



SEM Committee Paper

Trading and Settlement Code

Policy Parameters 2014

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.

1.1.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-12-077¹) for the period from 1 January 2013 to 31 December 2013 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 2014.

The calculation of VoLL for 2014, 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.

1.2.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 Uplift². These are:

¹ http://www.allislandproject.org/en/TS_Current_Consultations.aspx?article=554a25a4-61cf-4496-9b3d-ebd7d44ee7f4

² 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 Paper (AIP/SEM/230/06), and SMP Uplift Methodology and Parameters Decision Paper (AIP/SEM/51/07)

- 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-12-077) for the period from 1 January 2013 to 31 December 2013 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.

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 2012 to April 2013 and seeks to propose values for Uplift for 2014.

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 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 2014 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 2012 to 30 April 2013 shows that:

- The PCAP was applied to SMP on one occasion
- SMP has exceeded €500/MWh on six occasions from the year May 2012 to April 2013 (0.03% of the time), as the table below shows:

SMP (€/MWh)	Occurrences May 2012 – April 2013	Percentage
500+	6	0.03%
400-500	14	0.08%
300-400	30	0.17%
200-300	107	0.61%
100-200	1,514	8.64%
70-100	3,670	20.95%
50-70	6,668	38.06%
0-50	5,509	31.44%
<0	2	0.01%

- The seven highest SMPs were as follows:

Highest SMP (€/MWh)	Date Occurring in May 2012 to April 2013 Period	Time
€1,000.00	26/02/2013	05:30:00
€699.49	11/03/2013	19:00:00
€657.08	17/10/2012	19:00:00
€630.19	21/01/2013	17:30:00
€590.74	04/01/2013	17:30:00
€517.69	25/11/2012	12:30:00
€493.60	06/12/2012	09:30:00

Uplift has been responsible for spikes in SMP in the majority of occasions 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 €1,000.00/MWh. The Price Cap was applied to an actual SMP of €1,068.17. The limited availability of Kilroot Peaking Plant at 05:30a.m. on 26 February 2013 was identified as the reason behind the large Uplift. The unit was available for only one minute in the Trading Period where it was committed on. This meant that the recovery of running costs and Start Up costs had to happen on a much lower scheduled MSQ amount.

In the period being considered, the SMP exceeded €200/MWh in 157 trading periods (0.90% of the time). This compares with 205 trading periods (1.17% of the time) in the previous year (May 2011 to April 2012), and 235 (1.34%) trading periods in the May 2010 to April 2011 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 was preventing the proper functioning of the price-setting algorithms in the market software.

However, the PCAP was set at a level in excess of the SRMC of the most expensive unit on the system for all Trading Periods to allow prices to be set as intended by the MSP software without constraint. PCAP was therefore 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.

In the instance where the PCAP was reached, the PCAP was applied to an actual SMP of €1,068.17. The unit received corresponding Make Whole Payments in that Trading Period to make up for the remaining amount to recover. This price spike was caused due to one generator being switched on in the last Trading Period of the Trading Day. The unit's availability had been fully re-declared to a value of 185MW. However, this occurred in the last minute of the Trading Period, resulting in an Average Availability of 6.16667MW (1/30 of the declared amount). This limited availability meant that the unit had to recover Start Up costs based on a considerably smaller amount of scheduled MWs than in the circumstances of full availability and standard Minimum Stable Generation. In analysing the Commercial Offer Data, the highest PQ Pair on 26 February 2012 was £505.94 (circa €591.06/MWh) and 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 PQ Pair on 26 February was £375.45 (circa €438.74/MWh).

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 2012 to April 2013 above indicates that in general SMP has been on average slightly higher than the period reviewed for the setting of the 2013 PCAP. However, there appear to have been fewer instances (50 instances) of very high SMP (defined here as more than €300/MWh) as opposed to 71 instances in the 2011-2012 period.

The spot price for coal in the period April 2012 to 2013 is down almost 13% compared to the period April 2011 to April 2012 with the year-ahead prices down by 15%. The year-ahead prices are down 15% as compared with the same period in 2011/2012.

The period from January 2013 saw a significant decrease in the price of carbon in terms of the end of year prices. Both end-of-year and year-ahead prices are considerably lower than the same period from April 2011 to April 2012. The average price is 70% lower than in that previous period with the year-ahead price lower by almost 69%.

