

# ISG198-SPAR

## REPORTING ON AUGUST 2017

ISSUE 23 – PUBLISHED 26 SEPTEMBER 2017

### SYSTEM PRICE ANALYSIS REPORT

The System Prices Analysis Report (SPAR) provides a monthly update on price calculations. It is published by the ELEXON [Market Analysis Team](#) to the Imbalance Settlement Group (ISG) and on the ELEXON Website ahead of the monthly ISG meeting.

This report provides data and analysis specific to System Prices and the Balancing Mechanism<sup>1</sup>. It demonstrates out-turn prices and the data used to derive the prices. The data is a combination of II and SF Settlement Runs.

This month's SPAR also contains an Appendix that looks back at System Prices in previous autumns ahead of autumn 2017.

#### 1 SYSTEM PRICES AND LENGTH

This report covers the month of August. Where available, data uses the latest Settlement Run (in most cases 'II' or 'SF').

In this report we distinguish between a 'long' and a 'short' market when analysing System Prices because the price calculation differs between two scenarios. When the market is long, System Prices will be based predominantly on the System Operator's 'sell' actions such as accepted Bids. When the market is short, System Prices will instead be based predominantly on the System Operator's 'buy' actions. **Table 1.1** gives a summary of System Prices for August 2017.

**Graph 1.2** shows the distribution of System Prices across Settlement Periods in the last month when the market was long and short.

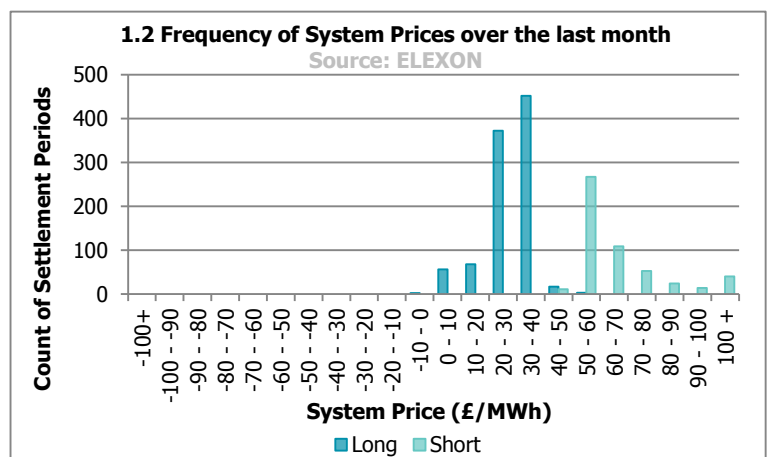
In August 2017 75% of System Prices were between £20/MWh and £60/MWh regardless of system length. When the System was long, 85% of prices were between £20/MWh and £40/MWh. When the System was short, 73% of prices were between £50/MWh and £70/MWh and 8% of prices were over £100/MWh. 1.9% of System Prices regardless of length were between £40/MWh and £50/MWh.

There were two negative System Prices in August. The lowest System Price was -£3.50/MWh on 18 August in Settlement Period 8, set by a Bid from a Pumped Storage BMU.

System Price (Long)					
Month	Min	Max	Median	Mean	Std Dev
August 2017	-3.50	52.21	29.79	27.43	8.36

System Price (Short)					
Month	Min	Max	Median	Mean	Std Dev
August 2017	43.19	130.00	59.06	66.11	18.46

#### 1.1 System Price summary by month (£/MWh)



<sup>1</sup> For further detail of the Imbalance Price calculation, see our imbalance pricing guidance: <https://www.elexon.co.uk/reference/credit-pricing/imbalance-pricing/>

# SYSTEM PRICE ANALYSIS REPORT

System Prices exceeded £100/MWh 39 times in August 2017 (compared to 42 times in July). The 39 System Prices which exceeded £100/MWh occurred across 13 different days. Settlement Period 19 was the most frequent of those exceeding £100/MWh, with five occurrences in the month.

The highest System Price for August was £130/MWh, occurring in nine Settlement Periods across four different days. Four of the Settlement Periods were on 17 August, with the System Price set by accepted Offers from two Pumped Storage BMUs, priced at £130/MWh. Three of the nine Settlement Periods were on 20 August, with the System Price in these Settlement Periods also set by accepted Offers from a Pumped Storage BMU.

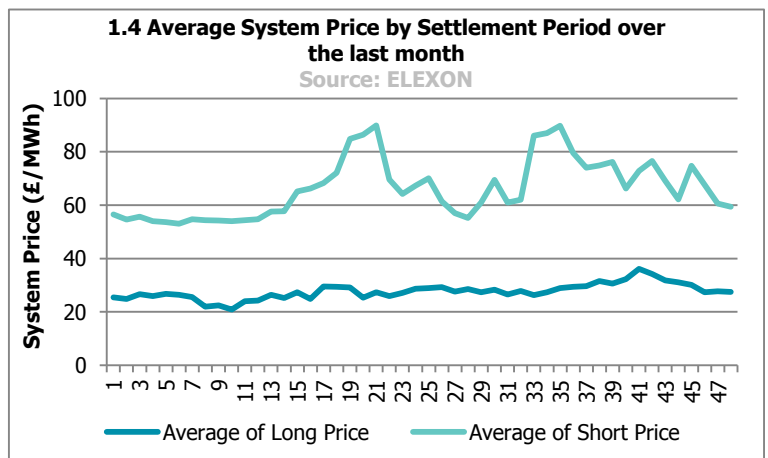
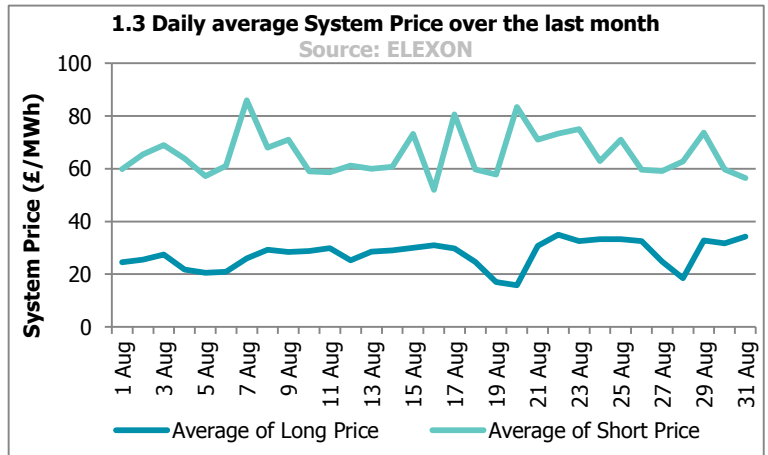
For four Settlement Periods in August the System Price was £0/MWh.

**Graph 1.3** shows daily average System Prices over the last month. In August, the average System Price when the system was long was £27.43/MWh and short was £66.11/MWh.

The highest daily average price when the system was short was £85.93/MWh and occurred on 7 August. The System was short for nine Settlement Periods on this day.

**Graph 1.4** shows the variation of System Prices across the day. Short prices were highest in Settlement Period 21 and long prices lowest in Settlement Period 10. The lowest average System Prices regardless of market length was seen during Settlement Period 29 when the System Price was on average £30.64/MWh.

Long prices show little variance over Settlement Periods, with the prices between £20.87/MWh and £36.14/MWh. Average short Settlement Period prices vary from £53.08/MWh to £89.84/MWh.

