System Prices Analysis Report: October 2024

Glossary

The System Prices Analysis Report (SPAR) provides a monthly update on price calculations. This report provides analysis specific to System Prices and the Balancing Mechanism, covering data used to derive prices, based on a combination of II and SF Settlement Runs.

The latest data on System Prices can be found on Insights Solution:
Insights Solution
(https://bmrs.elexon.co.uk/)

Large datasets are available through the Open Settlement Data collection:
Open Settlement Data
(https://www.elexon.co.uk/data/open-settlement-data/)

On this page

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 the two scenarios.

When the market is long, System Prices are based predominantly on the System Operator's 'sell' actions such as accepted Bids. When the market is short, System Prices are based predominantly on the System Operator's 'buy' actions.

System Price summary by month (£/MWh)

This table gives a summary of System Prices for April, with values shown in £/MWh.

System Length

Long

Min	-27.90
Max	134.75
Median	63.00
Mean	52.47
Std.Dev	30.72
Short	
Min	27.91
Max	669.21
Median	106.95
Mean	111.29
Std.Dev	46.06

Source: Elexon

Frequency of System Prices over last month

This graph shows the distribution of System Prices across Settlement Periods in October 2024 when the market was long and short. 80% of System Prices were between £21.49/MWh and £123.93/MWh regardless of system length. When the system was long, 80% of prices were between £0.50/MWh and £82.91/MWh. When the system was short, 80% of prices were between £90.00/MWh and £129.00/MWh.

System Prices were £100.00/MWh or more on 544 occasions and £1,000.00/MWh or more on no occasions in October 2024. In the previous month there were 511 System Prices on or over £100.00/MWh and no System Prices on or over £1,000.00/MWh. The highest System Price of the month, £669.21/MWh, occurred in Settlement Period 35 on 14 October.

There were 45 Settlement Periods where the System Price was less than £0.00/MWh in October, with the lowest System Price of -£27.90/MWh occurring in Settlement Period 30 on 20 October.

System Price spread

The graph below displays the spread of System Prices in October 2024 as a box plot diagram, split between a short and long system.

Microsoft Power BI

The middle line in each box represents the median System Price of the month, which is £106.95/MWh for short Settlement Periods and £63.00/MWh for long Settlement Periods. Each box edge represents the lower and upper quartiles (25th and 75th percentile respectively), with the Interquartile Range (difference between the Upper and Lower quartiles) being £22.00/MWh for short System Prices and £35.12/MWh for long System Prices.

Outliers are shown on the graph as circles, and have been defined as being greater than 1.5 times the Interquartile Range (IQR) away from the Upper and Lower quartiles. Under this definition, 31 long and 45 short System Prices in October were outliers. Of the 31 long outliers, 29 were less than the lower outlier boundary. The prices of Long outliers ranged from -£27.90/MWh (the lowest System Price of the month) to £134.75/MWh. The highest System Price of the month, £669.21/MWh, was 6.26 times the median short System Price for the month.

Daily average System Price

The graph below shows daily average System Prices over the last month.

Microsoft Power BI

In October, the average System Price was £52.47/MWh when the system was long and £111.29/MWh when the system was short. The highest daily average price when the system was short was £183.99/MWh, and occurred on 14 October; the system was short for 36 Settlement Periods on this day. The lowest daily average price when the system was long was £10.80/MWh on 13 October. The system was long for 20 Settlement Periods on this day.

Average System Price by Settlement Period

The graph below shows the variation of average System Prices across the day.

Microsoft Power BI

Short prices were highest in Settlement Period 37, with long prices lowest in Settlement Period 10. The lowest average System Price, regardless of market length, occurred during Settlement Period 10, when the System Price was £51.55/MWh. The daily average long Settlement Period

System Prices ranged between £33.73/MWh and £86.30/MWh. Average short Settlement Period prices varied from £80.54/MWh to £151.57/MWh.

Daily System Length

This graph shows system length by day.

System Length by Settlement Period

This graph shows system length by Settlement Period for October.

The system was long for 51% of Settlement Periods in October.

On 1 October, the system was short for 46 of FALSE Settlement Periods. The long Settlement Periods on this day had an average NIV of -132MWh. The daily average NIV on this day was 257MWh.

Historic long vs short market

This graph shows the percentage of long and short Settlement Periods over the past year. October 2024 had 51% of long Settlement Periods, compared to 52% per month over the previous 12 months.

Average Daily System Price when Long by Settlement Day

The graph below displays the daily average System Prices in October 2024 when the system was long compared to the two previous months and the same month last year.

Daily average long System Prices were £19.43/MWh higher in October 2024 than the same month in 2023.

Average Daily System Price when Short by Settlement Day

This graph looks at System Prices from the same months as the previous graph, but when the System was short.

Short daily average System Prices were -£22.11/MWh lower in October 2024 than the same month last year.

Accepted Volumes Accepted Offer Volume by Fuel Type

This graph displays the Offer volumes of fuel types that participated in the Balancing Mechanism during October. Offers are balancing actions taken to increase the level of energy on the System. This report also contains balancing volumes from Balancing Services Adjustment Actions (BSAAs). BSAAs include, but are not limited to, balancing actions such as system-to-system services, Short Term Operating Reserve actions taken outside the Balancing mechanism and forward contracted energy products.

