cases the only issue observed for the Trade Date was the SO-SO Trade. There was one date considered an issue date for the Metered Generation for the Interconnector Error Unit. Although the total quantity of the error on this date would be significant, the individual Trading Period values were not large and as a result may have dampened the impact of the MG for the IEU. Four dates also showed spikes in the System Marginal Price that persisted in the study re-runs. The impact of the SO-SO Trades on these dates was minimal due to the low quantities of SO-SO Trade observed.

June 13th 2008 does appear as an anomaly. However, the SO-SO Trade was limited to 6 Trading Periods only in the daily peak. This caused a reduction in the spike noted in the System Marginal Price on this date. However, a larger value of Uplift was required over more Trading Periods (the SMP in the base case was over €500 for a single Trading Period, whereas the study run produced an SMP of approx €300 for three Trading Periods at the peak). This coupled with no changes to the SMP or the system load outside of the peak meant that the overall impact on the Trading Day is below the SRT.

What can be noticed is that in most instances where the SO-SO Trade is the only observed issue, the date falls below the SRT. This holds true for the excepted dates noted above as demonstrated in the graph below.

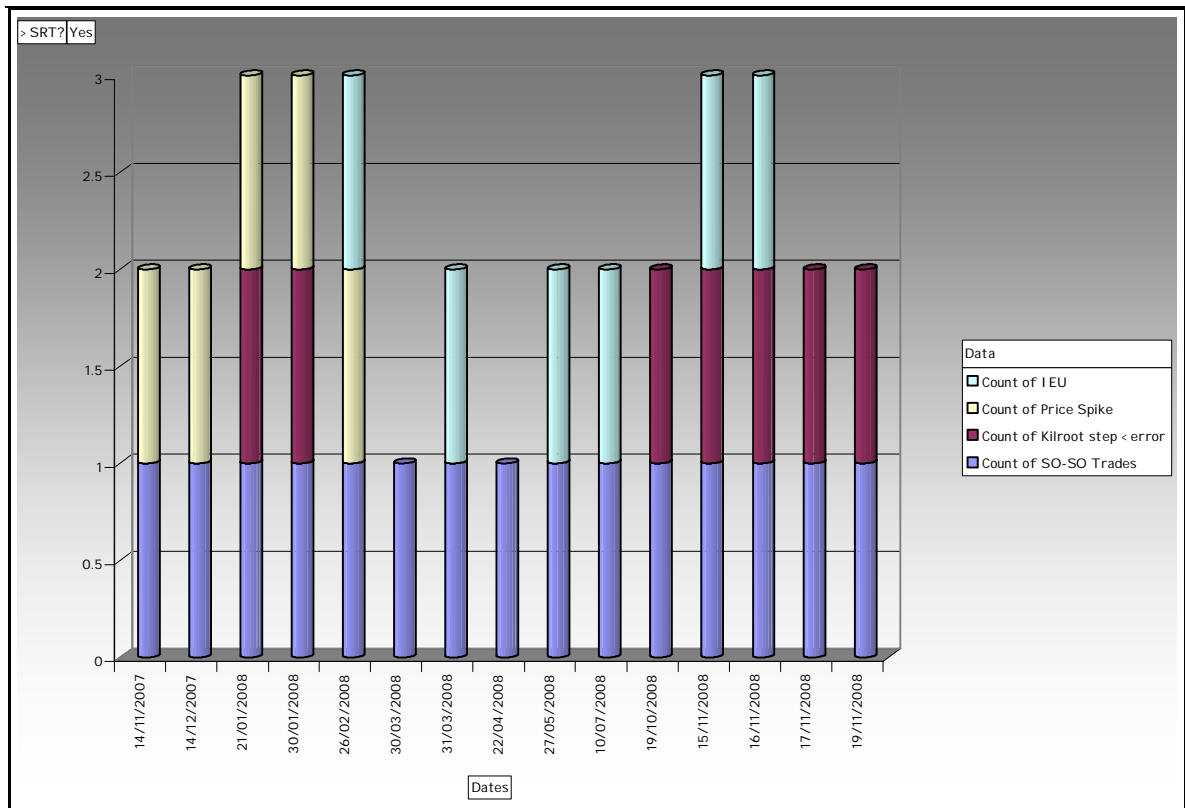


Figure 3 - Study Cases > SRT

In the above graph, it can be noted that of 10 cases that are above the SRT, in only two cases was the SO-SO Trade the only issue observed for this Trade Date. The quantities of the SO-SO Trades were not remarkable on these dates. These results would only echo the comment from the first interim report where it was observed that an outcome only served “to demonstrate how small changes to the Schedule Demand can cause the MSP solver to arrive at a different solution.” In each of these cases, the outcome of the study run was not consistent. Each study involved small decreases to the Schedule Demand. However, one date showed an increase in approximate Generator Revenues while the other date showed a decrease.

