



Connecting UK business customers
with the wholesale energy market

Issue 1 in a series of
thought pieces aimed at
businesses with onsite
energy generation

An EnDCo White Paper



In this paper, EnDCo, an independent licensed electricity supplier, explains the complexities of the cash-out arrangements in the wholesale energy market and the ramifications that forthcoming changes to the system will have on businesses - both in terms of generation and consumption of energy.

Executive Summary

- From November 2015, changes to the cash-out arrangements within the wholesale electricity market will require businesses that both generate and consume power to re-evaluate the commercial risks associated with their power trading activities.
- These businesses, be they net generators or consumers of electricity, will need to pay even closer attention to accurate forecasting of generation and/or consumption volumes and then micro manage their real-time 'imbalance' position – if not, they could face significant and unpredictable costs should they fail to operate in accordance with their contracted position.
- This is because the long-standing arrangements that have historically governed the Balancing Mechanism are being significantly amended following recommendations made by the regulator, Ofgem, in its Electricity Balancing and Settlement Code Review (EBSCR).
- Initiated in 2012 and finally published in 2014, the review has resulted in a number of key changes being implemented which are intended to sharpen cash-out prices and make them more reflective of the marginal costs to balance the UK system.
- The move is aimed at reducing imbalance costs in the energy market and is projected to deliver a generic benefit to consumers in the UK of around £200 million by 2030. However, one leading firm of energy analysts, Cornwall Energy, is already predicting greater volatility in imbalance pricing and that prices will be 'much sharper' once changes arising from the EBSCR bed in.
- The cash-out, or imbalance pricing, arrangements apply when companies selling or buying energy do not exactly match the traded position stipulated in their contract, i.e. they either generate or consume more, or indeed less, electricity than they have forecast and hence contracted.
- Electricity balancing arrangements, in particular the cash-out prices, provide incentives for generators and suppliers to either provide, or invest in, secure supplies to 'balance' positions and meet demand when the UK power system is stressed. They are therefore central to the delivery of a secure and competitive electricity market in the UK.

Cash-out arrangements in the wholesale electricity market

Electricity imbalance cash-out arrangements, also known as “Spill” or “System” prices, are a key part of the wholesale power market.

Whilst individual market participants are able to buy or sell power to satisfy their requirements under entirely voluntary contractual arrangements, at a UK-system level the National Grid (NG) has a responsibility to ensure that there is an overall balance between supply and demand in real time.

These potentially conflicting goals are reconciled via the imbalance cash-out arrangements. Through this mechanism, market participants are incentivised to keep their own individual supply/demand arrangements in balance because if they are not, they are then obliged to buy or sell power to make up the difference at so-called

System Prices, which are intended to penalise unbalanced positions.

Existing cash-out arrangements are now well established and, over the 15 years or so since they were introduced, individual market participants have by and large learnt how to manage the risks and costs inherent to the system. Nevertheless, for some time now questions have been asked about whether the existing arrangements are functioning properly. The industry regulator OFGEM has expressed concern that the incentives for generators, suppliers and other players to avoid imbalances are not strong enough. The reason for this concern primarily lies in the way cash-out arrangements have been designed.

As a result, OFGEM ordered a detailed review of electricity imbalance cash-out arrangements, and the resultant Electricity Balancing Significant Code Review (EBSCR) was initiated in 2012 and completed in 2014.



What is Imbalance?

Since the privatisation of the UK's electricity industry in the late 1980s, it has become accepted that electricity is a commodity that can be traded just like any other. In energy terms, this would include crude oil, natural gas, coal, etc.

However, there is one fundamental difference between electricity and the other traded energy commodities, this being the simple fact that electricity cannot yet be stored economically in large quantities and, consequently, electricity generation output must always match (or balance) in real time the demand for power.

It is this requirement for the UK's national electricity network to be “balanced” at all times that gives rise to what is known as the imbalance cash-out arrangements, and within these confines the concept of “imbalance”. The responsibility for managing this real-world situation is held by National Grid and, as in all things, there are costs associated with doing so which are paid by market participants in relation to their contribution to the imbalance issue.

How does the current dual-price system work?

When the overall UK system is ‘long’ (i.e. there is more power available than is required to meet demand), then the “main” cash-out price is deemed to be the System Sell Price (SSP). SSP is determined by the cost of the actions taken by NG to reduce production or increase demand. In these circumstances, the “reverse” cash out price is deemed to be the System Buy Price (SBP). SBP is determined by using market data from various sources. Participants who are long will receive the SSP (main price) and participants who are short will pay SBP (reverse price).

