

The Value of Lost Load, the Market Price Cap and the Market Price Floor

A Response by Synergen

1 Introduction

This note is Synergen's formal response to the consultation paper AIP/SEM/07/381 "The Value of Lost Load, the Market Price Cap, and the Market Price Floor", published on 2nd July. Synergen's comments are set out below.

2 Observations

Because of the way in which SEM terms are defined within the T&SC and operate, there is the potential for confusion over terms used. Where Synergen refers to PCAP, PFLOOR and VoLL these have the meanings used in the T&SC. As we refer to default market prices in other markets (where the value of lost load is the term used) we use the term "rationing price". Synergen's thinking on these points is set out in the following sections.

Synergen has a number of concerns regarding the RAs proposals, and proposed changes. Synergen:

- does not support the specific underpinning elements of the RAs' methodology for setting an inferred VoLL;
- does not concur that the Market Price Cap (PCAP) should be set at €10,000MWh;
- believes that PCAP is a more critical variable than VoLL (which is essentially a CPM re-distribution parameter) – the level of PCAP can present significant commercial risks to most participants and customers and should be set at a level which strikes a balance between a prudent economic signal and a manageable risk profile;
- has strong reservations about energy prices hitting PCAP (especially when that is set at the same level as VoLL) when no customer load is shed due to generation shortages in practice BUT the scheduling software fails to reflect this when price i.e. set ex-post. Synergen believes that larger customers being served by the PES on pool price pass through contracts will find price exposures up to €10,000MWh unacceptable, particularly when all load is actually served.
- proposes that PCAP should be set at a conservative level until:

1. adequate secondary market liquidity (including and DC contract availability) exists to adequately manage it; and
 2. there is sufficient certainty that scheduling software issues will not drive prices to rationing price levels at times when all load is being served;
- does not accept that the rationale for setting PCAP and VoLL at the same level is justified, or robust. Even if this is economically rationale, the basis of the SEM is one of compromises and regulatory controls. The workings of the CPM in particular, negate any justification for PCAP = VoLL that may exist in a less mechanistic/regulated regime;
 - proposes that PCAP should be formally reviewed one year after market start, against the criteria above, to see whether the risks associated with a higher level could be appropriately managed;
 - suggests that there should be no within year review of PCAP, VoLL and PFLOOR within year 1 of the SEM as this would prejudice parties contract positions;
 - proposes that, subject to the bullet point above, that:
 1. VoLL should be subject to escalation by an appropriate inflation index on an annual basis, and
 2. PCAP should be subject to reviews based on annual assessments of the maximum modelled SMP outcomes produced by the RAs as part of the DC and CPM modelling; and
 - proposes that the rationale for setting PFLOOR as a subjective judgement balancing risks and economic signals is reasonable. On this basis PFLOOR and PCAP should have the same criteria applied to setting their absolute value at a reasonably level which avoids unnecessary volatility.

Synergen's thinking on these points is expanded upon in the following sections.

3 Terminology and the operation of the market rules

The effect of PCAP and VoLL are set out below.

PCAP is the:

- maximum price that SMP (inc Uplift) can be set at in any Trading Period and hence the maximum price that a generator can receive as an energy payment within a trading period (T&SC 4.81);

- maximum P/Q pair price that a generator can submit (T&SC 4.11); and
- price which would be set if sufficient generation could not be scheduled to meet demand because of either a fundamental shortage of generator or else due to issues within the scheduling tool (T&SC 4.79).

VoLL is theoretically the price at which customers (in aggregate) would rather lose load than pay for supply in a Trading Period and hence the overall market price cap i.e. SMP + CPM in a Trading Period (T&SC 4.123).

The SEM is an unusual set of trading rules. In the event of load being unserved prices would go to PCAP i.e. an energy rationing price. As proposed by the RAs, prices would also hit the VoLL price level as PCAP is set at the same value as VoLL. This would be the total payment paid to scheduled generators. Given the scaling factors that operate within the CPM payments, in the event of SMP reaching PCAP then CPM payments would be zero in that period.

Further, in the absence of PCAP being hit (and plausibly given SRMC bidding principles it is difficult to see how it would be hit at the price level proposed by the RAs) there is no possibility of prices rising to VoLL given the way in which CPM payments are structured¹.

The split in the market payments between generators and suppliers means that there is an imbalance between generator and supplier revenues. There is a particular effect on a Trading Period basis whereby generators could see high CPM payments whilst suppliers payments are stabilised throughout the Capacity Payment Period. A spike in SMP would, however, be seen by both sides of the market.

