

SEM Committee Paper

Trading and Settlement Code

Policy Parameters 2013

Consultation Paper

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1. Introduction

The SEM Trading and Settlement Code (the Code) sets out a number of policy parameters which are determined by the Regulatory Authorities (RAs) on an annual basis.

VoLL/PCAP/PFLOOR

In accordance with paragraph 4.12 and 4.95 of the Code, the Regulatory Authorities (RAs) are required to determine the following three administered prices:

- the Value of Lost Load (VOLL);
- the Market Price Cap (PCAP); and,
- the Market Price Floor (PFLOOR).

Following consultation last year, the RAs decided (SEM-11-073) for the period from 1st January 2012 to 31st December 2012 that:

- PCAP will remain unchanged at €1,000/MWh;
- PFLOOR will remain unchanged at minus €100/MWh.

This Consultation Paper undertakes a review of the effectiveness of PCAP and PFLOOR with a view to setting the values for 2013.

The calculation of VOLL for 2013, using the methodology decided upon in 2007, will be published later in the year, to meet the requirement in paragraph 4.95 of the Code.

Uplift Parameters

Under paragraphs 4.70 and 4.71 of the Code, the RAs are also required to determine three parameters used in the calculation of Uplift¹. These are:

- The Uplift Alpha value α , which governs the importance of the Uplift Cost Objective, such that $0 \leq \alpha \leq 1$;
- The Uplift Beta value β , which governs the importance of the Uplift Profile Objective, such that $0 \leq \beta \leq 1$ and such that $\alpha + \beta = 1$; and
- The Uplift Delta value δ , to constrain the overall impact on revenue in each Trading Day t arising from the Uplift calculation, such that $\delta \geq 0$.

Following consultation, the Regulatory Authorities last year decided (SEM-11-073) for the period from 1st January 2012 to 31st December 2012 that:

- α should be set to a value of zero;
- β should be set to a value of 1; and,
- δ should be set to a value of 5.

¹ For more on the background to the methodology and objectives of Uplift in the SEM see the following: Objectives of the Function to Include Start-Up and No-load Costs in SMP(AIP/SEM/92/06), SMP Uplift Objectives – Decision Paper (AIP/SEM/142/06), SMP Uplift Parameters Consultation (AIP/SEM/230/06), and SMP Uplift Methodology and Parameters – Decision Paper (AIP/SEM/51/07)

As stated in previous consultations, the RAs intend to monitor the effectiveness of the proposed Uplift Methodology. This paper presents some analysis of the behaviour of Uplift for the period May 2010 to April 2012 and proposes values for the three Uplift values (α , β and δ) for the year 2013.

2. PCAP

In each of the previous decision papers on PCAP, it was noted that the RAs were satisfied that:

- the various measures put in place to mitigate market power in the SEM (directed contracts and the requirement to bid at short run marginal cost) would limit the need for a cap on wholesale prices as a defence against the abuse of market power;
- the requirement on generators to bid at Short-run Marginal Cost (SRMC) should avoid prices in the SEM from spiking for reasons other than a spike in short run marginal costs (e.g. reflecting a spike in fuel prices) or from a spike in uplift;
- there was nonetheless a case for setting PCAP at a conservative level, at least until:
 - there was adequate liquidity in the contract market to enable participants to manage risk effectively;
 - there was sufficient certainty that the MSP software does not frequently drive prices to PCAP at times when all load is actually being served.

The RAs therefore decided to set PCAP at a number which was a reasonable multiple of the expected SRMC of the most expensive plant on the system. It was argued that this would:

- allow for variations in SRMC during the year to be reflected in SMP without constraint; and,
- ensure that no generator would be expected to generate at a loss if its SRMC was higher than PCAP.

Thus since the beginning of the market, the RAs set PCAP at €1,000/MWh. This level is set to be at a margin above the highest SMP that could be expected in the market in the following year, but not so high as to allow prices to go to excessive levels in the event that the MSP Software fails to determine a price when there is an Insufficient Capacity Event.

2.1 Price outcomes for the previous year in the SEM

In order to propose the value for PCAP for 2013 and to gauge its performance to date, it is instructive to examine prices over the course of the previous year.

