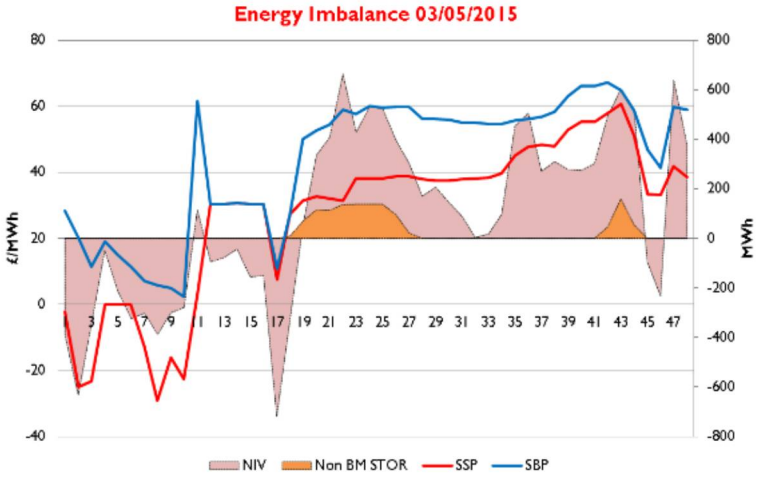
A taste of things to come?—negative and volatile electricity cash-out prices

Imbalance pricing has become more volatile over the winter and prices will get much sharper once changes arising from the regulator's Electricity Balancing Significant Code Review beds in.

The wholesale electricity market in the UK is designed to encourage participants to trade their generation and consumption or face imbalance. Parties are charged System Buy Price (SBP) when they are short, and System Sell Price (SSP) when they are long. These are currently calculated for each trading period based on the most expensive 500MWh of Offers and Bids taken by the system operator.

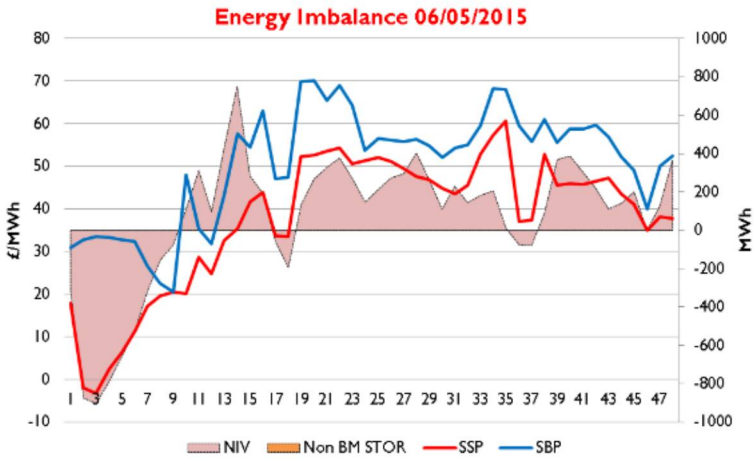
As a result of increased intermittent generation and closures of large-scale controllable capacity we are witnessing greater volatility in these cash-out prices. Within the last fortnight, we have seen negative prices occurring on two separate days when wind speeds have been high and demand low.



The charts to the right track SBP and SSP across 3 May, and display this against the energy imbalance of the overall system (the Net Imbalance Volume, or NIV). Unusually, SSP was negative for part of this day, resulting in some generators being paid to cut output.

SSP on 3 May averaged £27.4/MWh, but ranged from -£29.4/MWh to £60.7/MWh. Negative bids were seen in the early morning as an oversupply of wind generation resulted in a long system. The lowest accepted individual bid to reduce output was -£45.0/MWh from Drax during period 8, when the system was long by 387.5MWh. Accepted bids of less than -£40.0/MWh were also received from a number of windfarms, including Arecleoch, Clyde South, and Whitelee.

The next chart tracks SBP and SSP across 6 May and displays these prices against the NIV. Similar to 3 May, SSP was negative during the early morning when the system was oversupplied.