Given the above, Synergen considers that PCAP is the true default market clearing price (essentially the economic rationing) whilst VoLL is a parameter that scales CPM revenues relative to SMP and ultimately caps CPM + SMP. Whilst these two figures are the same value the sum effect is that where SMP hits PCAP, CPM revenues are zero – exactly at the time where capacity payments should be high in an efficient market. In sum, the SEM is a highly mechanised arrangement.

Synergen believes that the critical issue from a market integrity perspective is the level of PCAP. It also believes that within the context of the SEM design the values of PCAP and VoLL could and should be different. This would have an impact on allocation of CPM costs and revenues across each capacity month, but not their overall level.

¹ For the Generator CPM payment to hit VoLL during 2008, the ex-post availability in a single period would need to be very low (e.g. below 3500 MW) within that period whilst ex-post LOLP was greater than zero and ex-post LOLP would need to be zero in all other periods within the month – Synergen couldn't construct a plausible scenario where this will occur. Generally impact of higher / lower values for the VoLL parameter within the T&SC on CPM price outcomes is minimal.

4 The level of the market price caps

4.1 Rationing prices – the underlying rationale and SEM design issues

A rationing price is the point at which customers in aggregate are deemed to prefer to not take energy than pay. In short, it acts as a market clearing price when generation availability is insufficient to meet demand and the market does not clear. Consequently, this is theoretically reflective of the customer disconnection price.

In practice, however, this value is difficult to determine. International empirical evidence varies and in any event those putting in place wholesale market arrangements may deliberately choose to cap market prices at a different (lower) level.

Synergen notes that empirical studies have thrown up divergent values from customers as to the price at which they would rather lose supply than purchase at a given price. Clearly a number of factors make such assessments difficult, not to say time consuming and expensive to undertake. In particular variations between customer classes, the time, and duration of any loss of load. So, whilst empirical studies can inform decisions on the setting of a rationing price, they should not be the sole basis of setting a level.

The Australian arrangements are referred to in a number of places by the RAs. The RAs note that the Australian survey placed a customer rationing price at €50,000MWh. It also notes that the rationing price in the NEM is set at around €6,000MWh², and that this is the price cap within a discrete trading interval. It also recognises that sustained periods of rationing prices should be mitigated and includes explicit provisions to achieve this through the cumulative price cap levels.

The other evidence quoted from the USA provides a number of examples of markets where the price cap is set at relatively low levels. Whilst these markets may describe the price cap and rationing price as being synonymous with each other, Synergen believes that they actually provide examples where market prices are capped at levels below the actual levels where customers in aggregate would rather lose load than pay high prices within a trading period.

There thus appears to be no compelling evidence for setting the price cap at the level of customer's valuation of load continuing to be served. Further, there appears to be precedent for setting market price caps at levels significantly

² Our understanding was that the NEM process was somewhat less scientific than one might imagine – essentially previous values were deemed to low and VoLL was set at a level where it was assumed that there would be sufficient incentive to encourage parties to avoid exposure to it – essentially to incentivise contracting to mitigate peak price impacts, and thus provide revenue streams to peaking plant.

lower than that proposed in the SEM. This position is reflected in the RAs decision to smooth the CPM exposure of suppliers and thus customers to CPM signals within a Trading Period.

If customers do not react to a disconnection price, do generators? Synergen believes not, particularly within short time periods – decisions to avoid anticipated tight capacity margins would need to be taken many hours, or days in advance. Whether VoLL or PCAP actually reflects generation cost recovery is discussed later in this response.

4.2 Observations on the RA methodology

Synergen believes that the methodology based on utilising the generation security standard is not robust. This relates to both the use of the 8 hours of lost load for the security standard, and the application of a BNE price.

Regarding the security standard figure, the eight hours figure is based on an unconstrained all-island basis. This physical reality that would reflect this assumption will not arise until 2012. The use of this figure may reflect a future situation, but it is not a reflection of customers' rationing prices in either jurisdiction at this time.

The second calculative element is the use of the BNE price. Under the approach taken, the VoLL calculation based on the security standard cannot reflect customer's actual rationing price on an ongoing basis unless the BNE price is re-visited each year. This would make VoLL variable (increasing and decreasing) on an annual basis – an outcome that would be undesirable against any market stability success criteria. However, if the VoLL figure is set at €10,000MWh and then increased by an appropriate inflation index³ each year the arrangement would be stable, but the underlying accuracy of the figure would cease if BNE costs rose/fell over time. Further, setting VoLL based on a one-off BNE calculation at a given point in time would lack robustness.

