Lighting the blue touch-paper on electricity cash-out reform

On 5 November the GB electricity market saw possibly its biggest shake-up since the introduction of Betta (the British Electricity Trading and Transmission Arrangements) a decade ago: the introduction of Ofgem's Electricity Balancing Significant Code Review (EBSCR) changes to electricity imbalance pricing (cash-out) arrangements.

The regulator's main goal is to shake-up the incentives and encourage parties to invest in flexible generation and more accurate forecasting. Ofgem has long-held concerns that current rules under the Balancing and Settlement Code (BSC) do not send an efficient signal to parties to trade electricity in wholesale markets in timescales leading to delivery. In response, it endorsed a series of changes to industry codes that involved sharpening of the cash-out price calculation, ascribing an additional cost to demand disconnections and reserve actions, and replacing the dual imbalance pricing structure with a single price in each half hour period.

But while 5 November was, as is custom, widely celebrated with fireworks and bonfires, the real bangs and surprises occurred on the previous day. Specifically, National Grid issued a Notice of Inadequate System Margin (NISM) for the first time in over three years and drew on its Demand Side Balancing Reserves for the first time.

This *Energy perspective* takes a look at the new cash-out rules and considers how things might have turned out had they been implemented in time for the NISM.

Double break

We have in GB previously used the 500MWh of most expensive (to the system operator (SO)) actions to set the main energy imbalance price (of two) in any settlement period. From Thursday last week we shifted to using only the 50MWh most expensive offers, sharpening up the incentive to trade by exposing parties in imbalance to a potentially higher, single cash-out price.

Cash-out price distribution (November 2014 – October 2015)

Using cash-out data for the past year (see *chart right*) we have attempted to analyse the difference in price distribution under the old and new rules. This shows that although the distribution for the single price peaked at a similar price to the current System Buy Price (SBP) and System Sell Price (SSP), and most settlement periods remained in the £30/MWh-40/MWh range, a greater number of settlement periods will see prices at both ends of the spectrum (either >£100.0/MWh or <£10.0/MWh) under the new single price. Over this year-long period there would have been 44 more half hourly periods where negative spill prices were encountered and 290 extra periods where top-up prices would have been over £100/MWh.

While these could be considered representative, they do not reflect any behavioural response—something Ofgem is expecting from the market under the new rules.

Jumping jack

As noted, these reforms are all about sharpening and manipulating the incentives to balance and trade by making the price more marginal. But the most significant change is moving to a single imbalance price.

We previously had two prices in each half hour: a SSP, or spill price, for parties who are long against their reported contracts; and a SBP, or top-up, for parties who are short. These prices were set in different ways depending on the conditions (or net length) on the system. If the system was short it was the SBP that was set by National Grid's actions;

and if the system was long the company would set the SSP. In both instances the reverse price was set by reference to a traded market index.

Now a single price in each half hour will remove this dynamic of a spread and reward those parties who are in imbalance in the opposite direction to the system—to the full value realised by the SO not having to balance their positions. A sharper price will see smaller parties, who are more often long, benefit from the single imbalance price when the system is short, but be worse off when the system is long. This is the alteration to market rules of the current raft most likely to drive behaviour change—parties could see greater benefits from imbalance if they can forecast system length accurately and trade in the opposite direction.

Lift charge

In addition to the more marginal, single price, two new functions have been added to the cash-out calculations.

The first is the creation of a Value of Lost Load (VoLL), which will be applied whenever National Grid instructs a distribution network operator to disconnect a consumer under the Grid Code. This mechanism is the last weapon in National Grid's arsenal of balancing and is therefore priced at £3,000/MWh from winter 2015, increasing to £6,000/MWh from winter 2018 to coincide with the introduction of the capacity market.

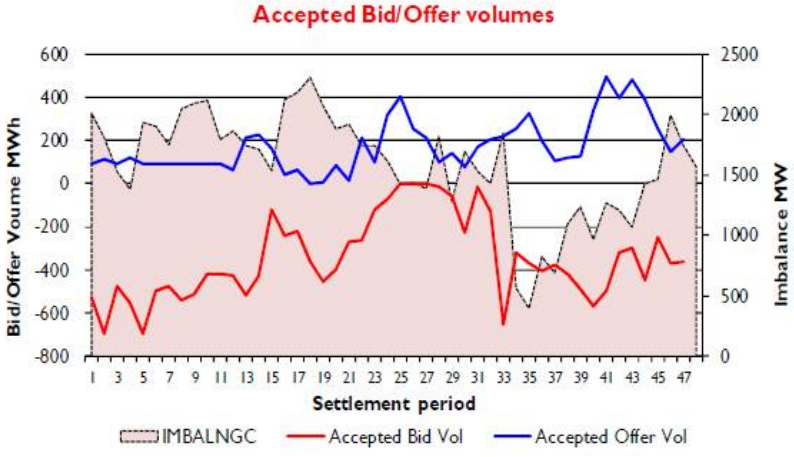
More importantly, the VoLL will also be applied whenever National Grid calls on Supplemental Balancing Reserves (SBR)—its contingency reserve service—which places plant outside the energy market only to be called on as a last ditch measure to keep the lights on.

The second new function is called the Reserve Scarcity Pricing (RSP) function and relates the cost of using non-Balancing Mechanism (BM) Short Term Operating Reserve (STOR) to the level of scarcity on the system. A Loss of Load Probability (LoLP) curve is now used to calculate the likelihood the system could be unable to meet demand. This factor can then be multiplied by the VoLL to calculate the price for using reserve (or the reserve's utilisation price, whichever is higher). At first this will be calculated by relating the margin to a historic measure of the LoLP, but from 2018 we will move to a dynamic calculation, using a stochastic model of supply and demand every half hour.