The value of the Euro rose relatively to both the US Dollar and Sterling from mid-2012 following a period of where it fell in value. However, taking the average daily exchange rate over the period April 2011 to April 2012 as compared with the same period in 2013 the Euro weakened almost 7% against the Dollar and 5% against Sterling. With over 90% of gas used

in the SEM imported from Great Britain, the exchange rate has a major impact on the price of gas and consequently the wholesale market price (SMP) in the SEM. In Sterling terms the day-ahead gas price increased by 10.41% in 2012/2013 compared to 2011/2012, but in Euros per therm the increase was greater, at 14.48%.

Forward fuel prices for the 2013/14 tariff period (Q4 2013 to Q3 2014) suggest an increase of approximately 6% in day-ahead gas prices when compared to the average gas price over the period May 2012 to April 2013. Coal prices are forecast to be 14% lower during the 2013/14 tariff period as compared with the period May 2012 to April 2013. Gas oil and fuel oil forward prices for the 2013/14 tariff period are approximately 4% lower than their average price over the period May 2012 to April 2013.

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 €1,000/MWh.

2.3. Proposal

The underlying fundamentals which make up the SMP have not changed significantly in the last 12 months. However, the PCAP was applied since the parameters were set last year.

When PCAP was applied previously in 2010 there was a subsequent re-pricing to address a specific issue. Therefore the 2010 PCAP did not endure.

In the case of the 2014 PCAP application, as the PCAP has been reached, this may warrant a modest increase in PCAP to €1,200/MWh for example.

The SEM Committee therefore seeks specific comments from respondents in relation to the level of the PCAP.

- Should PCAP remain at €1,000/MWh for 2014?
- Should PCAP be increased to €1,200/MWh for 2014?

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 2012 to 30 April 2013 show that:

- PLOOR has not been met.
- SMP was less than €0/MWh on two occasions and never equalled €0/MWh in the reporting period. This is down significantly on the previous 12 months which featured 23 instances of an SMP equalling €0/MWh.
- There has been a decrease (from 44% to 30%) in the number of trading periods where the SMP was below €50/MWh when compared to the previous year;
- Negative bids were submitted by one price making unit in the period in question.
- 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. The PFLOOR has not been reached in the period from May 2012 to April 2013.

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 2012 to April 2013) shows substantially fewer instances of prices below €50/MWh relative to the period reviewed for the setting of the 2012 PFLOOR, reflecting higher underlying fuel costs. 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 2014.

4. Uplift Parameters

As with the consultation on the 2013 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 15 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 2013 Uplift parameter values (SEM-11-077) 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 2014, the RAs have undertaken 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 2013 values.

In addition, the RAs have undertaken analysis of the effects of alternative Uplift parameters to determine whether the current parameters should be changed. The Market Operator conducted analysis for the dates of 17 January to 23 January 2013 inclusive using the following sets of values: $\alpha = 1$, $\beta = 0$, $\delta = 5$; and $\alpha = 0.5$, $\beta = 0.5$, $\delta = 5$.

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

4.2. Previous Data Set – May 2011 to April 2012

The analysis in the 2012 Policy Parameters Consultation Paper (SEM-12-042) was undertaken using a dataset covering the period May 2011 to April 2012. The statistics presented in that paper are shown below:

€/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

4.3. New Data Set -- May 2012 to April 2013

The RAs have examined the data for one year from May 2012 to April 2013, obtaining the following results:

€/MWh where appropriate	Shadow	Uplift	SMP
Mean	48.91	17.21	66.11
Median	48.97	8.87	57.83
Maximum	222.94	947.12	1000.00
Minimum	-5.27	0.00	-3.50
Standard Deviation - All Trading Periods	12.62	29.13	35.01
Coefficient of variation	0.26	1.69	0.53