Synergen accepts that there is insufficient time to undertake customer surveys to determine the rationing price in Ireland. Even if such a survey was done, there is not necessarily a rationale for adopting this figure as a market price cap. There is a theoretical reason for doing this – but not necessarily a practical one. This arises particularly as the CPM Supplier Prices are not reflective of a pure LOLP×VoLL signal within a half hour trading period given the monthly “pot” methodology although the level of SMP vs the level of VoLL will drive CPM volatility. Furthermore, whilst VoLL is the mathematic cap on SMP + CPM it is the sizes of the CPM pots within each month that will actually cap the CPM reward in any one trading period. Additionally, high overall market price caps can serve to impact CfD risks. These risks will primarily fall on IPPs that are highly contracted and suppliers un-hedged volumes.

³ This index should take account of changes in generation sector costs not just a general RPI figure.

Given the highly regulated generation market an alternative calculation methodology would be to cap SMP / bidding (i.e. PCAP) at the maximum likely SRMC bid price (including start-up and no load prices). This approach is consistent with the RAs assumption that CPM plus SRMC bidding is compensatory and would need to be re-visited if the SRMC market power provisions were no longer deemed appropriate. This would lead to a PCAP that is aligned to the maximum prices likely to be set in the market (including the operation of the Uplift mechanism).

4.3 De-coupling PCAP and VoLL

As CPM would be zero if PCAP is hit in a Trading Period, it is reasonable to question whether these two values should be set at the same level, and consider the effect if PCAP was set at a lower figure.

Assume that PCAP is set at half the value of VoLL. In the circumstance where PCAP is hit the overall market price paid to scheduled generators would be:

- SMP at the PCAP level; and
- CPM, comprising:
 - the flat payment;
 - the ex-ante payment, which would be unlikely to include a LOLP at 1; and
 - an ex-ante payment including a LOLP at 1.

Synergen's analysis shows that the effective market price in that Trading Period would be less than the VoLL level – and would be driven by the ex-ante LOLP forecast and the out-turn profile of prices.

The effect of this arrangement would be to maintain CPM payments at times of generation shortage.

Regarding VoLL, Synergen can see arguments for and against de-coupling it from PCAP.

On balance, Synergen believes that there is an overall benefit in maintaining some CPM signal at times of high ex-post LOLP. This would maintain a maximum price within a Trading Period as SMP + CPM is also capped.

4.4 The validity of one PCAP value

PCAP can result from either an actual shortfall of generation or a situation where the scheduling software cannot meet actual demand when it is run ex-post (even if demand was actually met in real time). This is an area of considerable concern to Synergen. The market trials that are presently running have produced price outcomes at PCAP. There is thus an expectation based on Synergen's current experience that PCAP events can and will arise. Prices at PCAP are thus not a theoretical price that is not expected to arise, but a real possibility, with consequences that would be highly prejudicial to a majority of participants and customers.

Synergen does not believe that it is valid to set market prices at the same capped level regardless of whether load is actually lost or a software programme could not solve a problem ex-post that had already been solved in practice earlier.

Synergen thus proposes that:

- 1. there should be two PCAP values.***
- 2. the first of these would apply when demand was fully met on the day but the scheduling software was unable to solve (potentially due to bid constraints) in its ex-post run. This figure would be set at a capped level, and subject to an ex-post review and re-set down to a level that ensured full cost recovery for the marginal plant. For the avoidance of doubt, and reference to this value is subsequently referred to as PCAP(Sched); and***
- 3. the second of these would apply when demand was actually unserved. This would be a higher figure and not subject to any ex-post review.***

For the avoidance of doubt the Synergen comments in this paper relate to the single PCAP value as presently utilised in the T&SC unless specifically identified as the lower PCAP(Sched) value.

4.5 The level of PCAP and VoLL

Synergen believes that the critical parameter as set out in the T&SC is PCAP – and that the €10,000MWh figure is far too high.

In Section 4.4 of the consultation paper the RAs set out their rationale for setting PCAP at VoLL. As far as we can determine the central thinking behind this, the argument appears to be that as a result of mandated SRMC bidding there is no need to utilise a low market price cap to reduce volatility. The inference is that any spike in price would be driven by underlying costs.

Synergen does not believe that assumption is thoroughly tested in the paper. The RAs note that prices could spike as a consequence of the Uplift methodology, yet there is no modelling that allows this risk to be understood – although the RAs do concede that the workings of Uplift may in the future require a downwards re-evaluation in PCAP.

Synergen understands that modelling to date⁴ suggests that maximum peak prices are likely to be less than 1,000 €/MWh, with PCAP being set at 10 times this level. If there is a failure to meet load, the price would flip between these two prices – creating generator revenues that are way in excess of SRMC at the margin. SRMC bidding may thus keep prices low *except* when demand is not met. This is when the value of PCAP becomes critical. Synergen believes that any legitimate cost must be reflected in bids and recovered through SMP, but the level proposed is out of all proportion to this.