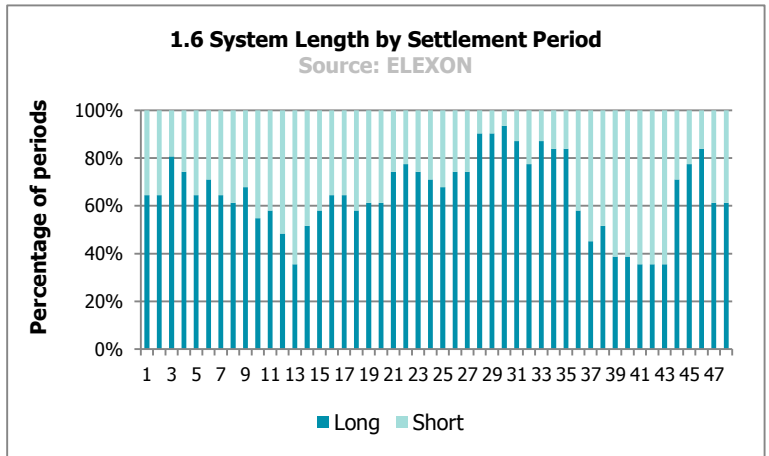
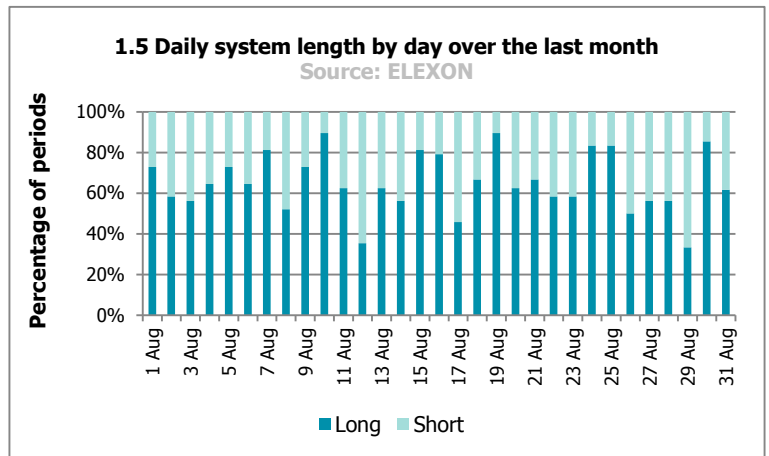


# SYSTEM PRICE ANALYSIS REPORT

**Graph 1.5** shows system length by day, and **Graph 1.6** shows system length by Settlement Period for August. The system was long for 65% of Settlement Periods in August, compared to 68% in July.

On 29 August the system was short for 67% of Settlement Periods. The average NIV while the system was short on this day was 187MWh. The average System Price on this day regardless of length was £60.10/MWh.

Settlement Periods 13 and 41-43 were short for 65% of the month, making them the shortest Settlement Periods in August 2017.



# SYSTEM PRICE ANALYSIS REPORT

## 2 PARAMETERS

In this section we consider a number of different parameters on the price. We consider:

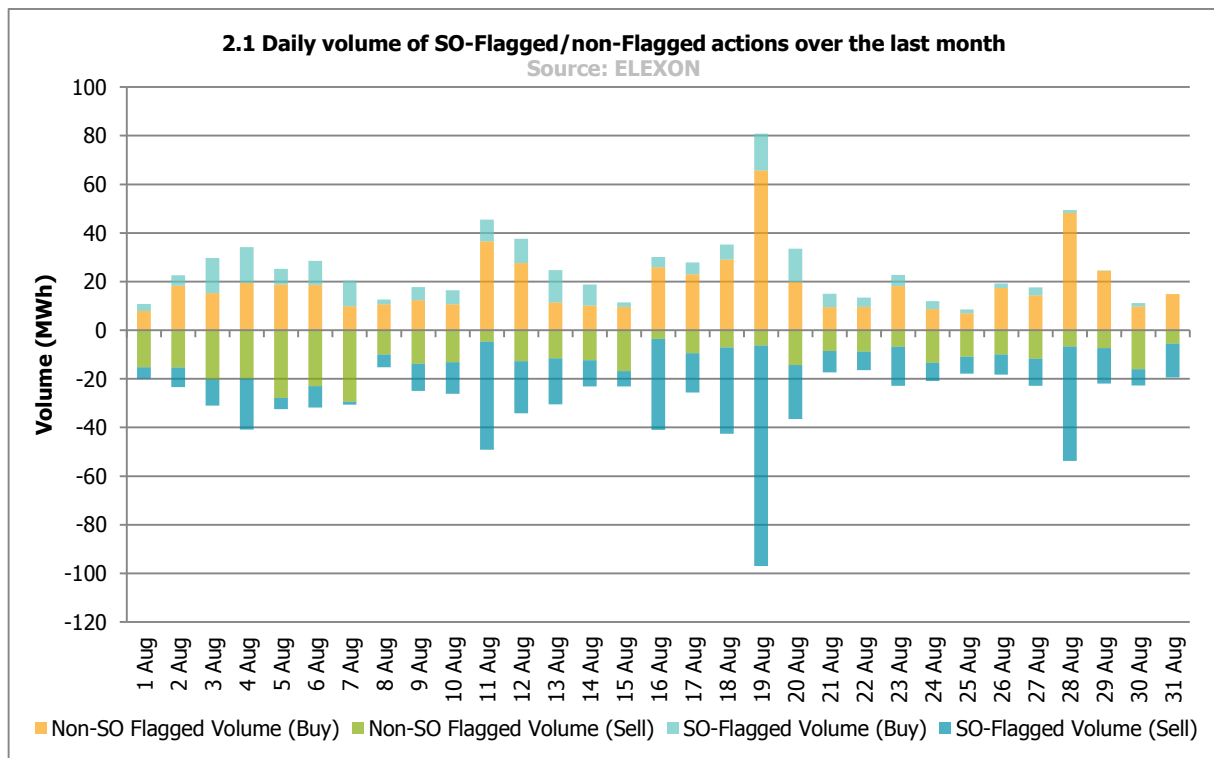
- The impact of Flagging balancing actions;
- The impact of NIV Tagging;
- The impact of PAR Tagging;
- The impact of the Replacement Price; and
- How these mechanisms affect which balancing actions feed into the price.

### Flagging

The Imbalance Price calculation aims to distinguish between 'energy' and 'system' balancing actions. Energy balancing actions are those which are related to the overall energy imbalance on the system (the 'Net Imbalance Volume'). It is these 'energy' balancing actions which the Imbalance Price should reflect. System balancing actions are actions which relate to non-energy, system management actions (e.g. locational constraints).

Some actions are 'Flagged'. This means that they have been identified as potentially being 'system related', but rather than removing them completely from the price calculation (i.e. Tagging them) they may be re-priced, depending on their position in relation to the rest of the stack (a process called Classification). Actions are Flagged by the System Operator when they are taken to resolve a locational constraint on the transmission network (SO-Flagging), or when they are taken to correct short-term increases or decreases in generation/demand (CADL Flagging).

**Graph 2.1** shows the volumes of buy and sell actions that have been Flagged by the SO in August 2017 as being constraint related. On 19 August, 94% of sell volume and 19% of buy volume were SO-Flagged.



# SYSTEM PRICE ANALYSIS REPORT

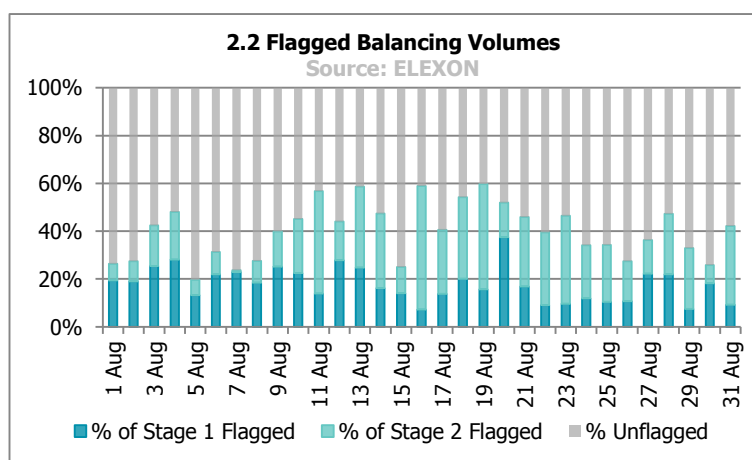
58% of sell balancing actions taken in August had an SO-Flag compared with 51% in July. 55% of SO-Flagged sell actions came from Balancing Services Adjustment Actions (BSAAs), 24% from Wind BMUs and 10% from CCGT BMUs. The average initial price (i.e. before any re-pricing) of a SO-flagged sell action was -£38.79/MWh.