Market data for the period from 1 May 2011 to 30 April 2012 show that:

- SMP has exceeded €500/MWh on two occasions from the year May 2011 to April 2012 (0.01% of the time), as the table below shows:

SMP (€/MWh)	Occurrences (May '10 to April '11) 24 April 2009)	Percentage
500 +	2	0.01%
400 – 500	21	0.12%
300 – 400	48	0.27%

200 – 300	134	0.76%
100 – 200	990	5.64%
70 -100	2,327	13.25%
50 – 70	6,229	35.48%
0 – 50	7,765	44.23%
< 0	1	0.01%

- The seven highest SMPs were as follows:

Highest SMPs	Date and Time
(May '11 to April '12)	
€675.58/MWh	24th April 2012 17.00
€600.29/MWh	12th October 2011 19:00
€487.78/MWh	25th December 2011 13.00
€485.45/MWh	7th December 2011 18.00
€482.68/MWh	7th December 2011 17.30
€481.04/MWh	17th December 2011 18.30
€470.56/MWh	19th October 2011 19:00

Uplift has been responsible for spikes in SMP on a number of occasions. Notably it was the main cause of the five of the seven highest SMPs over the period examined and was related to the recovery of start up costs for a number of different units during the relevant trading periods. The largest uplift in any one trading period was €595.49/MWh. This was driven by the Coolkeeragh Peaking unit coming on for one period, and happened at 17:00 on 24th April 2012.

In the period being considered, the SMP exceeded €200/MWh in 205 trading periods (1.17% of the time). This compares with 235 trading periods (1.34% of the time) in the previous year (May 2010 to April 2011), and 84 (0.45%) trading periods in the May 2009 to April 2010 period.

2.2 Effectiveness

If SMP is frequently being set at PCAP - for reasons other than Insufficient Capacity Events in the MSP software or an inability of the software to reach a feasible solution - then it could be argued that PCAP was set at too low a level and that it was preventing the proper functioning of the price-setting algorithms in the market software.

The fact that PCAP was set at a level sufficiently in excess of the SRMC of the most expensive unit on the system as to allow prices to be set as intended by the MSP software without constraint suggests that PCAP was effective in achieving its objectives – i.e. allowing for variations in SRMC during the year to be reflected in SMP without constraint and ensuring that no generator would be expected to generate at a loss if its SRMC was higher

than PCAP. The highest generator bid² on 30th April 2012 was £532.55 (circa €641/MWh); this bid was for the Kilroot Unit when running on oil. However, the instances where this unit can be scheduled in its oil firing range are specific as it is registered as a Dual Rated Unit in SEM. The next highest bid on 30th April was £366.7 (circa €441/MWh).

The analysis above suggests that a PCAP of say €800/MWh or less even would have been equally effective in achieving the objectives of a price cap in the SEM. However, for the reasons given previously i.e. the fact that other measures are in place to prevent prices from spiking for reasons other than SRMC bidding and because Insufficient Capacity Events are rarely likely to be declared by the MSP software, the RAs continue to see merit in maintaining the present level for PCAP. Furthermore, in the setting of parameter values in the SEM, the RAs are cognisant of the need for as much certainty as possible for participants operating in the market.

The data presented for the year May 2011 to April 2012 above indicates that in general SMP has been on average slightly higher than the period reviewed for the setting of the 2012 PCAP. However, there appear to have been less instances of price spikes and very high (more than €300/MWh) SMP.

Coal prices have fallen significantly over the past twelve months, with prices now 29% lower than this time last year. At the same time the day-ahead gas price has increased by 2%. Carbon prices have seen a severe reduction with prices for December 2012 now 63% lower than twelve months ago. In addition to movements in fuel prices, the Euro has fallen in value relative to the Dollar and Sterling since May 2011. As a result, in Euro terms coal prices are now 21% lower than this time last year and gas prices have increased by 12%.

Forward fuel prices for the 2012/13 tariff period suggest an increase of 8% in gas prices when compared to the average gas price over the last twelve months. Coal prices are forecast to be 10% lower during the 2012/13 period.

However, while an increase in gas prices is expected over the next 12 months, the RAs would emphasise that when fuel and carbon prices reached record highs in mid-2008, the level of PCAP was maintained at €1000/MWh.

2.3 Proposal

The SEM Committee therefore proposes to leave PCAP unchanged at €1,000/MWh for 2013.

² Interconnector offers were not analysed given that they are not subject to SRMC licence conditions.

3. PFLOOR

At the conclusion of last year's consultation, the RAs set PFLOOR in the SEM at minus €100/MWh, a level sufficiently below zero to allow for any generators whose short run marginal costs are a negative figure. The majority of respondents agreed with the RAs proposal.

3.1 Price outcomes so far in the SEM

Market data for the period from 1 May 2011 to 30 April 2012 show that:

- PLOOR has been hit on one occasion, on 5th January 2012 at 05:30. The Ex-Post Initial (EP2) run of the MSP software produced a solution which contained a Price Floor for the Shadow Price, with a final SMP of minus €-47.74 in one Trading Period.
- SMP was €0/MWh on 23 occasions in reporting period. This is up from 10 in the previous 12 months.
- There has been a slight decrease (from 45% to 44%) in the number of trading periods where the SMP was below €50/MWh when compared to the previous year;
- No negative bids were submitted by price making units in the period in question but negative PQ pairs for CHP units were submitted in previous years. Also there be units bidding negative prices into SEM in the future; and,
- No Excessive Generation Events have been called.