Between November 2014 and October 2015—again in the absence of any behavioural response—there were 1,142 periods when non-BM STOR was called. This mechanism could push the price over £150/MWh and up to £3,000/MWh depending on margin and the Net Imbalance Volume. We estimate there would have been over 1,000 half hours where the RSP function pushed the price over £130/MWh under a PAR50 single price.

Sparks

The possible impacts of P305 were brought sharply into focus on 4 November, when National Grid issued its first NISM since February 2012. This was a signal to the market that margins were expected to be below 500MW and to make more power available for certain periods. National Grid's issues are illustrated in the chart below, which shows its estimate of supply over demand went below 500MW below settlement periods 35-37.

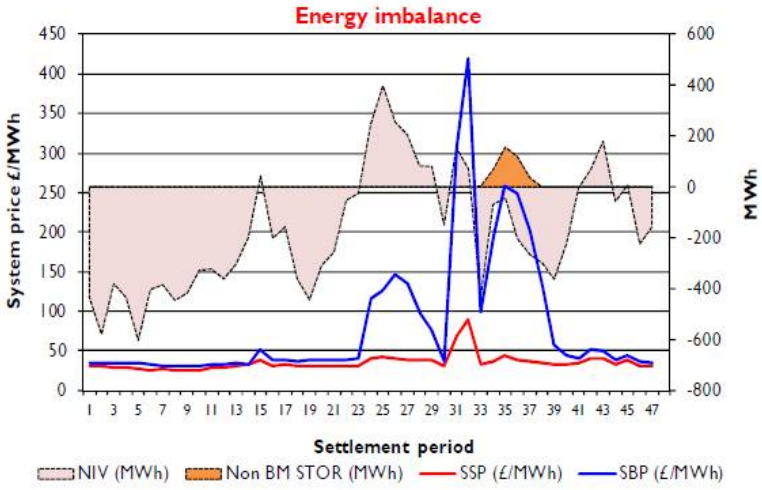


The SO also called for the first time on DSBR. The drivers of these actions were a culmination of several plant breakdowns, including unexpected outages at Cottam, West Burton, Fiddlers Ferry and Longannet. Reduced supply levels were made worse by low wind generation, which was providing on average only 1.3% of power—and just 0.6% between 5.30pm-6pm.

The day's net imbalance along with the imbalance prices are shown in the chart on the following page. The system was still generally long (represented by the pink area below the zero line on the right axis).

To put this system tightness into context, since 2009 there have only been three NISMs issued, including last week's. But between 1999-2008 111 NISMs were issued, with 39 of these alone in the year 2000.

National Grid issued a notice to the market that is had dispatched DSBR for periods 35 and 36, calling on registered participants in the reserve to reduce demand by 40MW. National Grid has reserved 515MW under the DSBR for winter 2015-16 at a cost of £2.6mn. DSBR is not priced into the cash-out mechanism and therefore does not impact on imbalance prices; however, if the SO had called on SBR, this would have impacted prices through the VoLL mechanism. On this occasion it did not.



Further to asking users to turn down, the SO also agreed a cross-border balancing transaction for 200MW of power from Ireland's Eirgrid via the East-West interconnector. This covered the period 15:55 to 18:30 at a cost of €390/MWh.

The generation market responded to the NISM request and we saw some exceptionally high offers being put into the balancing mechanism. This included one from a major power station offering to increase its output for £2,500/MWh. A peak APX exchange price of £259/MWh was also seen on the half hourly spot market in period 35.

The highest SBP for the day was recorded in period 32 at £419/MWh. If the events of 4 November had happened a day later under the new cash-out rules, we would have seen a peak SBP of £500/MWh, reinforcing the market signal. But the new RSP mechanism would not have impacted the outturn cash-out prices, as the LoLP would have been lower than the non-BM STOR utilisation price.

Interestingly, there was no noticeable response from the forward power market as day-ahead baseload and peak prices were broadly unchanged following the NISM. The day-ahead baseload price actually dropped 0.8% day-on-day to £40.3/MWh, mainly due to the expected rise in available wind power to a peak of 4GW during the day.

Banger

So despite much media alarmism over blackouts on Wednesday and Thursday, the system did respond as it was supposed to, and at reasonable cost to the consumer. The events were caused by low wind output and plant outages, and with increasing intermittency a feature of the system this could be a template for things to come. Following reaction from generators, with the incentives of higher balancing prices, the market was actually long for the periods of the NISM. The switch-over to more marginal cash-out prices last week will further sharpen incentives on generators to respond to these signals.

With single pricing, sharper values and new functions, the cash-out regime will drive behavioural change. Peak prices will be higher, trough prices lower and rates overall more volatile and complex to forecast. If there is a prolonged cold-snap with low wind speeds, or an unexpected failure at significant stations, which then requires the activation of the various reserve services, prices could spike to levels which could have material impacts on a wide array of trading parties in the market. This is especially true of smaller ones that have historically been more exposed to imbalance over peak periods than their larger peers.

We made our daily Balancing Mechanism Report for last Wednesday freely available on our website.

For further information about the report please contact Jonathan Davison on 01603 957086 or jonathan.davison@cornwallenergy.com.

"Top floor, please."