25% of buy balancing actions taken in August had an SO-Flag, compared to 22% in July. 54% of SO-Flagged buy actions came from CCGT BMUs, and 44% from BSAAs. The average initial price of a SO-Flagged buy action was £77.87/MWh.

Any actions which are less than 15 minutes total duration are CADL Flagged. 1% of buy actions and less than 1% of sell actions were CADL Flagged in August. The majority of CADL Flagged buy (92%) came from Pumped Storage BMUs. 48% of CADL Flagged sell actions were by Pumped Storage BMUs, whilst 47% were from CCGT BMUs.

SO-Flagged and CADL-Flagged actions are known as 'First-Stage Flagged'. First-Stage Flagged actions may become 'Second-Stage Flagged' depending on their price in relation to other Unflagged actions. If a First-Stage Flagged balancing action has a more expensive price than the most expensive First Stage Unflagged balancing action it becomes Second-Stage Flagged. This means that it is considered a system balancing action and becomes unpriced.

**Graph 2.2** shows First and Second-Stage Flagged action volumes as a proportion of all actions taken on the system. Note these are all balancing actions that were accepted – only a proportion of these will feed through to the final price calculation.



## The Replacement Price

If there are Second-Stage Flagged action volumes left in the NIV, these will be repriced by the Replacement Price. In total 59% of sell actions in August were flagged. Of these 9% were assigned a Replacement Price, currently based on the most expensive 1MWh of Unflagged actions.

Sell actions will typically have their prices revised upwards by the Replacement Price for the purposes of calculating the System Price. In August, the average original price of a Second-Stage Flagged repriced sell action was -£11.75/MWh and the average Replacement Price for sell actions (when the System was long) was £28.95/MWh.

26% of buy actions were Flagged; of these 0.01% had the Replacement Price applied. The average original price of a buy action with the Replacement Price applied was £104.09/MWh, the average Replacement Price was £87.55/MWh.

If there are no Unflagged actions remaining in the NIV, the Replacement Price will default to the Market Index Price. This occurred in 53 long Settlement Periods.

# SYSTEM PRICE ANALYSIS REPORT

## NIV and NIV Tagging

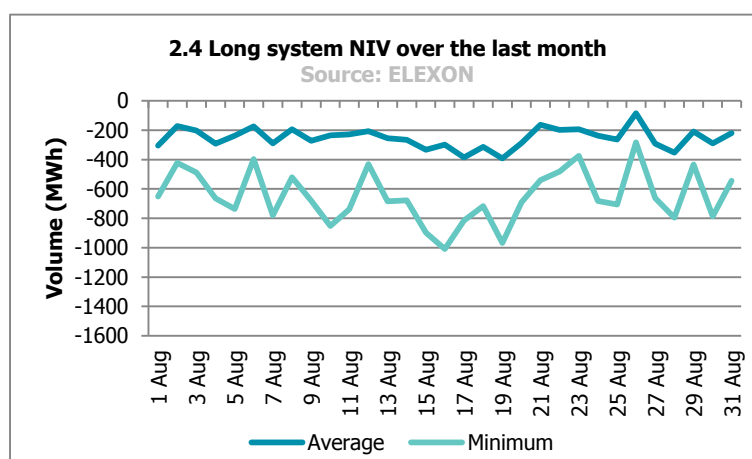
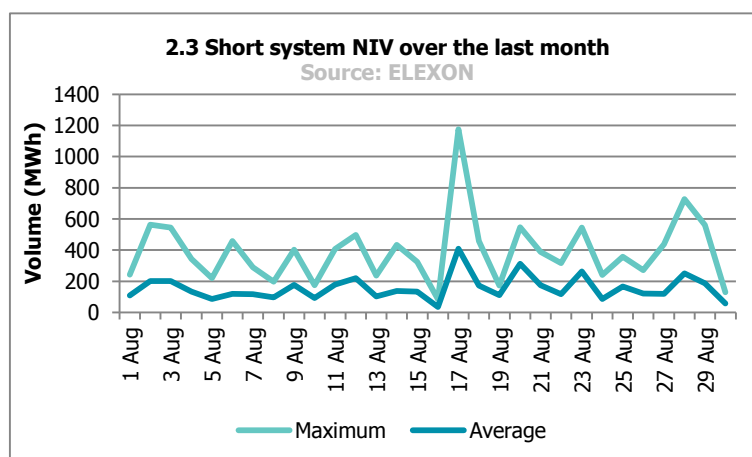
The Net Imbalance Volume (NIV) represents the direction of imbalance of the System – i.e. whether the system is long or short overall.

**Graph 2.3** shows the greatest and average NIV when the system was short and **Graph 2.4** shows greatest and average NIVs when the system was long. Note short NIVs are depicted as positive volumes and long NIVs are depicted as negative volumes.

In almost all Settlement Periods the System Operator will need to take balancing actions in both directions (buys and sells) to balance the system. However, for the purposes of calculating an Imbalance Price there can only be one imbalance in one direction (the Net Imbalance). 'NIV Tagging' is the process which subtracts the smaller stack of balancing actions from the larger one to determine the Net Imbalance. It is from these remaining actions that the price is derived.

NIV Tagging has a significant impact in determining which actions feed through to prices. 80% of volume was removed due to NIV tagging in August. The most expensive actions are NIV Tagged first; hence NIV Tagging has a dampening effect on prices when there are balancing actions in both directions.

The maximum long system NIV of the month was -1,009MWh, on 16 August 2017 during Settlement Period 24. There were -1,109MWh of sell actions and 100MWh of buy actions taken during this Settlement Period. The System Price for this Settlement Period was £30.76/MWh. Comparatively, in August 2016, the maximum long system NIV of the month was -1,441MWh, during Settlement Period 31 on 29 August, with -1,453MWh of sell actions taken.



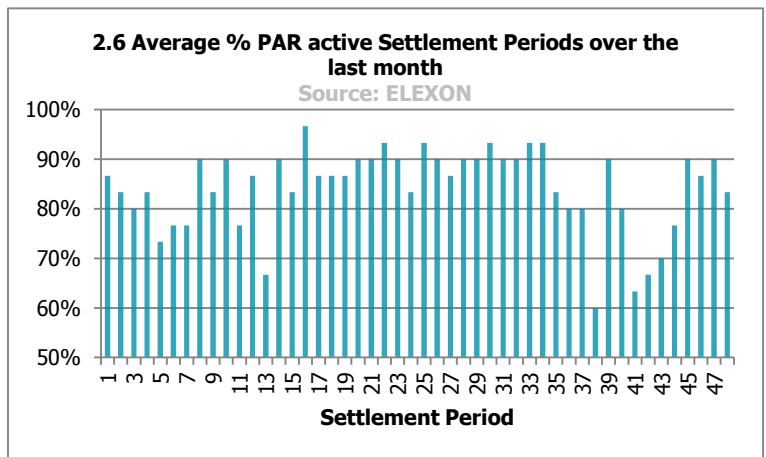
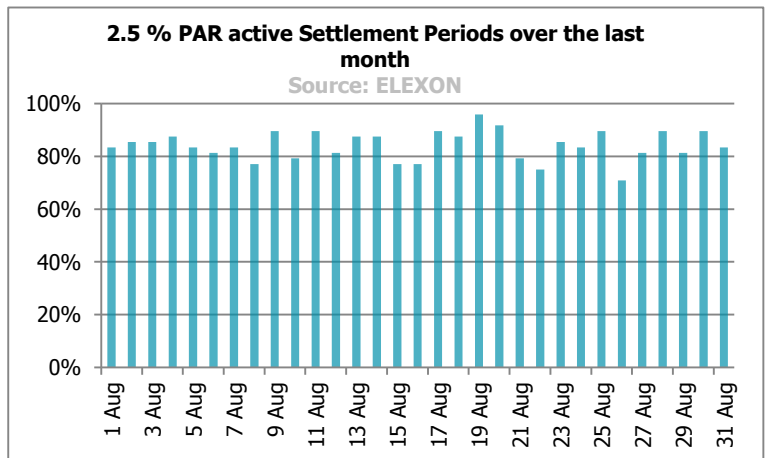
# SYSTEM PRICE ANALYSIS REPORT

## PAR Tagging

PAR is the final step of the Imbalance Price calculation. It takes a volume weighted average of the most expensive 50MWh of actions left in the stack. PAR is currently set to 50MWh, but is due to decrease to 1MWh on 1 November 2018.