3.2 Effectiveness

If SMP had frequently been set at PFLOOR - for reasons other than Excessive Generation Events in the MSP software – then it might be argued that PFLOOR was set at too high a level and that it was preventing the proper functioning of the price-setting algorithms in the market software. Although PFLOOR has occurred once in SEM, this was due to an inconsistency in the market rules; a Modification has been raised to address this.

PFLOOR has therefore been effective in achieving its objectives of minimising exposure of participants to negative prices whilst allowing for an efficient market price signal.

The period examined (May 2011-April 2012) shows a slightly lower occurrence of prices below €50/MWh relative to the period reviewed for the setting of the 2012 PFLOOR, reflecting higher underlying fuel costs. However, an Excessive Generation Event has yet to be declared by the MSP software and prices remain unlikely to go negative, at least in the short term for reasons other than generator bidding behaviour.

3.3 Proposal

The SEM Committee therefore proposes to leave PFLOOR unchanged at minus €100/MWh for 2012.

4. Uplift Parameters

As with the consultation on the 2012 Uplift Parameter values, the Regulatory Authorities are approaching this consideration of the Uplift Parameters from the perspective of seeking to determine whether there is evidence that change is required, rather than from the perspective of a repeat of the full review process that concluded with the Decision Paper of 15th March 2007³.

4.1 Analysis

The Uplift values⁴ calculated over the optimisation time horizon are optimised to meet two objective functions:

1. Minimising Uplift revenues (the cost objective); and,
2. Minimising Shadow Price distortion (the profile objective).

These functions are weighted within the optimisation by two Uplift parameters, α and β . In addition, a third Uplift parameter, δ , constrains the overall impact on revenue of the Uplift calculations.

The Code defines that α and β are complementary, such that $0 \leq \alpha \leq 1$, $0 \leq \beta \leq 1$ and $\alpha + \beta = 1$. The Regulatory Authorities concluded in the decision paper on the 2012 Uplift parameter values (SEM-11-073) that $\alpha = 0$, $\beta = 1$, $\delta = 5$ were the most appropriate Uplift parameters and that they provided the most appropriate balance of costs and price stability.

In considering the Uplift Parameter values for 2013, the RAs have undertaken further statistical analysis to examine the performance of Uplift and to determine whether the relationships between SMP, Shadow Prices and Uplift values have substantially changed from the previous analysis undertaken for the 2012 values.

³ See <http://www.allislandproject.org/GetAttachment.aspx?id=ed31f7f2-57d3-4a9c-b00d-9150e3fc93c5> for further details

⁴ The uplift element of SMP is explicitly designed to cover the costs of start-up and no-load, and is defined such that all price maker generator units should, within each period of continuous operation, recover their scheduled costs of operation from SMP payments (i.e. without resort to make whole payments to individual generators). Uplift is calculated in an optimisation which minimises a weighted sum of total generator revenue and the sum of the square of the uplift price, reflecting the objectives set out in the Code

Previous Data Set – May 2010 to April 2011

The analysis in the 2012 Policy Parameters Consultation Paper (SEM-11-056) was undertaken using a dataset covering the period May 2010 to April 2011. The statistics presented in that paper are shown below:

€/MWh where appropriate	Shadow	Uplift	SMP
Mean	47.55	12.01	59.56
Median	45.09	3.53	51.08
Maximum	394.95	687.67	766.35
Minimum	-100	0	-88.12
Standard Deviation - All Trading Periods	21.5	27.46	38.14
Coefficient of variation	0.45	2.29	0.64

SMP correlated with...	Shadow	Uplift
Correlation	0.711	0.83

New Data Set — May 2011 to April 2012

The RAs have examined the data for one year from May 2011 to April 2012 and the following are the results:

€/MWh where appropriate	Shadow	Uplift	SMP
Mean	46.02	15.07	61.09
Median	46.11	5.14	51.84
Maximum	421.78	595.49	675.58
Minimum	-100	0	-47.74
Standard Deviation - All Trading Periods	12.25	29.84	35.43
Coefficient of variation	0.27	1.98	0.59

