A Proposal for a Balancing Market to Determine Cash Out Prices

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1. Summary

This paper proposes that electricity cash out prices should be determined on a Balancing Market run by a power exchange rather than by the System Operator. Just before each trading period, bids and offers (for 'incs' and 'decs') would be made to this exchange. The market clearing price would be calculated and announced corresponding to the net imbalance volume predicted by the System Operator at that time. Bids and offers would be accepted in price order accordingly. The subsequent imbalances of market participants would be settled at this price. Apart from this, the System Operator would retain all its present functions, with continued incentive arrangements as appropriate. This Balancing Market would be consistent with underlying principles and would address present concerns about the determination of cash out prices. In particular it would combine the advantages of the two approaches recently suggested, without their disadvantages.

2. Background

In view of continuing concerns, Ofgem has instituted a new review of cash out arrangements. It asked me to look at the principles of cash out, and it asked Nigel Cornwall to look at the practical aspects. In parallel, it carried out a series of bilateral meetings to discuss these issues with market participants. On 30 March it held an industry briefing meeting to provide feedback and to discuss some findings by National Grid and some possible solutions put forward by EDF Energy and others in earlier meetings with Ofgem.

As to principles, the main conclusions of my paper may be summarised as follows:

1. Concerns about generator market power and System Operator's ability to balance are less serious than they were initially. Greater weight should now be attached to the underlying objectives of facilitating competition and efficiency.
2. Without downplaying the role of incentives on the System Operator, there would now be merit in providing cash out services via a balancing market.
3. The arguments for a dual cash out price no longer carry weight, and this arrangement has serious disadvantages. There would be merit in moving to a single cash out price.
4. A single cash out price based on a market-clearing price rather than pay-as-bid would have the advantages of marginal cost pricing while still breaking-even. This would avoid the problems of making and distributing surpluses (or losses).
5. Present rules of cost allocation and tagging are problematic and need reform.
6. There would be advantage in setting energy balancing prices ex ante rather than ex post.

As to practical issues, Nigel Cornwall's paper highlighted the problem areas as being associated with the tagging rules, especially the imprecise energy/system split, the

interactions between energy and transmission issues in the balancing mechanism, and the complexity and lack of transparency of pricing rules.

From its bilateral meetings, Ofgem reported a broad set of concerns that it summarised in three propositions:

- present arrangements are very complex so a simpler calculation of cash out prices would be desirable
- pollution of the energy signal in cash out prices necessitates a more effective mechanism to extract non-energy actions
- a lack of transparency in NG's actions as System Operator suggests the need for more information about these.

Ofgem proposed for consideration two possible cash out models:

- Model 1 would set cash out prices equal to a market price plus or minus X% to reflect an 'inefficiency premium' of System Operator balancing and to maintain incentives to contract.
- Model 2 would require the System Operator to set cash out prices based on an ex post unconstrained stack of acceptances.

NG as System Operator presented evidence that 59% of the bids and 75% of the acceptances remaining in the NIV stack reflect considerations other than energy balancing. It calculated that an idealised stack would have less extreme dual cash out prices (9% lower SBP and 7% higher SSP). It also explored the practicalities of calculating prices based on such an approach. EDF Energy suggested another method of calculating cash out prices based on a different approach to calculating an unconstrained stack.

I understand that the participants at the briefing meeting recognised the potential advantages of each of the two models but also the disadvantages. (These advantages and disadvantages were indicated by Ofgem in its presentation, and are supplemented in its note of the meeting.) Participants also agreed that more or better quality information about NG's balancing actions would be beneficial. They noted that single versus dual pricing was important but that the issue of price derivation was the priority task. I also understand that proposals for modifications reflecting both of Ofgem's models are under active consideration by the industry.

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3. The case for a third model

I agree with Ofgem and the workshop participants that, while each of the two models has merits, each also has serious disadvantages.

