

Single Electricity Market Committee

A Review of the Effectiveness of PCAP & PFLOOR

A Consultation Paper

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A Review of the Effectiveness of PCAP & PFLOOR

1 Introduction

The Regulatory Authorities (RAs) are required under the Trading and Settlement Code to determine three administered prices. These are:

- the value of lost load (VOLL);
- the market price cap (PCAP); and
- the market price floor (PFLOOR)

Following consultation last year, the RAs decided for the period from 1st January 2009 to 31st December 2009 that:¹

- PCAP will remain unchanged at €1,000/MWh;
- PFLOOR will remain unchanged at minus €100/MWh; and that
- these values would remain valid for the period to end-2009 and that a review of their effectiveness will be carried out in the second half of 2009 and re-set if necessary.

The calculation of VOLL for 2010 using the formula decided upon in 2007 will be done later in the year, to meet the requirement in the Trading and Settlement Code to publish a value for VOLL for 2010 two months before the start of the TSC year (i.e. by the end of October 2009).

This Consultation Paper undertakes a review of the effectiveness of PCAP and PFLOOR, as required by last year's decision of the RAs, with a view to re-setting the values for 2010.

This paper concludes with proposals to leave PCAP at €1,000/MWh and PFLOOR at minus €100/MWh.

The SEM Committee² 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, then this should be clearly stated in their response. Comments on this paper should be sent to Philip Newsome and Colin Broomfield, preferably electronically, to arrive no later than noon on Monday 20th July 2009.

¹ See SEM-08-090

² The SEM Committee is established in Ireland and Northern Ireland by virtue of section 8A of the Electricity Regulation Act 1999 as inserted by section 4 of the Electricity Regulation (Amendment) Act 2007, and Article 6 (1) of the Electricity (Single Wholesale Market) (Northern Ireland) Order 2007 respectively. The SEM Committee is a Committee of both CER and NIAUR (together the RAs) that, on behalf of the RAs, takes any decision as to the exercise of a relevant function of CER or NIAUR in relation to an SEM matter.

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2. PCAP

In the 2007 and 2008 decision papers on PCAP, 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 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.

For both years, 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 for 2007/08 and 2009, the RAs set PCAP 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 determine the value for PCAP for 2010 and gauge its performance to date, it is instructive to examine prices over the course of the previous year.

Market data for the period from 25 April 2008 to 24 April 2009 show that:

- SMP was never set at PCAP for any reason including an Insufficient Capacity Event and an inability of the MSP software to reach a feasible solution;
- SMP has exceeded €500/MWh on five occasions since end-April 2008 (0.03% of the time) and was above €200/MWh in 117 trading periods (0.66% of the time), as the table below shows:

Table 1. Distribution of SMP

SMP (€/MWh)	Occurrences (25 April 2008 to 24 April 2009)	Percentage
500 +	5	0.03%
400 – 500	6	0.03%
300 – 400	11	0.06%
200 – 300	95	0.54%
100 – 200	3070	18%
70 -100	3856	22%
50 – 70	6057	35%
0 – 50	4418	25%

- Uplift has been responsible for spikes in SMP on a number of occasions, notably it was the main cause of the two highest SMPs over the period examined - occurring at 06.00 and 06.30 on 15 October 2008 with prices of €696.85/MWh and €694.72/MWh respectively. Uplift in this case related to the recovery of start up costs for Tarbert Unit 3 over just two trading periods³
- Of the 22 occasions when the SMP exceeded €300/MWh, it did so as a result of uplift in only nine trading periods.
- In the period November 2007 to April 2008, the SMP exceeded €200 MW/h in 144 trading periods (1.64 % of the time). This compares with 117 trading periods (0.66% of the time) in the April 2008 to April 2009 period.

One further relevant observation on price trends until 24 April 2009 is:

- Since 1 January 2009, the SMP has not exceeded €400/MWh and has only exceeded €300/MWh in two trading periods.

2.2 Effectiveness

As was the case last year, the fact that SMP has not been set at PCAP so far is instructive. If SMP had frequently been set at PCAP - for reasons other than Insufficient Capacity Events in the MSP software or an inability of the software to reach a feasible solution⁴ - 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.

³ For more on this event, see the Market Monitoring Public Report, 14 April 2009 (SEM-09-039)

⁴Where the MSP Software (using Lagrangian Relaxation (LR)) produces a System Marginal Price (SMP) for any Trading Period in a Trading Day greater than €500/MWh or less than €5/MWh, or where the solution shows error messages or fails to produce a feasible solution, the Market Operator (SEMO) will rerun the results over the relevant Optimisation Time Horizon using an alternative solver - Mixed Integer Programming (MIP). MIP is used as either a sanity check on the LR solution or as an alternative to the LR solution in certain instances where the LR solution delivered is questionable. The process serves to mitigate price spikes for software infeasibility reasons. For details of when MIP results have been used, see SEMO monthly reports at: http://www.sem-o.com/market_publications/Monthly_Publications/

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.