The other dates which showed changes above the SRT included other issues as observed above.

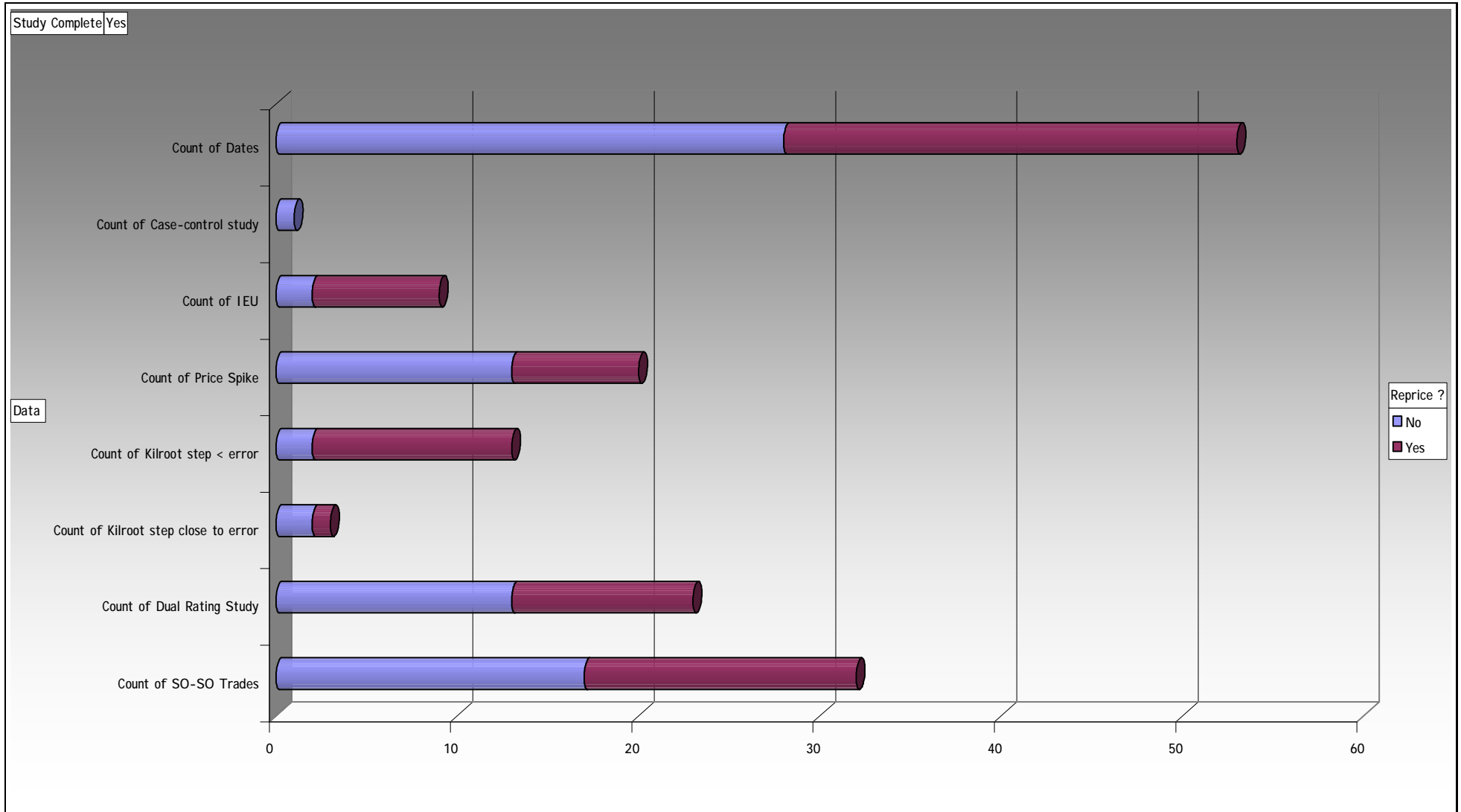
Conclusion

The analysis carried out so far would indicate that a number of days have been incorrectly priced and that, if the process as set out in the Settlement Recalculation Threshold report were applied, would warrant a re-pricing of the SEM for those dates, this is 15 dates out of the 32 that were studied with respect to the incorrect inclusion of SO-SO Trade in the derivation of the Schedule Demand. The remaining 17 dates would not require a re-pricing.

In total, of the 53 study runs completed at this time, 25 of these dates show outcomes above the SRT while 28 of these fall below the SRT.

Of the 25 that are above the SRT, we should note that four of these have already been re-priced under upheld Data Queries and one other date, 4th March 2008, has been re-priced under an upheld Settlement Dispute.

The graph below demonstrates the issues as studies and the number of dates under each issue that are above the SRT.



Appendix 1 – Study Dates Identified

Dates	SO-SO Trades	Dual Rating Study	Kilroot step close to error	Kilroot step < error	Price Spike	IEU	Case-control study
02/11/2007	x						
14/11/2007	x						
05/12/2007		x			x		
10/12/2007		x			x		
14/12/2007	x						
19/12/2007		x			x		
20/12/2007	x						
21/12/2007		x			x		
28/12/2007	x				x		
29/12/2007		x			x		
03/01/2008		x	x		x		
05/01/2008		x			x		
06/01/2008						x	
10/01/2008					x		
15/01/2008		x		x	x		
16/01/2008					x		
17/01/2008					x		
19/01/2008		x	x		x		
20/01/2008	x						
21/01/2008	x	x		x			
22/01/2008	x						
25/01/2008		x	x		x		
27/01/2008		x					
29/01/2008	x						

Dates	SO-SO Trades	Dual Rating Study	Kilroot step close to error	Kilroot step < error	Price Spike	IEU	Case-control study