The impact of PAR Tagging across the month can be seen in **Graph 2.5**. PAR Tagging is active when there are more than 50MWh of actions left in the NIV following the previous steps of Imbalance Price calculation. Only the most expensive 50MWh are used in the calculation, so any volumes greater than 50MWh are 'PAR Tagged' and removed from the Imbalance Price calculation stack. PAR was active for 84% of Settlement Periods in August.

**Graph 2.6** shows the proportion of Settlement Periods over the last month when PAR Tagging was active. Settlement Period 38 had the lowest active PAR Tagging in August 2017 at only 60%, representing the NIV being smaller in this period or the system being more balanced as a whole prior to System Operator balancing activity.



# SYSTEM PRICE ANALYSIS REPORT

## DMAT and Arbitrage Tagged Volumes

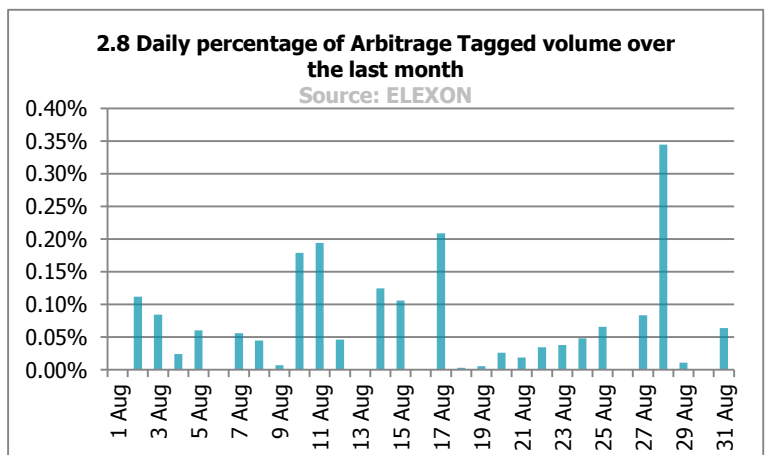
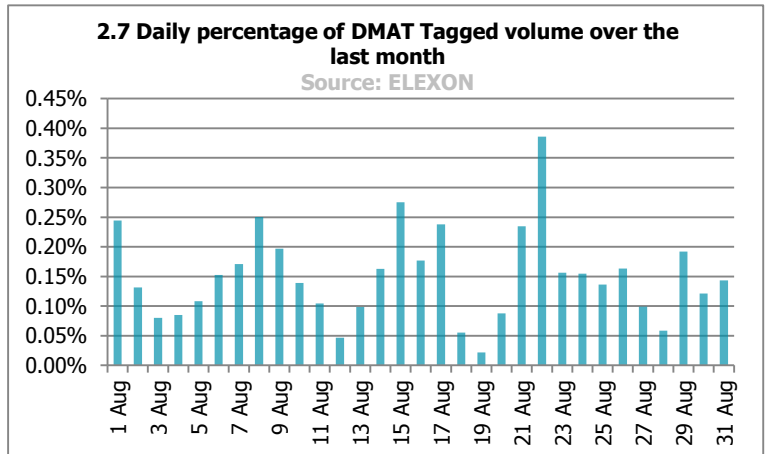
Some actions are always removed from the price calculation (before NIV Tagging). These are actions which are less than 1MWh (De Minimis Acceptance Threshold (DMAT) Tagging) or buy actions which are either the same price or lower than the price of sell actions (Arbitrage Tagging).

**Graph 2.7** shows the volumes of actions which were removed due to DMAT Tagging. 0.13% of buy and sell volume was removed by DMAT Tagging. 44% of DMAT Tagged volume came from CCGT BMUs and 42% from Balancing Services Adjustment Actions (BSAAs).

**Graph 2.8** shows the volumes of actions that were removed due to Arbitrage Tagging. 27% of Arbitrage Tagged volume was from BSAAs, 26% from CCGT BMUs and 23% from Wind BMUs.

In August the average initial price of an Arbitrage Tagged buy action was £44.38/MWh, and for a sell action was £59.76/MWh. The maximum price of an Arbitrage Tagged sell action was £140/MWh, and the lowest priced Arbitrage Tagged buy action was £0/MWh.

On 28 August 2017 356MWh of actions were Arbitrage Tagged. The average price of an Arbitrage Tagged buy action was £20/MWh and for a sell action was £41.02/MWh.





# SYSTEM PRICE ANALYSIS REPORT

## 3 BALANCING SERVICES

### Short Term Operating Reserve (STOR) costs and volumes

This section covers the balancing services that the System Operator (SO) takes outside the Balancing Mechanism that can have an impact on the price.

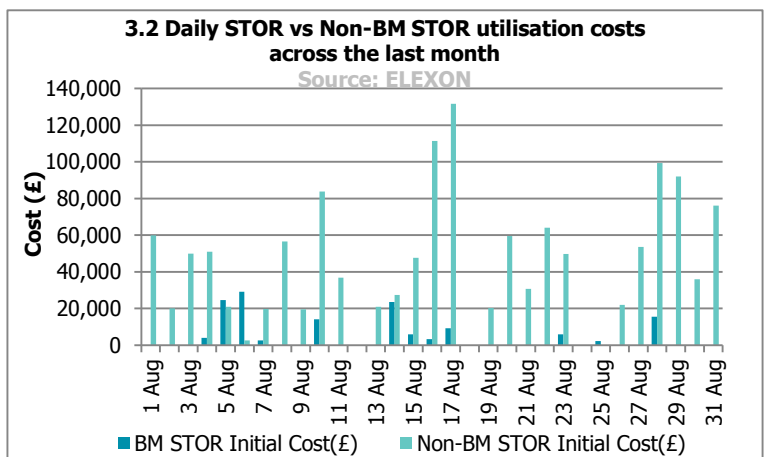
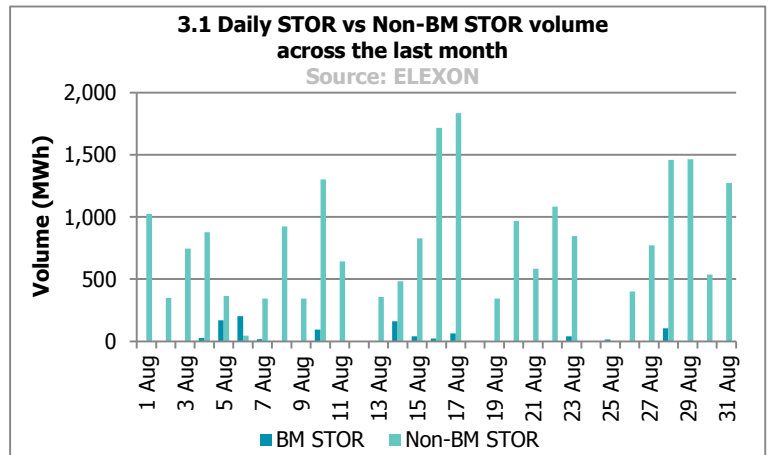
In addition to Bids and Offers available in the Balancing Mechanism, the SO can enter into contracts with providers of balancing capacity to deliver when called upon. These additional sources of power are referred to as reserve, and most of the reserve that the SO procures is called

Short Term Operating Reserve (STOR).

Under STOR contracts, availability payments are made to the balancing service provider in return for capacity being made available to the SO during specific times (STOR Availability Windows). When STOR is called upon, the SO pays for it at a pre-agreed price (its Utilisation Price). Some STOR is dispatched in the Balancing Mechanism (BM STOR) while some is dispatched separately (Non-BM STOR).