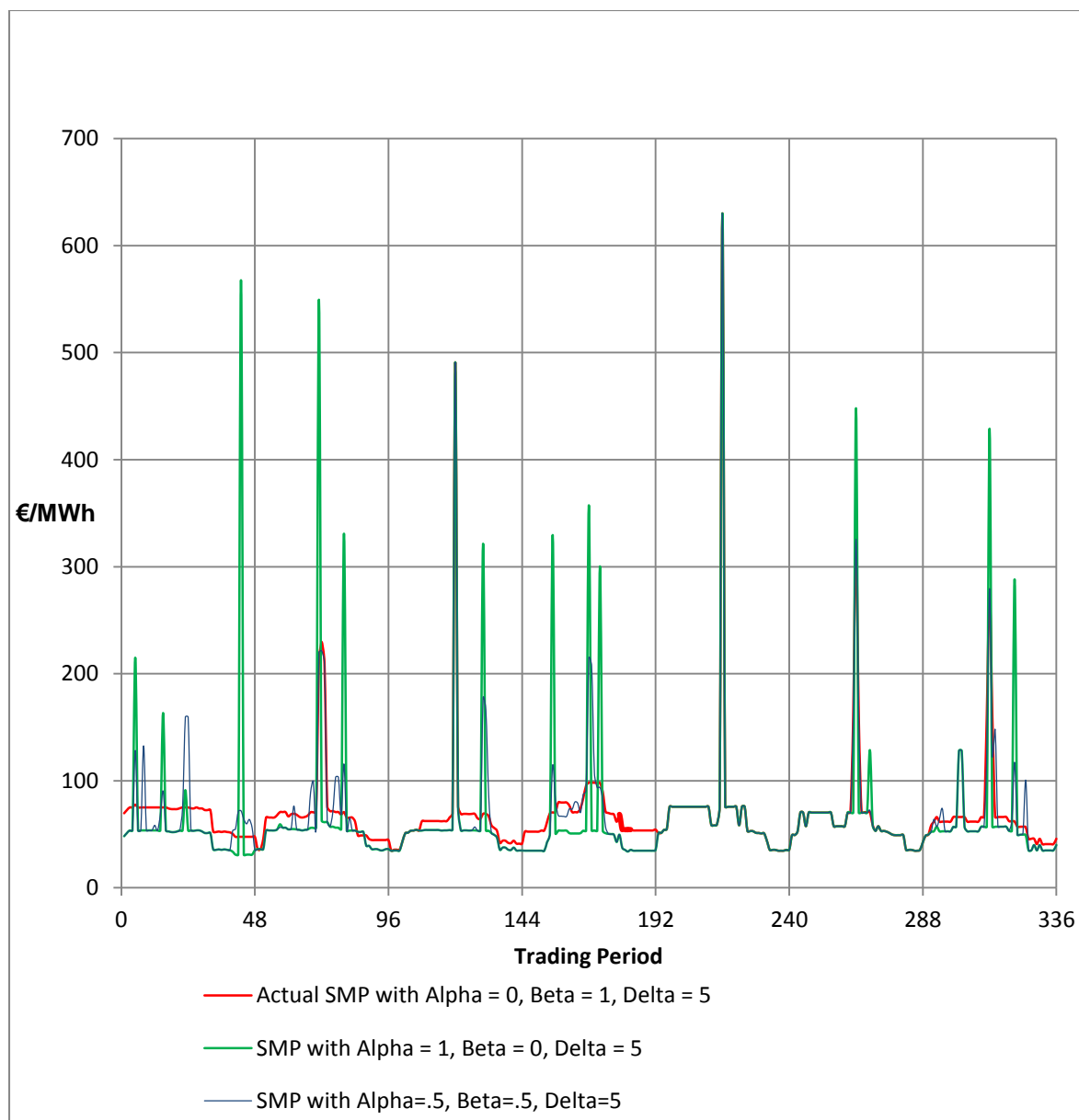
SMP correlated with:	Shadow	Uplift
Correlation	0.61	0.94

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

- The mean of the Shadow Price, Uplift and SMP have increased slightly in this period.
- The standard deviation of Uplift and SMP has decreased while the standard deviation of the Shadow Price has increased.
- The coefficient of variation has decreased for Shadow Price, Uplift and SMP.

The correlation between SMP and Uplift has remained unchanged while the correlation between SMP and Shadow Price has increased.

The RAs have taken a number of days in January 2013, 17 January to 23 January inclusive and compared the actual SMP using $\alpha = 0$, $\beta = 1$, $\delta = 5$ to the SMPs calculated (in an offline calculation by SEMO) using $\alpha = 1$, $\beta = 0$, $\delta = 5$ (“Uplift Cost 1”) and also using $\alpha = 0.5$, $\beta = 0.5$, $\delta = 5$ (“Uplift Cost 2”). It should be noted that the data set incorporates the use of the MIP solver on two days, and that the Uplift Parameters used may not affect the level of SMP to the same degree when MIP is used. The results for the period 17 to 23 January 2013 are indicated below:



The two “Uplift Cost” SMP scenarios are 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 in one scenario and to 0.5 in the other and the Uplift alpha which governs the importance of the Uplift Cost Objective is set to 1 in one scenario and to 0.5 in the other. For the Uplift Cost 1 scenario ($\alpha = 1, \beta = 0, \delta = 5$), in 85% of trading periods, the SMP is less than or equal to the actual SMP, but in the remaining 15% of trading periods, the SMP is greater than the actual SMP by an average of 185%. In the Uplift Cost 2 scenario ($\alpha = 0.5, \beta = 0.5, \delta = 5$), the Uplift Cost SMP is less than or equal to the actual SMP in 75% of the trading periods. In the remaining 25% of the trading period, the Uplift Cost SMP is greater than the actual SMP by an average of 14%. These spikes are shown in the graph above.

€/MWh where appropriate	Actual SMP with alpha = 0, beta=1, delta =5	“Uplift” “Uplift Cost 1”SMP with alpha=1, beta=0, delta=5	“Uplift Cost 2”SMP with alpha=0.5, beta=0.5, delta=5
Mean	67.93	65.86	65.40
Median	62.36	53.41	53.62
Maximum	630.19	630.19	630.19
Minimum	34.65	30.98	33.87
Standard Deviation - All Trading Periods	48.27	73.65	52.73

The table above shows the summary statistics from the analysis of the days examined (17 to 23 January 2013). 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 second set of data above, (“Uplift Cost 1”, alpha=1, beta=0, delta=5), the weighting for the parameters is towards alpha (the cost objective) shown by lower mean value. In contrast the final set of data shown above (“Uplift Cost 2”, alpha=0.5, beta=0.5, delta=5) where the parameters are equally weighted between cost and profile objectives, the mean SMP is lower than both previously examined alternatives. This is not immediately intuitive since this Uplift Cost 1 scenario has a lower SMP even though it is less weighted towards cost than the Uplift 2 scenario.

Although the data shows that SMP mean values are lower for both the Uplift Cost 1 and Uplift Cost 2 scenarios, the volatility of the profile is evident in both cases. Furthermore, these results should be treated with caution due to the limited dataset used which analysed data from seven consecutive days in January 2013.

4.4. Proposed Uplift Parameters for 2014

The SEM Committee has stated in previous consultations that 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. It was noted that 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).

The SEM Committee previously pointed out the possibility that increased price volatility could have negative impacts on cross border interconnector trade.

In view of these considerations, the SEM Committee has not changed the Uplift Parameters since Go-Live.

However, the additional analysis carried out by SEMO using $\alpha=0.5$, $\beta=0.5$, $\delta=5$ has not been carried out previously for the annual policy parameters consultation. The analysis has shown interesting results which the SEM Committee believes might warrant further analysis. In particular the analysis shows that it might be possible to give greater weighting to the cost profile without excessive increase in volatility.

The RAs have discussed the possibility with SEMO of carrying out further analysis on these Uplift parameters and in particular to look at a data set covering a more extended period (three months) to ensure that the data is representative of the analysis year. In particular it is planned that SEMO will examine the impacts of using $\alpha=0.1$, $\beta=0.9$, $\delta=5$. Initial Plexos modelling within the RAs suggests that using $\alpha=0.1$, $\beta=0.9$, $\delta=5$ could reduce SMP by just over 1% without losing price stability. The RAs have requested that SEMO carry out their analysis by the end of November 2013. -+

The SEM Committee welcomes comments from respondents on the possibility of making changes to the Uplift parameters. Comments are also welcomed on what respondents believe to be the potential advantages and disadvantages with making changes now.

Given the length of time required to carry out this analysis, the RAs will not be in a position to inform the Market Operator of the parameters to be used in 2014 by the deadline set out in paragraph 4.70 of the Code (four months in advance of the year, i.e. by 1 September 2013). The SEM Committee will publish a decision on the Uplift Parameter values for 2014 before the end of 2013.

5. Proposed Parameters for 2014

As detailed in this paper, the SEM Committee proposes the following values of the policy parameters for 2014:

- The SEM Committee is minded to consider changing PCAP to €1,200/MWh;
- PFLOOR at minus €100/MWh;
- The SEM Committee is minded to consider the values for Uplift parameters further;

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 Elaine Gallagher, preferably electronically, to arrive by 5p.m. on 3 September 2013.

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