30/01/2008	x			x	x		
01/02/2008	x						
04/02/2008	x	x			x		
06/02/2008						x	
07/02/2008					x	x	
15/02/2008					x		
16/02/2008		x			x		
18/02/2008			x				
20/02/2008		x			x	x	
26/02/2008	x					x	
29/02/2008		x			x		
03/03/2008			x				
04/03/2008				x	x	x	
09/03/2008							x
13/03/2008					x		
19/03/2008		x		x			
21/03/2008	x						
29/03/2008	x	x			x		
30/03/2008	x						
31/03/2008	x					x	
01/04/2008	x						
10/04/2008						x	
22/04/2008	x						
23/04/2008		x					
24/04/2008							x
01/05/2008						x	
03/05/2008							x

Dates	SO-SO Trades	Dual Rating Study	Kilroot step close to error	Kilroot step < error	Price Spike	IEU	Case-control study
06/05/2008		x					
08/05/2008	x						
11/05/2008							x
19/05/2008		x		x	x		
19/05/2008		x		x	x		
23/05/2008							x
27/05/2008	x					x	
11/06/2008						x	
13/06/2008	x	x		x			
15/06/2008							x
16/06/2008							x
17/06/2008							x
18/06/2008		x			x		
18/06/2008		x			x		
19/06/2008						x	
20/06/2008	x						
21/06/2008						x	
05/07/2008						x	
06/07/2008						x	
07/07/2008						x	
10/07/2008	x					x	
11/07/2008						x	
19/07/2008						x	
29/07/2008							x
31/07/2008	x						
05/08/2008							x
13/08/2008						x	
20/08/2008	x					x	

Dates	SO-SO Trades	Dual Rating Study	Kilroot step close to error	Kilroot step < error	Price Spike	IEU	Case-control study
21/08/2008					x		
30/08/2008						x	
03/09/2008						x	
04/09/2008						x	
12/09/2008						x	
14/09/2008	x					x	
21/09/2008							x
09/10/2008							x
13/10/2008					x		
14/10/2008	x			x			
15/10/2008					x		
16/10/2008					x		
19/10/2008	x			x			
25/10/2008						x	
26/10/2008						x	
03/11/2008						x	
15/11/2008	x			x		x	
16/11/2008	x			x		x	
17/11/2008	x			x			
19/11/2008	x			x			
Total Days	33	25	5	14	32	31	12