**Graph 3.1** gives STOR volumes that were called upon during the month – split into BM STOR and non-BM STOR. **Graph 3.2** shows the utilisation costs of this capacity. 96% of the total STOR utilised in August came from outside of the Balancing Mechanism.

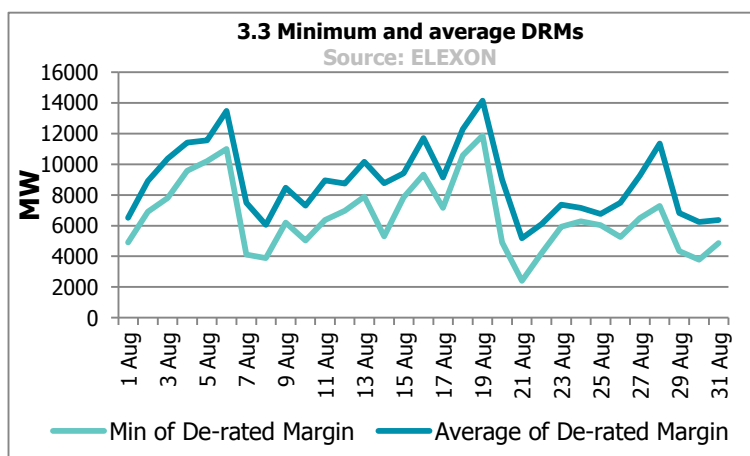
The average Utilisation Price for STOR capacity in August was £65.69/MWh (£146.81/MWh for BM STOR and £62.17/MWh for non-BM STOR).



# SYSTEM PRICE ANALYSIS REPORT

## De-Rated Margin, Loss of Load Probability and the Reserve Scarcity Price

There are times when the Utilisation Prices of STOR plants are uplifted using the **Reserve Scarcity Price (RSP)** in order to calculate System Prices. The RSP is designed to respond to capacity margins, so rises as the system gets tighter (the gap between available and required generation narrows). It is a function of **De-Rated Margin (DRM)** at Gate Closure, the likelihood that this will be insufficient to meet demand (the **Loss of Load Probability, LoLP**) and the **Value of Lost Load (VoLL)**, currently set at £3,000/MWh).



**Graph 3.3** shows the daily minimum and average Gate Closure DRMs for August 2017.

The System Operator has determined a relationship between each DRM and the LoLP, which will determine the RSP<sup>2</sup>. The minimum DRM in August was 2,408MW (July minimum 2,370MW) on 21 August in Settlement Period 37.

The RSP is used to re-price STOR actions in the Imbalance Price calculation if it is higher than the original Utilisation Price. There were no STOR actions that were re-priced using the RSP in August (see **Table 3.4**).

## 3.4 Top 5 LoLPs and RSPs

Date	SP	DRM	LoLP	RSP	RSP Used	System Length	System Price
21/08/2017	37	2,408.91	0.0003	<b>0.87</b>	No	Short	78.35
21/08/2017	38	2,762.83	0.0000	<b>0.12</b>	No	Long	33.00
21/08/2017	39	3,096.50	0.0000	<b>0.01</b>	No	Short	110.00
21/08/2017	36	3,122.07	0.0000	<b>0.01</b>	No	Short	110.00
21/08/2017	35	3,753.95	0.0000	<b>0.00</b>	No	Long	32.99

<sup>2</sup> The System Operators methodology for LoLP is set out in the LoLP Methodology statement: [https://www.elexon.co.uk/wp-content/uploads/2015/10/Loss\\_of\\_Load\\_Probability\\_Calculation\\_Statement\\_v1.0.pdf](https://www.elexon.co.uk/wp-content/uploads/2015/10/Loss_of_Load_Probability_Calculation_Statement_v1.0.pdf)

# SYSTEM PRICE ANALYSIS REPORT

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## 4 P305 - SPECIFIC ANALYSIS

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This section compares live prices with two different pricing scenarios. First we consider what prices would look like with the **pre-P305 price calculation** to highlight the impact of P305. Before the implementation of P305, the price calculation had:

- A PAR of 500MWh, and an RPAR of 100MWh;
- No non-BM STOR volumes or prices included in the price stack;
- No RSP, and instead a Buy Price Adjuster (BPA) that recovers STOR availability fees; and
- No Demand Control, Demand Side Balancing Reserve (DSBR), or Supplementary Balancing Reserve (SBR) actions priced at VoLL.

We also consider the **November 2018 Scenario**, which captures the effect of changes to the Imbalance Price parameters that are due to come in on 1 November 2018. These are:

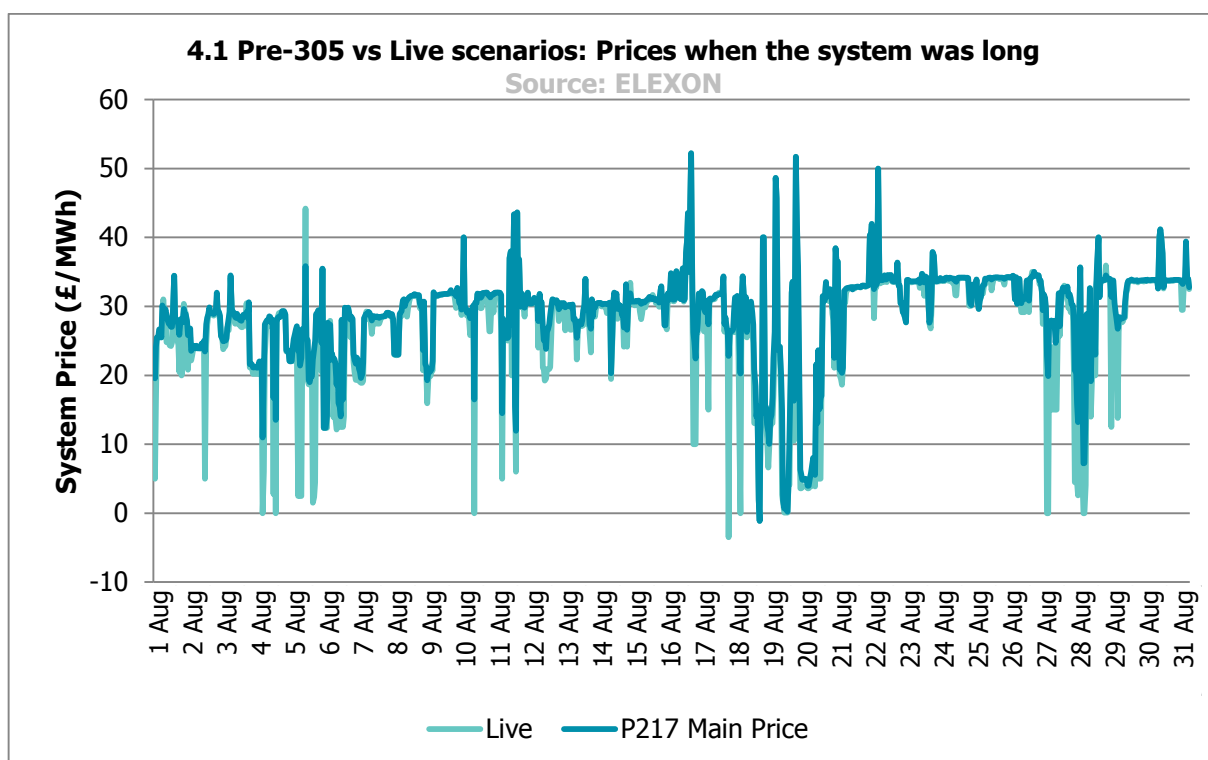
- A reduction in the PAR value to 1MWh (RPAR will remain at 1MWh);
- The introduction of a 'dynamic' LoLP function; and
- An increase in the VoLL to £6,000MWh, which will apply to all instances of VoLL in arrangements, including the RSP function.

# SYSTEM PRICE ANALYSIS REPORT

## Pre-P305 Price Calculation

**Graph 4.1** compares live System Prices when the system was long with prices re-calculated using the pre-P305 pricing scenario 'P217' (for comparison we use the Main Price calculation). On average, live prices were £1.50/MWh lower when the system was long compared to the pre-P305 calculation. This is expected, in particular because of the reduction of PAR from 500MWh to 50MWh to make prices 'more marginal'. This change reduces the dampening effect of a large PAR.