The RAs position on PCAP also seems inconsistent with its approach to PFLOOR. This is discussed in section 5.

Further, as CPM is a fixed pot, “scarcity rents” would continue to be collected. There is no clear rationale for allowing generator prices to rise to this level. High price spikes in energy prices create risks to suppliers purchasing from the pool, and in the contract market. A high PCAP (i.e. one way above any plausible SRMC) merely increases risks to most participants and prices to end customers, particularly those on pool price pass through contracts.

Synergen also believes that there are insufficient opportunities to hedge out PCAP risks. The appropriate hedging mechanism for a baseload (contracted) generator or supplier and a peaking generator would be a one way peak price hedge. Synergen argued for these forming part of the Directed Contract (DC) regime, but the RAs determined that (a) one way CfDs would not be part of the DC regime, and (b) generators will not be allowed to purchase DCs. In short, the RAs have effectively excluded some parties from accessing appropriate hedges in an environment where by their own admission a liquid market for such hedges does not yet exist. It would be inequitable to expose parties such as Synergen to risks that are not readily hedgeable as a consequence of RA decisions.

Synergen thus believes:

- PCAP should be set at a significantly lower level – a suggested level is set out below;
- PCAP should be formally re-considered one year after market go-live - this could take account of any increased hedging possibilities to mitigate PCAP price risks, and operational experience of the scheduling software;

⁴ Synergen conversation with RAs.

- there is merit in de-coupling PCAP and VoLL. Synergen is less concerned at the level of VoLL as its analysis suggests that the level of VoLL has only a marginal impact on the distribution of CPM revenues, and thus the suggested level of VoLL at €10,000MWH could be maintained
- if PCAP = VoLL, VoLL should consequently be set at a much lower level.

4.6 Proposed approach to PCAP

Synergen believes that the level of PCAP is set too high. Evidence from other markets suggests that lower figures are acceptable in market design terms – even if these are lower than customer estimates of rationing price. The SEM is a highly administered regime – both in the central market design and the level of Regulatory Control. It is demonstrably more mechanistic and controlled than other liberalised markets referred to in the paper, yet there is a potentially volatile element introduced via very high PCAP levels. There is no obvious requirement for this, and a number of potential dis-benefits (as set out in this section).

Clearly there is a primary requirement for energy prices to cover all of a generator's SRMC based bids. PCAP clearly has to allow for any plausible level of cost recovery – but this is a level massively below the PCAP suggested by the RAs. Synergen believes that prices would only plausibly rise to a high PCAP figure in the event of either an actual failure to meet demand, or an MSP failure to schedule to meet demand.

Given that exposures, directly on pool purchases or arising under CfDs, there are a number of parties exposed to the possible level of PCAP.

In a regime of mandated SRMC bidding and a mechanistic CPM there is no need for high VoLL levels and/or PCAPs as the scarcity rents that a peaker requires as these are provided by the CPM. As the CPM is fixed by year, and then by month, high energy prices would have no impact on CPM monies within year⁵. Thus a high VoLL would potentially shift CPM monies in a counter intuitive way, and be more likely to give rise to occasional windfall gains to generators with residual pool exposure to the detriment of some suppliers and ultimately customers.

Synergen's view is that:

- there are flaws in the RAs approach to setting an implicit VoLL. Synergen's feeling is that this figure is too high but in practice it does not act as a rationing price – but as a CPM monies allocation parameter;

⁵ Additionally high prices and overall revenues in one year would have no impact on the calculation of next years CPM.

- the argument made by the RAs (section 4.4) that because of SRMC bidding principles that significant protection exists against very high price spikes is flawed as spikes above €1,000MWh appear unlikely under SRMC bidding principles when generation > demand BUT PCAP events are likely to arise through actual or deemed generation inadequacy events. At this point prices would be set way above any SRMC bid levels;
- There is no rationale for setting prices at €10,000MWh (as proposed by the RAs) when demand is actually met; and
- the market design practicalities (such as stability and risk allocation) can be more important than a pure theoretical approach – the approach proposed for PFLOOR;

Therefore it is Synergen's assessment that setting PCAP at 1,500 €/MWh will balance economic signals, manageable risks and allow for generator cost recovery.