Appendix 2 – Error MW compared to Dual Rated Generator step into Oil

TRADE DATE	DELIVERY HOUR	DELIVERY INTERVAL	Marginal Generator Unit	SMP	MW Into Oil Bid Step	SO-SO Trade	MGEU MW
19/12/2007	18	2	GU_500060	477.22	8.194	0	-0.094
19/12/2007	19	1	GU_500060	477.22	3.676	0	0.566
20/12/2007	18	1	GU_500070	482.74	3.632	0	0.072
21/12/2007	18	2	GU_500070	474.47	29.274	0	0.072
21/12/2007	19	1	GU_500060	474.47	22.202	0	-0.034
29/12/2007	18	2	GU_500070	435.63	3.275	0	0.152
29/12/2007	19	1	GU_500070	435.63	23.534	0	0.132
03/01/2008	12	1	GU_500060	460.98	7.583	0	0.672
03/01/2008	18	2	GU_500060	463.03	1.556	0	0.112
03/01/2008	19	1	GU_500060	463.03	0.659	0	0.628
05/01/2008	18	2	GU_500060	452.78	14.293	0	0.072
10/01/2008	18	2	GU_500060	432.52	4.399	0	1.054
15/01/2008	18	1	GU_500060	326.66	1.258	0	1.232
15/01/2008	19	1	GU_500060	326.66	0.087	0	1.152
15/01/2008	20	1	GU_500060	326.66	3.656	0	1.466
16/01/2008	18	2	GU_500060	328.47	14.195	0	1.032
17/01/2008	18	2	GU_500060	360.3	6.188	0	0.844
19/01/2008	19	1	GU_500060	333.64	1.67	0	-0.134
20/01/2008	12	1	GU_500060	332.8	2.031	0	0.072
21/01/2008	18	2	GU_500070	421.93	1.393	29.564	9.338
25/01/2008	18	2	GU_500070	430.96	16.077	0	-0.088
25/01/2008	19	1	GU_500070	430.96	1.959	0	0.408
27/01/2008	13	2	GU_500070	440.19	16.837	0	0.132
27/01/2008	14	1	GU_500070	440.19	17.634	0	0.072
30/01/2008	12	2	GU_500070	417.61	7.419	26.79	0.58
30/01/2008	13	1	GU_500070	417.61	23.538	0	0.232
01/02/2008	19	1	GU_500070	414.2	7.827	0	0.186
04/02/2008	18	2	GU_500070	468.32	3.065	0	1.164

TRADE DATE	DELIVERY HOUR	DELIVERY INTERVAL	Marginal Generator Unit	SMP	MW Into Oil Bid Step	SO-SO Trade	MGEU MW
07/02/2008	19	1	GU_500070	398.6	24.041	0	0.392
15/02/2008	19	2	GU_500070	348.57	22.934	0	0.212
16/02/2008	19	1	GU_500060	332.26	7.323	0	0.072
16/02/2008	19	2	GU_500060	332.26	12.455	0	0.132
18/02/2008	19	2	GU_500070	409.67	1.497	0	-0.14
20/02/2008	19	1	GU_500070	415.95	18.496	0	0.012
20/02/2008	19	2	GU_500070	415.95	4.045	0	0.072
26/02/2008	20	2	GU_500070	403.53	3.515	0	0.488
29/02/2008	20	1	GU_500070	390.98	9.972	0	0.472
03/03/2008	20	1	GU_500060	394.65	1.957	0	0.362
04/03/2008	20	1	GU_500060	384.47	0.559	0	0.598
04/03/2008	20	2	GU_500060	384.47	14.785	0	0.538
13/03/2008	20	1	GU_500060	417.87	5.976	0	0.928
19/03/2008	20	2	GU_500060	439.56	0.045	0	0.848
29/03/2008	20	1	GU_500060	422.77	26.398	0	0.104
23/04/2008	9	1	GU_500060	494.56	13.146	0	0.072
23/04/2008	9	2	GU_500070	494.56	32.526	0	0.072
23/04/2008	10	1	GU_500060	494.56	9.462	0	0.132
23/04/2008	10	2	GU_500060	494.56	30.82	0	0.072
06/05/2008	22	2	GU_500070	499.68	5.798	0	0.212
19/05/2008	18	1	GU_500070	525.44	0.025	0	0.272
13/06/2008	12	1	GU_500060	525.7	5.17	150.074	0.398
21/08/2008	12	2	GU_500070	551.46	1.461	0	-0.86
13/10/2008	20	1	GU_500070	430.39	11.775	0	-1.192
14/10/2008	18	1	GU_500060	405.66	6.016	300.248	0.8
14/10/2008	18	2	GU_500060	405.66	12.678	300.248	0.8
15/10/2008	20	1	GU_500060	404.72	18.559	0	-0.268
16/10/2008	20	1	GU_500060	397.91	5.578	0	-0.31
18/10/2008	19	2	GU_500060	299.85	2.163	0	-0.826
19/10/2008	19	2	GU_500060	220.55	27.39	100	0