When the system was long, prices were different in 82% of Settlement Periods; in 85% of these periods the change was less than £1/MWh. The biggest price change occurred on the 18 August 2017 in Settlement Period 8, where the live price was £26.32/MWh lower than the System Price would have been under the P217 Scenario. This price change is due to the reduction in PAR.



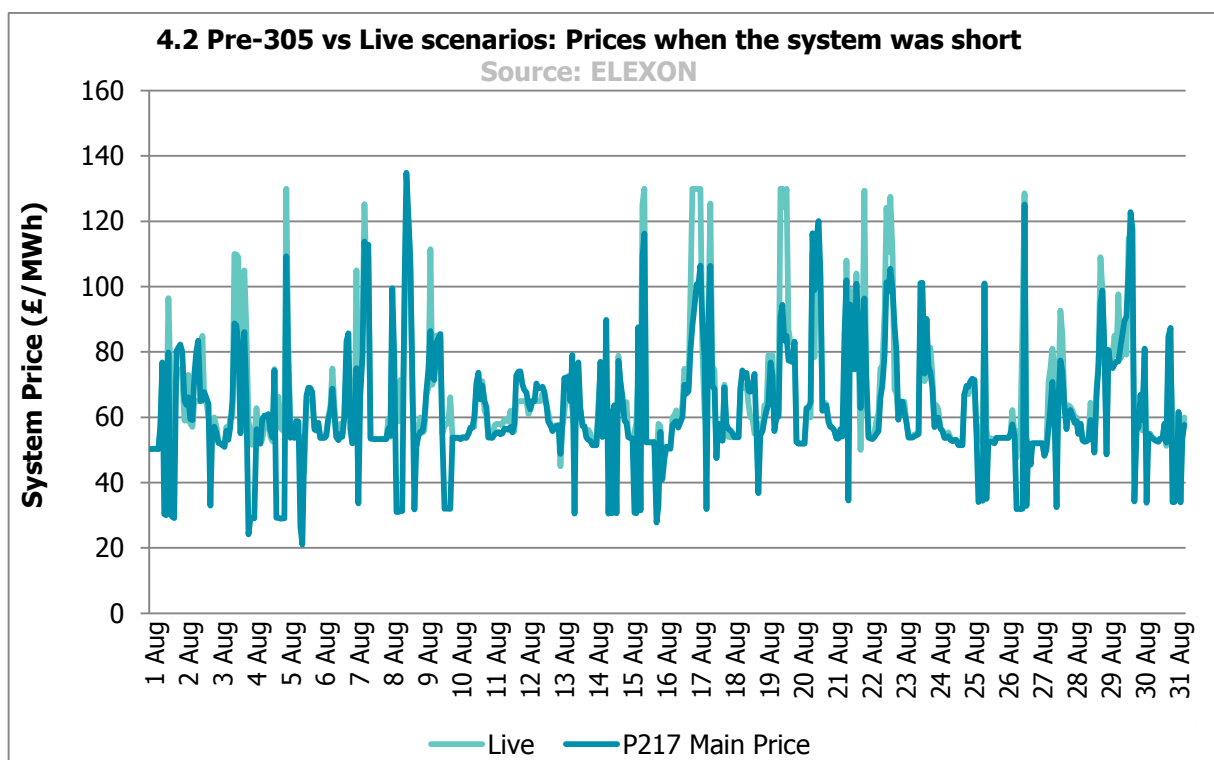
# SYSTEM PRICE ANALYSIS REPORT

**Graph 4.2** compares live System Prices when the system was short with prices re-calculated using the pre-P305 pricing scenario 'P217' (using the Main Price calculation).

Live prices were on average £3.78/MWh higher when the system was short, and 19% of short Settlement Periods had price changes greater than £10/MWh.

The biggest difference in prices when the system was short was £58.94/MWh, which happened on 27 August 2017 during Settlement Period 41 as a result of the inclusion of no-BM STOR actions changing the system length from long to short. In the P217 scenario the Main Price would have been £32.02/MWh whereas in the live scenario the System Price was £90.96/MWh.

The inclusion of non-BM STOR volumes in the pricing stack changed the system length from long to short in 63 Settlement Periods.

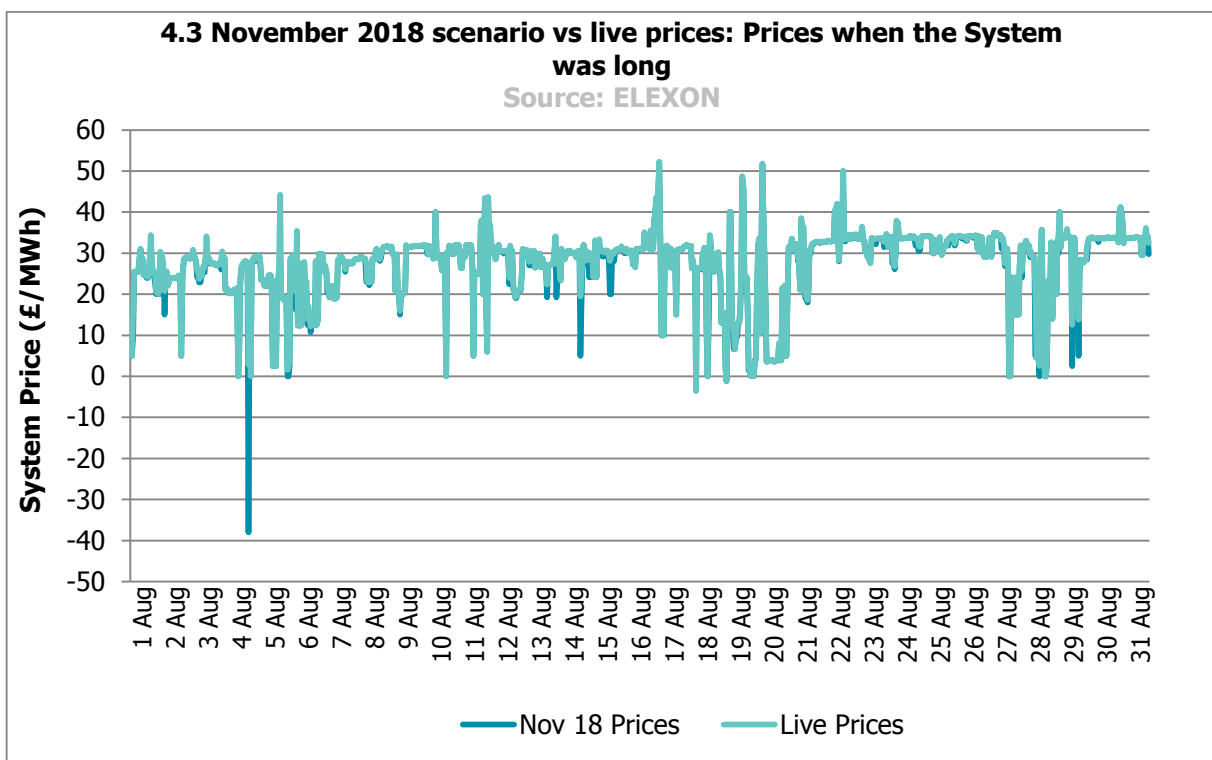


# SYSTEM PRICE ANALYSIS REPORT

## November 2018 Price Calculation

Under the November 2018 scenario, when the system is long prices would be the same or lower, and when the system is short prices would be the same or higher. The average price differences across the month are relatively small under the November 2018 scenario. System Prices would be £0.45/MWh lower when the system was long and £2.10/MWh higher when the system was short. There was no change in prices in 56% of Settlement Periods