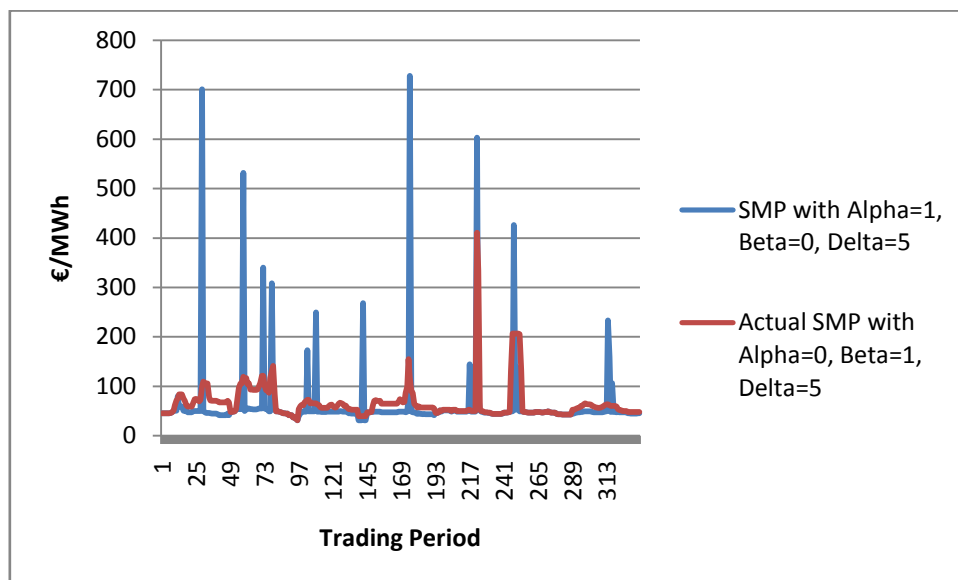
SMP correlated with...	Shadow	Uplift
Correlation	0.59	0.94

From this it can be seen that there are some changes to the observed data. In particular it is noted that:

- the mean of the Shadow Price has decreased slightly while the mean of the SMP and Uplift has increased

- the standard deviation of Uplift has increased while the standard deviation of the SMP and Shadow Price has decreased. In particular the standard deviation of the Shadow Price has decreased significantly. This suggests that Uplift is now a much greater driver in volatility in SEM prices
- the coefficient of variation have decreased for Shadow Price and SMP but has increased for Uplift.
- the correlation between SMP and Uplift has increased while the correlation between SMP and Shadow Price has decreased further.

The RAs have taken a number of days in April 2012 and compared the actual SMP using $\alpha = 0, \beta = 1, \delta = 5$ to the “Uplift Cost” SMPs calculated (in an offline calculation by SEMO) using $\alpha = 1, \beta = 0, \delta = 5$ and the results are shown below.



The “Uplift Cost” SMP is more volatile than the actual SMP. This is because the uplift beta which governs the importance of the Uplift Profile Objective is set to zero and the uplift alpha which governs the importance of the Uplift Cost Objective is set to one. In 95% of trading periods, the “Uplift Cost” SMP is less than or equal to the actual SMP, but in the remaining 5% of trading periods, the “Uplift Cost” SMP is greater than the actual SMP by an average of 228%. These spikes are shown in the graph above.

€/MWh where appropriate	Actual SMP	“Uplift Cost” SMP
Mean	65.23	60.12
Median	56.26	47.43

Maximum	410.66	727.93
Minimum	30.51	30.51
Standard Deviation - All Trading Periods	36.44	74.44

The table above shows the summary statistics from the analysis of the days examined (1-7 April 2012). For the actual SMP, the weighting for the parameters is towards beta (the profile objective), which is shown by the lower standard deviation. On the other hand, for the Uplift Cost SMP, the weighting for the parameters is towards alpha (the cost objective) shown by lower mean value.

These results should be treated with caution due to the limited dataset which was analysed (seven consecutive days in April 2012).

4.2 Proposed Uplift Parameters for 2013

Using different parameters could lower the overall costs of Uplift to consumers, but would be expected to drive a lower correlation and increase the volatility of SMPs. Such an increase in volatility might be expected to increase suppliers' risks, in-turn driving an increase in costs to consumers (with a potential to negate any Uplift revenue benefits). In view of this and the above analysis, the RAs are minded to leave the current Uplift Parameter values unchanged for 2013.

Based upon the above considerations, the SEM Committee proposes that the values of the Uplift Parameters for the year 2013 should remain unchanged. Therefore:

- α should be set at zero;
- β should be set at 1; and
- δ should be set at 5.

5. Proposed Parameters for 2013

As detailed in this paper, the SEM Committee proposes to leave the value of the policy parameters for 2013 unchanged as follows:

- PCAP at €1,000/MWh;
- PFLOOR at minus €100/MWh;
- Uplift Parameter α to be set at zero;
- Uplift Parameter β to be set at 1; and,
- Uplift Parameter δ to be set at 5.

The SEM Committee welcomes the views of interested parties on these proposals. It is intended to publish all responses received. If any respondent wishes all or part of their submission to remain confidential, this should be clearly stated in their response. Comments on this paper should be sent to Clive Bowers, preferably electronically, to arrive by 5pm on Friday 13th July 2012.

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