Regarding PCAP(Sched) Synergen does not possess adequate data on the operation of the scheduling software, the likelihood of PCAP resulting from scheduling constraints, or the underlying costs of generation when these occur. It is desirable to place a cap on this PCAP figure which must at least cover all generation costs. However, there is a likelihood that a cap could be well above the underlying costs – for example if PCAP(Sched) were to be hit overnight as a result of plant inflexibilities, or deemed inflexibilities. Under such circumstances a price at a cap figure, designed to ensure cost recovery when costs are high, would be inappropriate. Synergen believes that:

- The risk of scheduling limitations leading to PCAP figures should be reported on, and assessed as part of the assessment of the market trial;
- The RAs should specifically investigate the case for the use of 2 PCAP figures as suggested in this response; and
- The RAs should propose an PCAP(Sched) cap figure and methodology for ex-post assessment of an actual market price when demand is served but not scheduled.

If the RAs process does not allow for this at this stage, Synergen is prepared to make specific T&SC Modifications proposals on this point.

5 The Level of PFLOOR

The RAs position on PFLOOR is that it should be limited to -500€/MWh as this figure maintains ***“a balance between minimising the exposure of participants to negative prices without excessively dulling an efficient***

price signal'. Synergen supports this approach in principle and believes that this is exactly the view that should be taken on PCAP. There is no rationale for why the -500€/MWh figure strikes this balance any better than, say -1,000€/MWh, -1,500€/MWh or even -10,000€/MWh.

There should be a consistency of approach to how VoLL, PCAP and PFLOOR are set. The RAs paper suggests that the approach adopted is far from this, and approaches have been adopted to give rise to particular outcomes.

Synergen is also concerned that the RAs present information from other markets that suggests that the VoLL and PCAP (as $\text{VoLL} = \text{PCAP}$) levels are towards the higher end of the range, whilst recognising that PFLOOR is “a smaller absolute value”. This approach creates asymmetrical risks within the generation market (taking account of CfD positions).

Synergen believes that the approach of balancing risks and signals should be applied to the assessment of both PCAP and PFLOOR and that there should be a principle adopted whereby PFLOOR should be a negative value with the same absolute value of the PCAP figure.

6 Re-setting the VoLL and market Cap/Floor levels

Synergen is concerned by the proposal in Section 6 of the consultation paper where the RAs reserve the right to change the VoLL, PCAP and PFLOOR values within the first year. Whilst this is within the RAs authority under the Electricity Regulation (Amendment) (Single Electricity Market) Act 2007, such statements create significant uncertainty, and an expectation of ad-hoc intervention. This introduces market risk and therefore increases the cost of capital for all participants which feeds into higher end customer prices.

Going forwards, it is important that there is clarity on how VoLL, PCAP and PFLOOR are revised. Whilst the paper states that this is set out in Table E, of Appendix E of the Code, this merely sets out when figures are published – it does not set out how they are derived (as is implied by the paper). In essence, there is no clear understanding about how these figures are set going forwards. There needs to be clarity on this.

Synergen suggests that there should be:

- an annual adjustment in PCAP based on RA modelling of the next years pool prices (a projection that is planned to assess both Directed Contract prices and the annual CPM pot) taking into account a reasonable margin to allow for increases in generator input costs; and
- If VoLL and PCAP are decoupled, an indexation adjustment in the VoLL level (calculated by the SMO and verified by the RAs). If $\text{PCAP} = \text{VoLL}$ then VoLL would be set based on the PCAP methodology above; and

7 Summary

Synergen position is that:

- that the level of SEM rationing price (PCAP) should be reduced to a level where:
 - generator cost recovery is assured;
 - market risks are at a manageable level; and
 - adequate market signals are provided;

this would:

- reduce contract risks to generators that are not priced into the DC prices;
 - reduce un-necessary volatility into the CPM;
 - align the SEM rationing price with those in other developed economies; and
 - avoid the introduction of significant risks to generators and retailers in commercial CfDs – where such risks cannot be priced into contract prices; and
 - mitigate customer price risks (directly through pool price related contracts and indirectly through risk premiums on contract prices);
- PCAP should be set below the level of VoLL such that $PCAP + CPM$ would be the rationing price in any half hour - this may not be a pure rationing price level because of the design of the CPM mechanism, but it is a more rational approach than one where $CPM = \text{zero}$ when $LOLP = 1$;
 - There should be a separate, lower, PCAP(Sched) figure used for circumstances where demand is met but cannot be scheduled ex-post.
 - PFLOOR should be a negative value with the same absolute value of the PCAP figure (i.e. amend the T&SC such that $PFLOOR = -PCAP$); and
 - the mechanism for changing VoLL and the other values should be clearly set out in the T&SC⁶.

⁶ Synergen will raise a change request to introduce this into the Code, and if this cannot be implemented prior to market start will submit a modifications proposal to this effect immediately on market go-live.