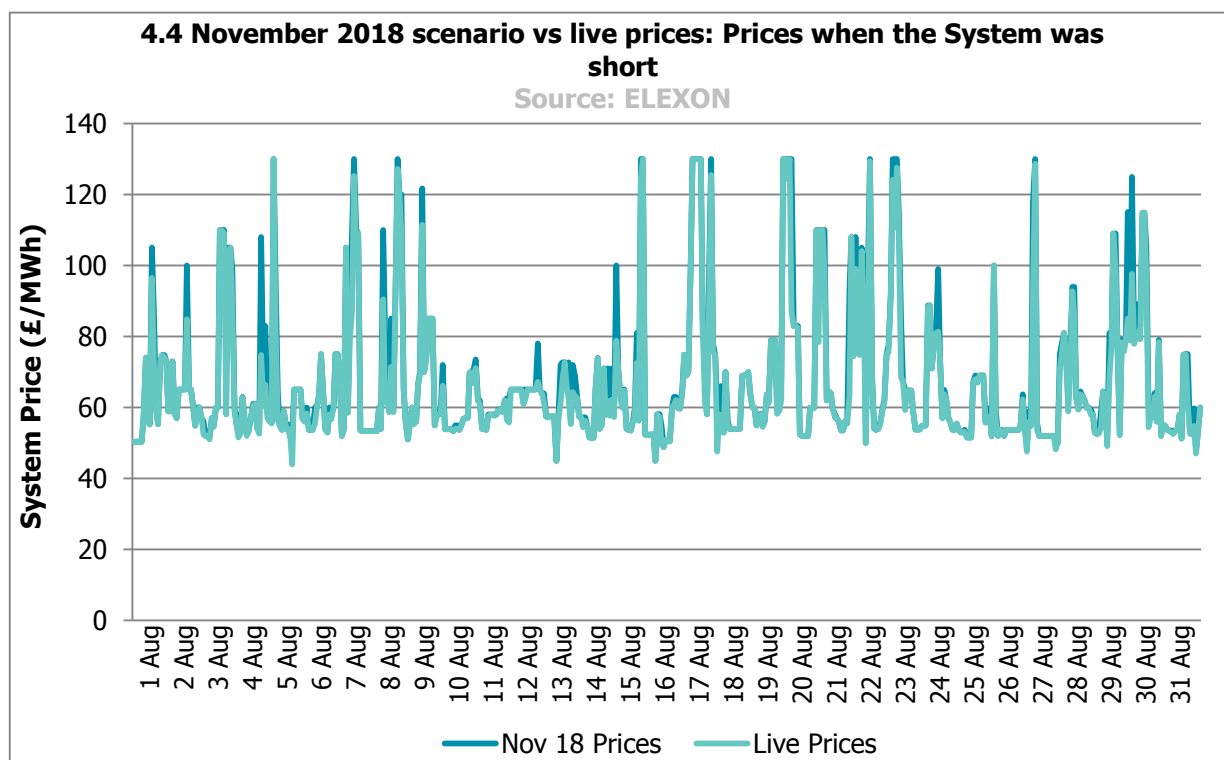
**Graph 4.3** compares live System Prices with prices re-calculated using the November 2018 scenario when the system was long. When the system was long, price changes were less than £1/MWh in 76% of Settlement Periods and greater than £5/MWh in 4% of Settlement Periods. The biggest shift in price was £40.82/MWh (Settlement Period 31 on 4 August 2017) when the price would have been -£38.05/MWh under the November 2018 scenario, compared to the current live System Price of £2.77/MWh.



# SYSTEM PRICE ANALYSIS REPORT

**Graph 4.4** compares live System Prices with prices re-calculated using the November 2018 scenario when the system was short. Prices would be higher in 46% of short Settlement Periods under the November 2018 scenario. Of those, 29% changed by more than £5/MWh and 16% by more than £10/MWh. The biggest difference in price was £43.18/MWh (Settlement Period 37 on 20 August 2017) when the price would have been £130/MWh under the November 2018 scenario, compared to the current live System Price of £86.82/MWh.

Under the November 2018 scenario, there would be 59 Settlement Periods in August 2017 with prices greater than £100/MWh, compared to 39 periods under the current live scenario.



There were no Demand Control actions taken during August 2017. Under the November 2018 scenario, these action types would be priced at a VoLL of £6,000/MWh rather than the current £3,000/MWh. Although this scenario does not capture the impact that a move to a dynamic LoLP methodology will have, the impact of the change in VoLL on the RSPs can be seen in **Table 4.5**. The RSP would have re-priced no STOR actions in August.

## 4.5 Reserve Scarcity Prices with VoLL of £6,000

Date	SP	DRM	LoLP	RSP	RSP Used	System Length	System Price
21/08/2017	37	2,408.91	0.0003	<b>1.74</b>	No	Short	78.35
21/08/2017	38	2,762.83	0.0000	<b>0.24</b>	No	Long	33.00
21/08/2017	39	3,096.50	0.0000	<b>0.03</b>	No	Short	110.00
21/08/2017	36	3,122.07	0.0000	<b>0.02</b>	No	Short	110.00
21/08/2017	35	3,753.95	0.0000	<b>0.00</b>	No	Long	32.99

# SYSTEM PRICE ANALYSIS REPORT

## 5 GLOSSARY

Term	Abbrev.	Definition
<b>Bid</b>		A proposed volume band and price within which the registrant of a BM Unit is willing to reduce generation or increase consumption (i.e. a rate below their FPN).
<b>Bid/Offer Acceptance</b>	<b>BOA</b>	A Bid or Offer within a given Settlement Period that was Accepted by the SO. BOAs are used in the Imbalance Price calculation process e.g. to calculate NIV or the System Price.
<b>Offer</b>		A proposed volume band and price within which the registrant of a BM Unit is willing to increase generation or reduce consumption (i.e. a rate above their FPN).
<b>System Price</b>		A price (in £/MWh) calculated by BSC Central Systems that is applied to imbalance volumes of BSC Parties. It is a core component of the balancing and settlement of electricity in GB and is calculated for every Settlement Period. It is subject to change via Standard Settlement Runs.
<b>Replacement Price</b>		A price (in £/MWh) calculated by BSC Central Systems that is applied to volumes that are not priced during the imbalance pricing process (detailed in BSC Section T) It is calculated for every Settlement Period, and is subject to change via Standard Settlement Runs.
<b>Utilisation Price</b>		The price (in £/MWh) sent by the SO in respect of the utilisation of a STOR Action which: (i) in relation to a BM STOR Action shall be the Offer Price; and (ii) in relation to a Non-BM STOR Action shall be the Balancing Services Adjustment Cost.
<b>Market Index Price</b>	<b>MIP</b>	The Market Index Price reflects the price of wholesale electricity in the short-term market (in £/MWh). You can find an explanation of how it is calculated and used in the Market Index Definition Statement (MIDS).
<b>Reserve Scarcity Price</b>	<b>RSP</b>	Both accepted BM and non-BM STOR Actions are included in the calculation of System Prices as individual actions, with a price which is the greater of the Utilisation Price for that action or the RSP. The RSP function is based on the prevailing system scarcity, and is calculated as the product of two following values: <ul style="list-style-type: none"> <li>the Loss of Load Probability (LoLP), which will be calculated by the SO at Gate Closure for each Settlement Period; and</li> <li>the Value of Lost Load (VoLL), a defined parameter currently set to £3,000/MWh.</li> </ul>
<b>Replacement Price Average Reference</b>	<b>RPAR</b>	The RPAR volume is a set volume of the most expensive priced actions remaining at the end of the System Price calculation, and is currently 1MWh. The volume-weighted average of these actions, known as the Replacement Price, is used to provide a price for any remaining unpriced actions prior to PAR Tagging.
<b>Long</b>		In reference to market length, this means that the volume of Accepted Bids exceeds that of Accepted Offers.
<b>Short</b>		In reference to market length, this means that the volume of Accepted Offers exceeds that of Accepted Bid.
<b>Net Imbalance Volume</b>	<b>NIV</b>	The imbalance volume (in MWh) of the total system for a given Settlement Period. It is derived by netting buy and sell Actions in the Balancing Mechanism. Where NIV is positive, this means that the system is short and would normally result in the SO accepting Offers to increase generation/decrease consumption. Where NIV is negative, the system is long and the SO would normally accept Bids to reduce generation/increase consumption. It is subject to change between Standard Settlement Runs.



