Single Electricity Market Committee

Policy Parameters 2012

Consultation Paper

SEM-11-056

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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-10-059) for the period from 1st January 2011 to 31st December 2011 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 2012.

The calculation of VOLL for 2012, 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 Uplift[1]. 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-10-059) for the period from 1st January 2011 to 31st December 2011 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.

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[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 November 2007 to April 2011 and proposes values for the three Uplift values (α, β and δ) for the year 2012.

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:

  o there was adequate liquidity in the contract market to enable participants to manage risk effectively;

  o 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 2012 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 2010 to 30 April 2011 show that:

• SMP has exceeded €500/MWh on seven occasions from the year May 2010 to April 2011 (0.04% of the time), as the table below shows:

SMP (€/MWh)	Occurrences (May '10 to April '11)	Percentage
500 +	7	0.04%
400 – 500	22	0.13%
300 – 400	88	0.50%

200 – 300	118	0.67%
100 – 200	899	5.13%
70 -100	1,819	10.38%
50 – 70	6,653	37.98%
0 – 50	7,911	45.16%
< 0	1	0.01%

- The seven prices above €500/MWh were as follows:

Highest SMPs	Date and Time
	(May '10 to April '11)
€766.35/MWh	13th November 2010 5.30 pm
€649.48/MWh	8th April 2011 8.00 am
€644.31/MWh	5th April 2011 8.30 am
€617.3/MWh	10th April 2011 11.30 am
€506.21/MWh	24th July 2010 12.00 pm
€506.21/MWh	24th July 2010 12.30 pm
€500.04/MWh	17th February 2011 6.00 pm

Uplift has been responsible for spikes in SMP on a number of occasions. Notably it was the main cause of the four SMPs over €600/MWh 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 €586.80/MWh. This was driven by one of the Cushaling Power units coming on for one period, and happened at 8:00am on 8th April 2011.

In the period being considered, the SMP exceeded €200/MWh in 235 trading periods (1.34% of the time). This compares with 84 trading periods (0.45% of the time) in the previous year (May 2009 to April 2010), and 117 (0.66%) trading periods in the May 2008 to April 2009 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.

It is worth noting that an issue did occur (and was noted last year's paper), where different tolerance levels with the phases of the market engine resulted in the PCAP being hit for the Trading Day of 20th January 2010. This shows that when such an incident occurs, PCAP can prevent excessive prices from being reached'. It should be noted that the Trading Day in question has since been repriced and therefore the original PCAP was not a valid price in this instance.

A PCAP of €800/MWh 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 2010 to April 2011 above indicates that in general SMP has been higher and there are more occurrences of price spikes relative to the period reviewed for the setting of the 2011 PCAP. Fuel prices have increased since mid-2010. Forward fuel prices for the coming year are higher than the forward prices in 2007 when PCAP was set. However, 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 2012.

3.   PFLOOR

At the conclusion of last year's consultation, the RAs noted that:

- None of the respondents disagreed with the RAs proposal that PFLOOR should remain unchanged at minus €100/MWh for 2011;

- In an excessive generation event, the market price should send an efficient market signal both to generation and demand that there is an excess of generation and/or low demand. Such a signal should not be mitigated such that it prevents consumers from benefitting from negative prices which reflect market dynamics.

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.

3.1   Price outcomes so far in the SEM

Market data for the period from 1 May 2010 to 30 April 2011 show that:

- PLOOR has been hit on one occasion, on 23rd September at 03:30am. 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 €88.12 in one Trading Period[2]. An investigation subsequently revealed that this price was the result of a generator becoming marginal at 03:30 when it had been operating under a ramp rate constraint. This is the due to the market rules not reflecting certain generator physical characteristics; a Modification to address this is currently being progressed.

  SMP was €0/MWh on ten occasions in reporting period. A report produced by SEMO in 2010[3], detailing some of these zero prices in September and October 2010, concluded that these prices were a result of increasing wind generation throughout the night valley with Hydro and Interconnector Units setting the price at zero, while other Price Maker Generator Units were at Minimum Stable Generation and therefore unable to set the price.

Zero SMP's for the period May 2010 to April 2011	
Date	Time
27th September 2010	03:30 am
1st October 2010	03:00 am
1st October 2010	03:30 am
1st October 2010	04:00 am
2nd October 2010	03:30 am
15th January 2011	05:00 am
15th January 2011	05:30 am
15th February 2011	04:30 am
15th February 2011	05:00 am

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[2] http://www.sem-o.com/Publications/General/Market%20Incident%20Report%20September%2020th%202010%20-%20V1%200.pdf

[3] http://www.sem-o.com/Publications/General/Market%20Incident%20Report%20Zero%20Prices%20Sept%202010%20-%20Oct%202010%20V1%200%20_2.pdf

15th February 2011	05:30 am

- There has been a marked decrease (from 78% to 45%) 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, the lowest negative bid being minus €90.52/MWh; 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, 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 2010-April 2011) shows a lower occurrence of prices below €50/MWh relative to the period reviewed for the setting of the 2010 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. Notwithstanding this, the future setting of PFLOOR may need to take into account the prospect of excessive generation events occurring as increasing levels of variable price taking generation come on the system, in addition to the increase in generators bidding negatively. The setting of SMP when demand is met by price takers is being examined in more detail as part of the RAs Dispatch and Scheduling workstream and the matters outlined in that workstream[4].