Alternatively, when the UK system is ‘short’ (too little power or too much demand), the “main” price is the SBP and the “reverse” price is SSP, hence participants who are short will pay SBP (main price) which is determined by the cost of actions taken by NG to reduce demand/increase production. Conversely, participants who are long will receive the SSP (again, determined by reference to market sources).

The Cash-Out Story

The EBSCR identified a number of defects in the existing arrangements as summarised below:

- Cash-out prices are calculated using the average costs of actions taken by the NG to balance the system. This means that the costs of balancing the system at the margins are underestimated.
- The system of dual prices creates unnecessary imbalance costs for parties who are out of balance, but in a 'helpful' way (i.e. parties who are long when the system is short or vice versa). By definition, larger participants are much more likely to cause system imbalances (i.e. their imbalances are unhelpful), whereas smaller parties are often 'out of balance' in a helpful way and suffer disproportionately from very low System Sell Prices (SSP) when they are long (but the system is short), and very high System Buy Prices (SBP) when they are short (and the system is long).

- Cash-out prices do not include the costs borne by consumers when they have to be disconnected due to imbalance issues, nor when there are voltage reductions, i.e. the cash-out prices are too low at times of UK system stress.
- Cash-out prices at time of system stress are also too low because the costs of holding reserve plant on standby are not properly reflected.

- The introduction of a single cash-out price to replace dual cash-out prices.
- The inclusion of a cost for disconnections and voltage reduction in the cash-out price calculation - this is the so-called Value of Lost Load [or VoLL] pricing, with the VoLL price to be set at £3000/MWh on 5th November this year, later increasing to £6000/MWh in 2018.
- Changing the pricing of Short Term Operating Reserve (STOR) actions into cash-out using a so-called Reserve Scarcity Pricing (RSP) function, starting on 1st November 2015.

Code Modification Proposals

In response to these findings, OFGEM instructed NG to put together a proposal to take forward the conclusions from the EBSCR. The proposal is known as P305 and its main elements are as follows:

- A reduction of the Price Average Reference volume (PAR) from 500 MWh to 50 MWh on 5th November 2015 (and subsequently to 1 MWh on 1st November 2018).

What is PAR?

PAR is the "Price Average Reference".

This average price being calculated based on the volume of electricity, as taken from the sources available to NG (in descending price order), available for use to facilitate "balancing" in real time and thus included in the calculation of the main price (1).

Historically the PAR volume has always been the most expensive 500 MWh of available electricity, but effective November 2015 this will reduce to the most expensive 50 MWh.

In November 2018 it will reduce further to 1MWh.

1 – See; *How does the current dual-price system work?* - page 3

What will be the effect of a change to a single-price cash out?

Single-price cash out will mean that the concepts of main price and reverse price will disappear. Cash-out prices will only be determined by the cost of actions taken by NG to redress the imbalances. Single-price cash out means that in time periods when the system is short, those market participants whose imbalance position is long (i.e. on the opposite side to the system imbalance - so-called "helpful" imbalances) will receive the same single cash out price that will have to be paid by other participants who are short, and vice versa when the system is long.



Possible impact of P305 - the evidence

In reaching its decision to implement P305, it is unclear how much of OFGEM's reasoning is based purely on economic theory and how much is supported by empirical evidence.

A piece of research by the consultancy firm, Baringa, suggests that, as a result of P305, the improvement in parties' balancing strategies (particularly trading and hedging) and investment in balancing improvements will reduce total balancing costs and deliver benefits to consumers of around £200 million by 2030. In fact, OFGEM states that the Baringa research is likely to have significantly underestimated the total efficiency benefits caused by investment and innovation in flexible capacity and demand-side response. This would be caused, in OFGEM's view, by the significant impact that VoLL and RSP pricing would have on cash-out exposure at times of system stress. However, not all of these arguments would appear to be supported by any hard evidence.

In summary, the OFGEM evidence on the impact of P305 appears to be based on what is quite sophisticated, but highly aggregated, modelling, and

so it is hard to relate these findings to the potential impact of the P305 proposals on individual parties or categories of party.

Evidence of the possible impact of P305 on market participants is thin on the ground. In December 2014, an Elexon working group produced a report which analysed what the effect of the P305 proposals would have been on historical system prices, imbalance cash flows and the net financial position of different types of player – the analysis being carried out on data relating to the years 2011-2014.