TRADE DATE	DELIVERY HOUR	DELIVERY INTERVAL	Marginal Generator Unit	SMP	MW Into Oil Bid Step	SO-SO Trade	MGEU MW
21/10/2008	9	1	GU_500070	289.24	2.53	0	-1.434
21/10/2008	19	2	GU_500070	289.24	8.554	0	0.108
22/10/2008	19	2	GU_500060	224.35	40.615	0	0.102
22/10/2008	20	1	GU_500060	224.35	24.259	0	-0.102
28/10/2008	18	2	GU_500060	225.62	39.109	0	-15.86
30/10/2008	18	2	GU_500070	337.15	33.02	0	-0.846
31/10/2008	18	2	GU_500060	289.12	10.56	0	-0.16
01/11/2008	18	2	GU_500060	260.93	4.982	0	-15.8
03/11/2008	18	2	GU_500060	204.22	21.945	0	-0.818
03/11/2008	19	2	GU_500070	200.57	9.797	0	-1.356
04/11/2008	18	2	GU_500060	200.78	34.352	0	-0.74
05/11/2008	18	2	GU_500070	265.05	12.53	0	-0.776
07/11/2008	18	2	GU_500070	211.03	3.426	0	-0.8
08/11/2008	18	2	GU_500060	201.3	34.816	0	-15.86
08/11/2008	19	1	GU_500070	201.3	32.19	0	-15.8
09/11/2008	18	2	GU_500060	164.81	11.016	0	-0.94
10/11/2008	18	1	GU_500060	157.22	1.882	0	-0.858
10/11/2008	19	1	GU_500060	173.84	8.017	0	-0.892
11/11/2008	18	2	GU_500060	189.79	26.857	0	0.256
11/11/2008	19	1	GU_500070	189.79	29.653	0	-1.862
12/11/2008	18	1	GU_500070	233.53	1.559	0	-0.958
12/11/2008	18	2	GU_500060	233.93	23.934	0	-0.598
14/11/2008	18	2	GU_500070	217.88	21.449	0	-1.296
15/11/2008	18	2	GU_500070	257.94	8.952	425	1.14
16/11/2008	18	2	GU_500070	187.44	9.256	450	18.792
16/11/2008	19	1	GU_500070	178.88	13.374	450	26.384
16/11/2008	19	2	GU_500070	178.88	7.83	450	26.52
16/11/2008	20	2	GU_500070	178.88	5.122	450	26.52
17/11/2008	18	1	GU_500070	178.88	19.248	0	-0.906
17/11/2008	18	2	GU_500070	181.3	13.693	0	-0.8

TRADE DATE	DELIVERY HOUR	DELIVERY INTERVAL	Marginal Generator Unit	SMP	MW Into Oil Bid Step	SO-SO Trade	MGEU MW
19/11/2008	18	1	GU_500060	213.95	19.36	280	0.52
19/11/2008	18	2	GU_500060	224.02	30.804	278.148	2.452
20/11/2008	18	1	GU_500070	200.74	9.037	0	-0.8
20/11/2008	18	2	GU_500070	200.74	29.64	0	-0.74
22/11/2008	18	2	GU_500060	234.17	36.346	0	-0.938
22/11/2008	19	1	GU_500060	234.17	11.694	0	-15.8