# SYSTEM PRICE ANALYSIS REPORT

## 6 APPENDIX 1 – AUTUMN SYSTEM PRICES

In this section one of our Market Analysts, Emma Tribe takes a detailed look at past System Prices. This analysis looks back at previous autumns and seasonal variations in System Price ahead of autumn 2017. Autumn 2016 saw the System Price rise to £1,529/MWh, the highest System Price since 2001 when the System Price rose to £5,003/MWh in one Settlement Period.



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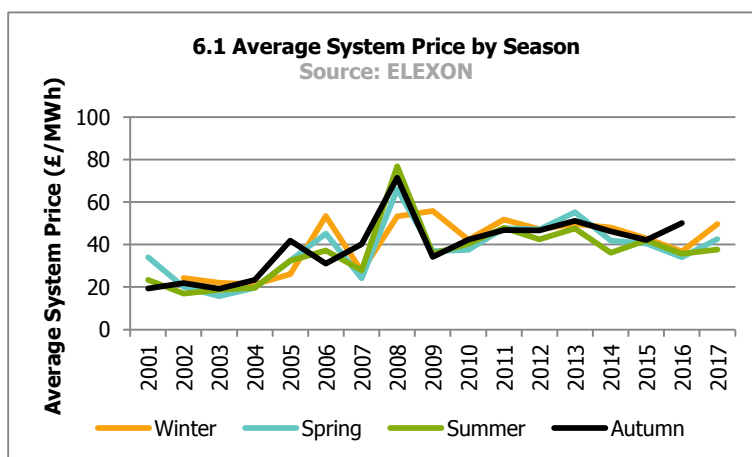
### All Seasons

The earliest Settlement Day with System Prices we have data for is 27 March 2001. **Graph 6.1** shows average System Prices from this date by BSC Season and year. Where the winter season crosses years, the year is taken as the year in which the January occurs.

The average System Price was £19.28/MWh in autumn 2001, compared to £50.06/MWh in autumn 2016.

The highest seasonal average price occurred in summer 2008 when the average System Price was £76.85/MWh. In the same year the autumn average System Price was £71.44/MWh. Autumn has had the highest seasonal average System Price during five of the last 16 years, while winter has had the highest seasonal average prices in nine years.

Since 2001 there have been 21 approved Pricing Modifications, some which have changed the way the System Price is calculated. Notable pricing modifications that have altered the calculation of the System Price include [BSC Modification P305](#) implemented in November 2015, [BSC Modification P217](#) implemented in November 2009 and [BSC Modification P78](#) implemented in February 2003. A 12 month post-P305 review was published in February 2017 looking back to the start of P305, and can be downloaded from the [ELEXON website](#).

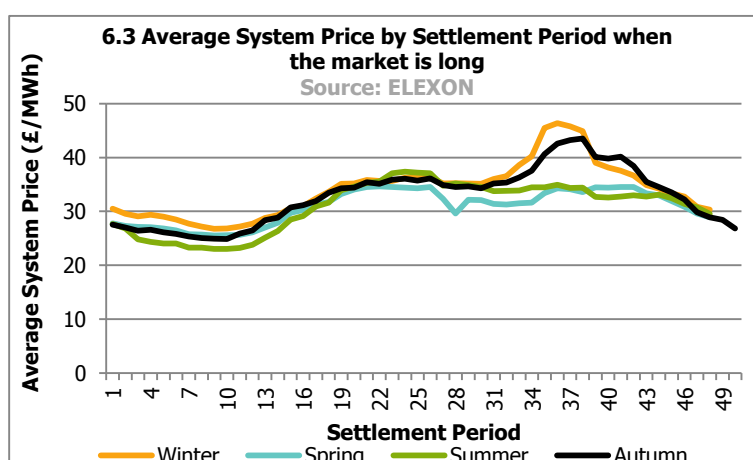
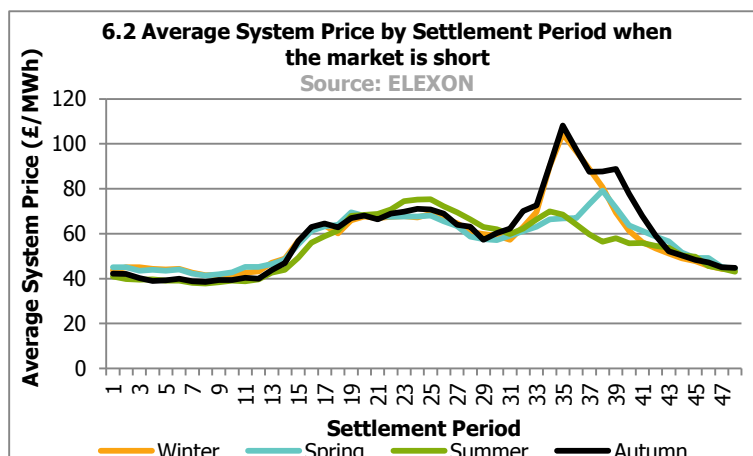


# SYSTEM PRICE ANALYSIS REPORT

**Graphs 6.2 and 6.3** show the average System Price by BSC Season and Settlement Period and market length. This data is from 11 March 2003 onwards, as we do not have Net Imbalance Volume (NIV) data before this date.

In both graphs, winter and autumn show a more pronounced evening average System Price peak compared to spring and summer. The autumn short system peak occurs in Settlement Period 35 and the long system peak in Settlement Period 38.

In autumn when the market is short, the average System Price varies between £38.59/MWh and £108.19/MWh. The average range of prices while the market is long is between £24.87/MWh and £43.51/MWh.



## Autumn 2003 - 2016

The BSC autumn season runs from 1 September to 30 November. **Table 6.4** shows a summary of System Prices in autumns between 2003 and 2016. The mean long System Price is £27.82/MWh and the mean short price £73.81/MWh.

The maximum System Price in autumn was £1,528.72 and the minimum was -£73.51/MWh, both of which occurred in autumn 2016.

**Graph 6.5** shows the distribution of System Prices in autumn between 2003 and 2016; the Main Price has been used for each Settlement Period. The Main Price is equal to the System Sell Price (SSP) when the System is long, and the System Buy Price (SBP) when the system is short.

In 70% of autumn Settlement Periods between 2003 and 2016 the system is long. In 88% of these, the System Price is between £10/MWh and £40/MWh.

System Price (Long)					
Season	Min	Max	Median	Mean	Std Dev
Autumn	-73.51	72.17	27.94	27.82	10.56

System Price (Short)					
Season	Min	Max	Median	Mean	Std Dev
Autumn	10.38	1,528.72	60.94	73.81	57.51

### 6.4 Autumn System Price summary (£/MWh)

# SYSTEM PRICE ANALYSIS REPORT

When the system is short, 52% of System Prices are between £40/MWh and £70/MWh. System Prices over £150/MWh occur in 6% of short Settlement Periods. There have been six Settlement Periods in autumn with Main Prices over £1,000/MWh, all in November 2016.

There is a greater spread of prices when the system is short compared to when the system is long. The standard deviation of long autumn prices is £10.56/MWh, compared to £57.51/MWh when the market is short.

**Graph 6.6** shows how the standard deviation of System Prices changes by year. The Standard Deviation is used as a measure of the spread of System Prices. The spread of short System Prices is smallest in the autumns of 2010 to 2015 when the standard deviation of prices is between £20/MWh and £30/MWh. 2016 is the first full autumn since the implementation of BSC Modification P305; in this year the standard deviation of System Prices is £130.13/MWh. The standard deviation of System Prices when the system is long is smallest in autumn 2004 at £2.09/MWh and greatest in 2016 at £11.90/MWh.

**Graph 6.1** shows that the average autumn System Price has increased by £7.97/MWh between 2015 and 2016. Over the same period the standard deviation increased by £104.74/MWh while the market was short, and £7.08/MWh while the market was long. This increase in spread was a result of BSC Modification P305 and the autumn 2016 market conditions. If the standard deviation of prices stays high in autumn 2017, then the market could see more Settlement Periods with System Prices over £1,000/MWh.