A PCAP of €700/MWh would have been equally effective in achieving the objectives of a price cap in the SEM. But, for the reasons given in 2007 and 2008, 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 - if ever - 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 above indicates that there are fewer occurrences of price spikes relative to the period reviewed for the setting of the 2009 PCAP. While a significant decline in international fuel prices in the final quarter of 2008 has led to a lower SMP thus far in 2009 compared to the same period last year, forward fuel prices for the coming year are not significantly different from those prices available when PCAP was originally set in 2007⁵. Any argument that PCAP should be set to a lower value to reflect the decline in oil and gas prices relative to 2008 must be tempered by this consideration. The RAs would also point to the fact that when fuel and carbon prices reached record highs last year, the level of PCAP was maintained at €1000/MWh.

In light of this, the RAs are of the view that PCAP should be set at a level at which is yet to bind is the most sensible approach.

2.3 Proposal

The SEM Committee therefore proposes to leave PCAP unchanged at €1,000/MWh for 2010.

⁵ For some fuels (e.g., coal and gas) forward prices for 2009/10 are actually higher than those for 2007/08

3. PFLOOR

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

- All respondents agreed that PFLOOR should remain unchanged at minus €100/MWh for 2009;
- 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. Should respondents feel that the setting of the SMP to the PLFOOR is inappropriate in such circumstances; the RAs suggest that they bring a modification proposal to the TSC Modifications Committee, justifying the Modification against the TSC Objectives.

The RAs set PFLOOR in the SEM at minus €100/MWh, a level sufficiently below zero to allow renewable generators to bid the opportunity cost of their ROCs and CHP plant at the opportunity cost of using their heat boilers.

3.1 Price outcomes so far in the SEM

Market data for the period from 25 April 2008 to 24 April 2009 show that:

- SMP has never been negative;
- PFLOOR has never been hit;
- The lowest SMP set so far was €3.29/MWh, between 3:30am and 5:00 am on 23rd October 2008, where one of the hydro units operating in the market set a shadow price of €0/MWh;
- No generator has yet bid in a unit with negative PQ bids;
- No Excessive Generation Events have been called.
- In the period November 2007 to April 2008, the SMP was below €50/MWh in 1645 trading periods (18% of the time), compared with 4418 trading period (25% of the time) in the April 2008 to April 2009 period.

3.2 Effectiveness

As was the case in 2007 and 2008, the fact that SMP has not been set at PFLOOR since the SEM began indicates that it has been effective in achieving its purpose. 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 software⁶.

⁶ As noted above in the section on PCAP, SEMO reruns the MSP Software using Mixed Integer Programming as a sanity check on prices, that is where the SMP goes below €5/MWh. This serves to mitigate price troughs for software infeasibility reasons.

The fact that SMP has never been set at PFLOOR has meant that prices have been set by the MSP software without constraint. As with PCAP, and as was the case in last year's review, this would suggest that PFLOOR has been effective in achieving its objectives of minimising exposure of participants to negative prices whilst allowing for an efficient market price signal.

As noted in previous consultations, given that there have been neither negative prices nor negative bids submitted by any generator since the market began, a PFLOOR higher than minus €100/MWh (e.g. minus €50/MWh or zero) would have been equally effective in achieving the objectives of a price floor in the SEM. However, the RAs continue to see merit in giving generators that are prepared to pay to stay on the system rather than be constrained off the opportunity to reflect that willingness to pay in negative price bids⁷.

The period examined (April 2008-April 2009) shows a higher occurrence of prices below €50/MWh relative to the period reviewed for the setting of the 2009 PFLOOR, reflecting lower underlying fuel costs, a significant decline in demand and an increase in price taking generation. However, an Excessive Generation Event has yet to be declared by the MSP software and prices remain unlikely to go negative 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. This issue is expected to be examined more detail as part of the RAs 'Wind in the SEM/Dispatch Principles' workstream.

3.3 Proposal

The SEM Committee therefore proposes to leave PFLOOR unchanged at minus €100/MWh for 2010.

⁷ As discussed in previous consultations on the setting of PFLOOR in 2007 and 2008, setting this to minus €100 MWh would allow eligible renewable Variable Price Maker Generating Units in Northern Ireland to bid the opportunity cost of their Renewable Obligation Certificates (ROCs) with a margin to spare, given that the 'buyout' price for 2009/10 stands at £37.19.