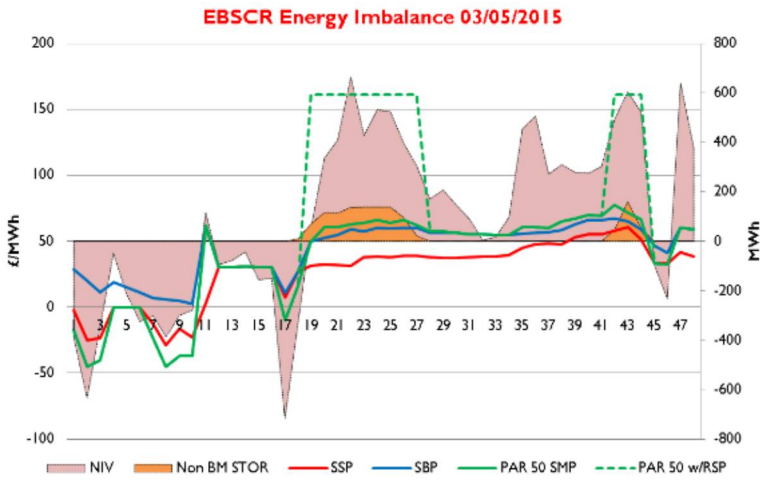


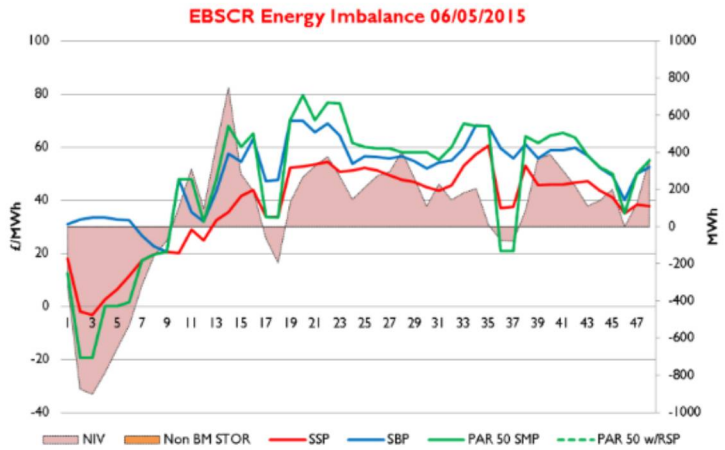
On 6 May, SSP averaged £37.6/MWh, but ranged between -£3.2/MWh and £60.6/MWh. The lowest accepted bid was -£19.6/MWh from West Burton during period 3, when the system was 903.0MWh long. Another accepted bid at -15.0/MWh was taken in this period from an unidentified balancing action.

The stations setting negative prices appear to be the inflexible coal fired power stations, which are asking to be paid to reduce generation in order to cover the cost of starting up again and the lost dark spread. In effect when demand is low the consumer is paying to support inflexible generation that cannot respond to the conditions on the network. Negative wind bids are also often accepted by National Grid; however these actions are often tagged out by the system operator as they are taken to reduce output in response to transmission congestion, a problem which will be alleviated as National Grid invests in infrastructure such as the Western HVDC bootstrap.

Ofgem launched the Electricity Balancing and Settlement Code Review (EBSCR) in 2012 because of concerns that the current imbalance pricing mechanism is not creating the correct signals for the market to balance. In order to address its concerns Ofgem directed National Grid to raise the P305 modification. This will:

- reduce the average used to calculate cash-out prices from 500MWh to 50MWh from winter 2015 and to 1MWh from winter 2018;
- move from a dual price to a single pricing system—there would only be one price in each half hour, which parties receive or pay for being long or short;
- implement a Reserve Scarcity Pricing (RSP) function that would raise the cash-out price if non-BM reserve is called on based on the margin on the system; and
- introduce a cost for consumer disconnections of £3,000/MWh from winter 2015 and £6,000/MWh from winter 2018.





The modification to implement these changes was approved by the Authority on 2 April for implementation on 5 November 2015. We believe that the effect of these changes will be to create greater volatility in cash out prices. For example, if these changes had been in place on 3rd May 2015 prices could have ranged between -£45/MWh and £161/MWh. The RSP function is responsible for the increase in prices during the periods when reserve was called by the system operator.

In National Grid's latest *Summer Outlook* report, the system operator noted that minimum summer demand was expected to be around 18.6GW—only 1.1GW higher than the expected level of must-run generation. This is grounds for concern, as the level of embedded generation below the transmission network is anyone's best guess; to the system operator this capacity looks like negative demand.

Over the summer this capacity could combine with already low demand levels to reduce demand to a level where we are required to constrain inflexible generation. As this becomes a more common occurrence we will not only see negative imbalance prices, but negative wholesale prices (as N2eX and APX now both accept negative bids). In fact on 11 May we observed for the first time the reverse pricing mechanism set a negative price of -£9/MWh in period 3 based on a traded volume of 703.9MWh on the APX exchange.

As illustrated in the charts above right, Ofgem's reformsexacerbate this situation. Reducing the average used to calculate imbalance prices will increase the occurrence and magnitude of negative pricing; when looked at in addition to the single pricing proposal this encourages parties to remain uncontracted when the wind is blowing.

When considering cash-out reform, industry spent most of its time investigating what happened when the system was tight and prices were high, but little attention was paid to the effects of the reforms on negative prices. We feel more work needs to be done, not only in terms of the impacts that prices would have on these events, but what kind of behaviour these changes drive. This is especially considering future CfDs will have their top up payments withheld if prices remain negative for longer than six hours. As a matter of urgency the Future Trading Arrangements work needs to be progressed and its terms updated to include negative pricing.

Cornwall Energy produces a daily Balancing Mechanism Report that tracks system imbalance, cash-out prices and the effects of EBSCR. For more information about this report, and to sign up for a free trial, please contact Tom Edwards on tom.edwards@cornwallenergy.com or 01603 604411.