Model 1 is indeed simpler as it does not depend on a complex allocation method and allows a market rather than the System Operator to determine cash out prices. But the resulting prices based on short term trading have no particular relationship to the costs of actually balancing energy on the system in the light of how far it is short or long. Consequently these prices cannot be expected to give appropriate signals to market participants. The method of calculating the cash out prices by weighting the forward market prices is also somewhat artificial and not necessarily transparent. The

approach is unlikely not to distort those market prices and could be subject to gaming. The proposed X % inefficiency premium seems somewhat arbitrary.

Model 2 would hopefully more closely reflect the costs of balancing the system and also improve transparency. But it is not clear whether in practice it would be much more than a revised tagging methodology, with the attendant problems of judgement and complexity. Concerns about cost allocation and transparency could remain. In some versions the approach would reflect hypothetical trades and calculations rather than actual ones.

There is therefore a case for a third model, one that seeks to combine the advantages of both the other two models without the disadvantages. That is, it will seek to be simpler than the present system and to allow the market to determine cash out prices, without the artificialities and distortions of model 1. At the same time it will seek to reflect more closely the costs of balancing the system and to be more transparent, without the allocation and classification problems and hypothetical calculations of model 2. It will also more adequately reflect the principles underlying cash out.

4. Two functions of cash out

We may distinguish two functions of the cash out mechanism. The first is to facilitate the System Operator's task of balancing the system in real-time, along with its other tasks of managing transmission constraints and maintaining system stability etc. This function has generally been given prominence in the UK, at some times exclusively so.[1]

The cash out mechanism also has a second function: to enable market participants to trade electricity without knowing in precise detail what their supply and demand commitments will be. Indirectly, it enables market participants to trade with each other so as to cover or reduce their imbalance positions as late as possible, at 'the going rate' even though they do not yet know what that rate is. In some other markets overseas, this role of an 'imbalance market' has been given greater recognition and prominence.[2]

The proposal here is to recognise more clearly these two separate functions of cash out, and to make each more effective and transparent by placing them in separate organisational frameworks. That is, it is proposed that a power exchange take on the task of facilitating the ability of market participants to trade amongst themselves, including by determining the cash out price in each half hour. At the same time, NG should continue to exercise its other present functions as System Operator. Of course, the two organisations will need to coordinate and cooperate so that each can discharge its own functions effectively and efficiently.

[1] For example "The Balancing Mechanism is one of a number of tools that the SO has available to it to ensure that short-term quality and security of supply are met. …The role of the Balancing Mechanism is to provide a mechanism for NGC to adjust participants' intended operating levels of generation and demand in real time. … The Balancing Mechanism allows the SO to match system-wide imbalances between electricity production and consumption; to adjust local and bulk power flows to ensure the security of the transmission system; and to procure other Balancing Services." *The New Electricity Trading Arrangements: A review of the first three months*, Ofgem, August 2001, paper 53/01, page 27.

[2] The concern that this role of a market was being overlooked was also expressed by some early commentators on NETA.

5. The proposed Balancing Market Model

The present proposal is as follows:

- market participants and NG (in consultation with Ofgem) choose a power exchange to operate a Balancing Market;
- market participants wishing to bid or offer balancing services (incs and decs) in any half hour period submit their bids and offers to that Balancing Market instead of to the System Operator;
- at a specified time shortly before the beginning of each half hour period, the System Operator informs the Balancing Market of its predicted Net Imbalance Volume during the forthcoming half hour period;
- on the basis of the bids and offers submitted and the System Operator's prediction, the Balancing Market operator ranks the bids and offers in order, calculates the cash out price as the market clearing price for that half hour, and accepts the bids and offers in price order accordingly;
- the actual (ex post) imbalances of energy market participants (generators and suppliers) in each half hour period are cashed out at the market clearing price determined in the Balancing Market.