3.3   Proposal

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

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[4] Principles of Dispatch and the Design of the Market Schedule in the Code : Consultation Paper http://www.allislandproject.org/en/renewable_current_consultations.aspx?article=e0c599c8-6b2c-4931-b7cd-d2f818bed836 & Principles of Dispatch and the Design of the Market Schedule in the Code : Proposed Decision Paper http://www.allislandproject.org/en/renewable_decision_documents.aspx?article=b94b7748-1faf-41e3-975a-a0323d074eca&mode=author

4. Uplift Parameters

As with the consultation on the 2011 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 2007[5].

4.1   Analysis

The Uplift values[6] 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 2011 Uplift parameter values (SEM-10-059) 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 2012, 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 2011 values.

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

[6] 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 2009 to April 2010

The analysis in the 2011 Consultation Paper (SEM-10-059) was undertaken using a dataset covering the period May 2009 to April 2010. The statistics presented in that paper are shown below:

€/MWh where appropriate	Shadow	Uplift	SMP
Mean	34.5	8.1	42.6
Median	33.7	1.0	37.5
Maximum	1000	529.7	1000
Minimum	4.1	0.0	4.1
Standard Deviation - All Trading Periods	18.2	18.1	27.55
Coefficient of variation	0.53	2.24	0.65

SMP correlated with…	Shadow	Uplift
Correlation	0.759	0.756

New Data Set — May 2010 to April 2011

The RAs have examined the data for one year from May 2010 to April 2011 and the following are the results:

€/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

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

- the mean and median of the Shadow Price and SMP have risen, which can be largely explained by the higher fuel prices;

- the standard deviation of the Shadow Price and SMP have increased, implying more volatility – this may be explained by increased Shadow Prices and SMPs more generally and potentially an increase in price taker generation;

- the coefficient of variation have decreased for Shadow Price and SMP but have increased for Uplift.

- the correlation between SMP and Uplift has increased while the correlation between SMP and Shadow Price has decreased.

In a previous year's consultation paper, consideration was given to the effect of the specific outlier events on the statistics. Two particular outliers, with SMPs of close to €700/MWh, were removed and the effects were examined. It was noted that there are only minor differences in the statistics and the paper concluded that a small number of outliers do not have a material effect on the summary statistics. Therefore the effect of outliers has not specifically been examined in this paper.

The RAs have taken a number of days in May 2011 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.
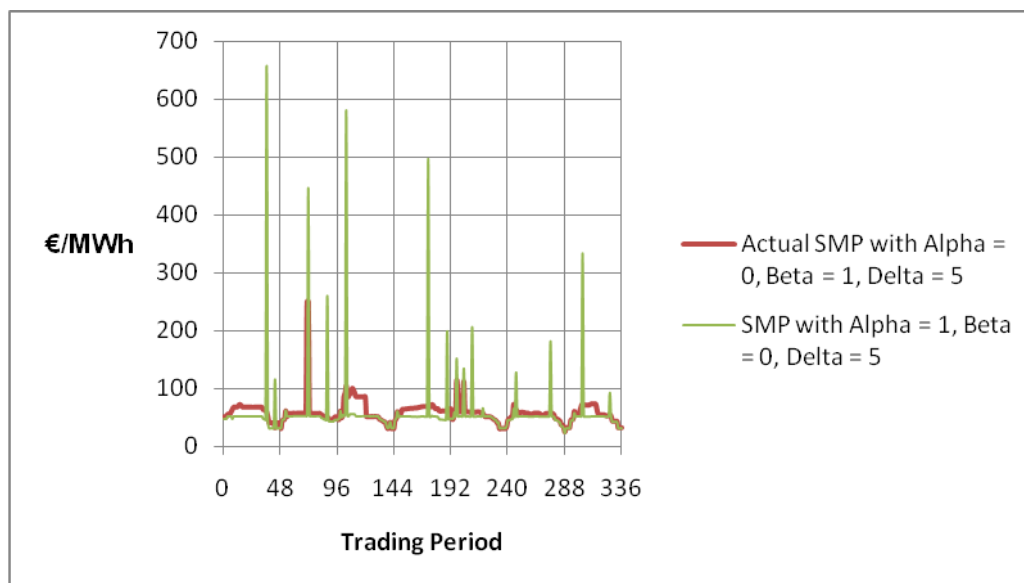
The "Uplift Cost" SMP is more volatile than the actual SMP. This is because the uplift beta which governs the importance of the Uplift Profile Objective is set to zero and the uplift alpha which governs the importance of the Uplift Cost Objective is set to one. In 95.5% of trading periods, the "Uplift Cost" SMP is less than or equal to the actual SMP, but in the remaining 4.5% of trading periods, the "Uplift Cost" SMP is greater than the actual SMP by an average of 254%. These spikes are shown in the graph above.

€/MWh where appropriate	Actual SMP	"Uplift Cost" SMP
Mean	59.32	58.33
Median	57.80	51.72
Maximum	249.53	657.87
Minimum	25.90	22.71
Standard Deviation - All Trading Periods	20.28	60.34

The table above shows the summary statistics from the analysis of the days examined (15-21 May 2011). 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 May).

4.2 Proposed Uplift Parameters for 2012

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 2012.

Based upon the above considerations, the SEM Committee proposes that the values of the Uplift Parameters for the year 2012 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 2012

As detailed in this paper, the SEM Committee proposes to leave the value of the policy parameters for 2012 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 and Jean Pierre Miura, preferably electronically, to arrive by 5pm on Friday 5th August 2011.

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