In considering the results of this analysis, it is important to note that these findings assume no changes in behaviour as a result of changing prices and cash flows so in that respect the analysis is somewhat partial and limited. The main findings of this research are as follows:

- Reduction of PAR consistently increases SBP and reduces SSP and the greater the reduction in PAR, the greater these upward and downward movements become (Occurrences of negative prices also increased)
- Maximum main price in 2013 was £520/MWh

- Minimum main price in 2013 was £78/MWh
- Single price cash-out has the effect of setting all reverse prices equal to the main price so that in general SSPs increase to SBP when the system is short and SBPs decrease to SSP when the system is long (of 14,784 settlement periods analysed in 2013, an average of 38% had the SSP increased to equal SBP and an average of 62% had the SBP reduced to equal SSP)
- Impact of VoLL and RSP pricing is comparatively limited and in most cases the opposite of what is expected as a result of additional STOR actions and other factors.
- Total cash flows (both inflows and outflows) reduced as a result of single price cash-out mainly due to re-pricing of SBP at SSP in over 60% of periods
- The impact of P305 on overall net cash positions (taking account of RCRC) varies according to type of player. Independent suppliers and thermal generators appear to be better off due to re-pricing of SBP at SSP and better RCRC receipts compared with dual pricing. Vertically integrated parties appear to be worse off due to lower RCRC receipts.

While the limitations of this research have to be taken into account, the broad thrust appears to be that the main impact of P305 will be from the reduction of PAR, and the effects of introducing VoLL and RSP may not be as significant as first thought.

Single cash-out pricing may cause prices paid to increase, or prices received to fall, more sharply than would have been the case under the

The Cash-Out Story

dual-price system, but this is by no means clear and the exposure of independent players may be reduced due to lower buying prices when they are short and the system is long.

In summary, at the moment there is no conclusive evidence about how the P305 proposals will affect individual market participants. The evidence that P305 will on balance adversely affect larger companies more than smaller ones is at best partial and at this stage tentative.

Overall conclusion

P305 proposals will be implemented starting this Autumn. It is the stated intention of these proposals that they should raise the incentives for market participants to balance their positions more accurately by sharpening the price signals in the cash-out arrangements.

Whether P305 will actually have the impact desired by OFGEM remains to be seen, but available evidence suggests that, of all the proposals



made, it is the change to PAR that is likely to have most impact. The effects of VoLL and RSP still need to be watched carefully since there is as yet no convincing evidence one way or the other about what impact they will have.

For market participants who are thinking about how to position themselves, to the extent they can, as a result of these changes the best that can be said is that a degree of caution is advisable.

At the same time, it should be emphasised that accurate forecasting of output or consumption, alongside

a strong focus on managing the real time imbalance position, is and will remain the most effective way of managing exposure to cash-out prices - there is nothing in the P305 proposals which changes that simple fact.

Looking ahead, while it is true that the new cash out arrangements will present some challenges for those seeking to minimise their imbalance risks, it is equally true that active management of imbalances will generate some significant commercial opportunities for those who are alert to the new market arrangements.

What does this all mean for embedded/small independent generators ?

Stand-alone generators, whether embedded or otherwise, are by virtue of their small scale less able to absorb the financial consequences of "imbalance risk" than large portfolio generators.

This is simply because loss of generation in one plant cannot be compensated for by ramping up generation in another, which means that such generators are more exposed to the imbalance cash out.

Whilst the new changes to the cash out system may work in their favour in some circumstances, they also mean that the downside risks of imbalance could have disproportionately large adverse financial consequences which are much more difficult to absorb.

This will place a premium on close attention to accurate forecasting of generation volumes, and micro management of the real time imbalance position, particularly in the early stages of changes to the cash out system.

How EnDCo can help ?

EnDCo is an electricity supplier that specialises in supporting both consumers and embedded generators of electricity to manage their imbalance position, offering a proactive customer-specific approach which has demonstrably reduced these costs below one per cent of the associated energy value.

This is achieved by a combination of sophisticated forecasting mechanics and our willingness to trade intra-day, day and week ahead of real time on a customer specific basis. In addition (and we believe uniquely to EnDCo) we achieve these results by passing any of our imbalance portfolio benefits directly back to our customers.



About the author

Les Abbie, Chief Executive Officer of EnDCo, has worked in the energy industry for 28 years. He advised on the privatisation of the England & Wales electricity market, and subsequently on industry privatisation and restructuring in many countries. He was involved in setting up the APX in the late 1990s. Since 2004, he has been responsible for setting up and developing EnDCo as a UK Electricity Supplier.

Managers of businesses that both generate and consume electricity wishing to know more about the impact of the introduction single-price cash out or about imbalance management can contact Les Abbie by email (les.abbie@endco.co.uk) or at the contact details below:

EnDCo is an independent licensed electricity supplier providing direct and transparent access to the wholesale electricity markets both for business energy consumers and generators. It has a track record of delivering measurable benefits to a wide range of companies in the industrial and commercial sectors. **EnDCo** is the trading name of **EPG Energy Limited**.

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