6. The role of NG as System Operator

Except in the above respects, NG would continue to perform its function as System Operator. In particular, it would

- continue to enter contracts for balancing and other services ahead of each half hour to the extent that it deemed it appropriate to do so
- continue to receive notifications of the expected positions of market participants
- continue to be notified of the bids and offers into the Balancing Market, and be notified of the market clearing price and the bids and offers accepted
- continue to enter contracts and/or take actions after the determination of the cash out price and during the half hour (real time) so as to discharge its functions as System Operator
- continue to be reimbursed for its efficiently incurred costs, depending on such incentive scheme as might be deemed appropriate.

At present the System Operator takes into account a wide range of considerations in selecting bids and offers, including (for example) transmission constraints as well as energy balances, and then has to tag out some of these actions or allocate the costs among the different objectives. Under the proposed approach, the energy balancing actions would be taken first and separately. The System Operator would then start from a balanced system (with reference to the expectations just before the period begins), so that its actions taken for other reasons are now clearly identified and costed. (To the extent that these actions might necessitate cancelling out trades accepted in the Balancing Market, provision would be made for giving effect to this at an appropriate cost.)

7. Advantages of the Balancing Market

The advantages of the proposed Balancing Market would include the following:

- it clearly separates the function of market making and determining a balancing market price from the other functions of the System Operator, and allocates the price setting function to a more appropriate body;
- it thereby clearly separates those actions and costs that determine cash out price from those actions and costs that do not. In simple terms it separates the sheep from the goats: if an action is an accepted bid or offer in the Balancing Market it is a sheep, if it is an action taken by the System Operator is a goat;
- it is a pure energy price, and it is simple in concept and in operation;
- it is entirely transparent: there seems no reason why the bids and offers in each period, and the System Operator's prediction and the calculation of market clearing cash out price, should not all be made public at the same time as declaring the cash out price;
- it reflects the actual costs of balancing energy on the system, as these costs are perceived at the specified time of setting the cash out price;
- there would be no problematic surplus or deficit to deal with via RCRC or some other method;
- it would seem conducive to increased market liquidity and to a greater involvement by market participants. It would also seem complementary to ongoing discussions about the possibility of establishing a clearing house for day ahead trades;
- it would support other aspects of market efficiency by enabling suppliers to reflect a near to real-time price to customers that wish to see it, fostering more efficient usage and demand management.

There has been some concern that an ex ante price would be an imperfect approximation to the ex post price, or in other respects misleading, and perhaps needing to be corrected ex post. However, with the approach proposed the ex ante price *is* the price in the ex ante market, in a similar way that a forward or future price is also a price in its own right. It is not an imperfect approximation of something else.

8. Outstanding issues for discussion

Many issues of implementation remain to be discussed and resolved. For example

- at what time before the beginning of each period would it be most convenient and advantageous to strike the cash out price? (Later may mean better predictions of market conditions; earlier may enable better response to the information contained in the cash out price.)
- how far should the basis of the System Operator's predictions be specified and based on objective data, or explained at the time or afterwards?
- should NG as System Operator provide earlier information about its expectations about NIV and the information upon which this is based?
- is current BMRS data fit for this proposed purpose?
- how should NG be incentivised to act efficiently with respect to all its functions?
- should NG be permitted to procure energy other than specifically for reserve purposes?
- how should the costs of NG's various different actions be classified and recovered?

Many of these questions exist today, and some would still apply with the other two models. However, they could be less problematic under the proposed mode, since the volume of NG's actions to which they apply, and the magnitude of the costs involved, could be substantially less.

The proposal raises wider questions about the role and functionality of the SO. I understand that Ofgem has separately indicated that it intends to review this issue later this year. Given the relationship with cash-out, it would seem appropriate to consider these matters in parallel.

9. Conclusions

The present proposal for a Balancing Market is consistent with underlying principles and responds to the present practical concerns about cost pollution, complexity and tagging rules. It takes to a logical conclusion the arguments for separating energy balancing costs from other costs. It has substantially the advantages of both Models 1 and 2 without most of the attendant disadvantages. Many issues of practical implementation would remain for discussion, but this is true of all three models proposed. The concept of a Balancing Market therefore deserves further active consideration.