Accepted Bid Volume by Fuel Type

This graph displays the Bid volumes of fuel types that participated in the Balancing Mechanism during October 2024. Bids are balancing actions taken to decrease the level of energy on the System.

During October, 76% of Offer volume came from Gas BMUs with a further 15% from BSAA and 3% from Other BMUs.

64% of Bid volume came from Wind BMUs with a further 15% from Gas and 9% from Pumped Storage BMUs.

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 the Replacement Price;
- The impact of NIV Tagging;
- The impact of PAR Tagging;
- The impact of DMAT and Arbitrage Tagging; 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 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 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). The System Operator (SO) flags actions when they are taken to resolve a locational constraint on the transmission network (SO-Flagging), or to correct short-term increases or decreases in generation/demand (Continuous Acceptance Duration Limit (CADL) Flagging).

Daily volume of SO-Flagged/non-Flagged actions

This graph shows the volumes of Buy and Sell actions in October 2024 that have been Flagged by the SO as being constraint related. On 31 October, 99% of Sell volume was SO-Flagged.

82% of Sell balancing action volume taken in October had an SO-Flag, compared with 70% the previous month. 7% of SO-Flagged Sell actions came from CCGT BMUs, 3% came from Balancing

Service Adjustment Actions (BSAAs) and 77% from Wind BMUs. The average initial price (i.e. before any re-pricing) of a SO-Flagged Sell action was -£41.09/MWh.

34% of Buy balancing action volume taken in October had an SO-Flag, compared to 39% in September. 73% of SO-Flagged Buy actions came from CCGT BMUs and 26% from BSAAs. The average initial price of a SO-Flagged Buy action was £141.02/MWh.

Any actions with a total duration of less than the CADL are flagged. The CADL is currently set at 10 minutes.

0.7% of Buy action volume and 0.6% of Sell action volume were CADL Flagged in October. The majority of CADL Flagged Buy actions (39%), and CADL Flagged Sell actions (24%) came from Pumped Storage BMUs, with CCGT BMUs accounting for a further 3% of CADL Flagged Sell Actions.

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-Staged Unflagged balancing action, it becomes Second-Stage Flagged. This means it is considered a system balancing action and becomes unpriced.

Flagged Balancing Volumes

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

In October, 56% of balancing volume received a First-Stage Flag with 80% of this volume going on to receive a Second-Stage Flag. On the 21 October, 70% of balancing volume was flagged; with 75% of this volume receiving a Second Stage Flag.

The Replacement Price

Any Second-Stage Flagged action volumes left in the NIV will be repriced using the Replacement Price. The Replacement Price is either based on the Replacement Price Average Reference (RPAR currently based on the most expensive 1MWh of Unflagged actions), or if no Unflagged actions remain after NIV Tagging, the Market Index Price (MIP). In October, 247 (17%) Settlement Periods had a Replacement Price based on the RPAR and 237 (16%) Settlement Periods had a Replacement Price based on the MIP. However, the majority of Settlement Periods (68%) did not have a Replacement Price.

Number of Settlement Periods with Replacement Price by System Length

This chart displays the count of Settlement Periods which had a Replacement Price applied, split by the system length and if the Replacement Price was based on RPAR or the MIP.

Average Price and Replacement Price by System Length

This table displays the average original and Replacement Price of Second-Stage Flagged actions

System Length	
Long	
Original Price	13.26
Replacement Price	50.55
Short	
Original Price	116.40
Replacement Price	90.47

Source: Elexon

Sell actions will typically have their prices revised upwards by the Replacement Price for the purposes of calculating the System Price. In total, 82% of Sell volume in October was Flagged. Of this Flagged Sell volume, 11% was assigned a Replacement Price. The average original price of a Second-Stage Flagged repriced Sell action was £13.26/MWh and the average Replacement Price for Sell actions (when the System was long) was £50.55/MWh.

35% of Buy volume was Flagged; 5.2% of this volume had the Replacement Price applied. The average original price of a Second-Stage Flagged repriced Buy action was £116.40/MWh and the average Replacement Price for Buy actions (when the System was long) was £90.47/MWh.

If there are no Unflagged actions remaining in the NIV, the Replacement Price will default to the MIP. This occurred in 176 long and 61 short Settlement Periods in October, compared to 63 long and 49 short Settlement Periods the previous month.

Monthly Average Long Price, Short Price and MIP

This graph compares the monthly average MIP to the monthly average long and short System Prices for the past 13 months. The monthly average long price decreased by -£4.28/MWh to £48.18/MWh, the short price decreased by -£4.07/MWh to £107.22/MWh and the MIP decreased by -£2.49/MWh to £77.24/MWh in October 2024 compared to the previous month.

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.

Short system NIV

This graph shows the greatest and average NIV when the system was short.

Long system NIV

This graph shows the minimum 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 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. The price is then derived from these remaining actions.

NIV Tagging has a significant impact in determining which actions feed through to prices. In September, 85% of volume was removed due to NIV tagging. 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 short system NIV of the month (1,176MWh) was seen in Settlement Period 35 on 14 October, where the System Price was £669.21/MWh.

The minimum long system NIV of the month was -1,016MWh, in Settlement Period 11 on 28 October, where the System Price was £25.29/MWh.

Net Imbalance Volume and System Price

This graph displays a scatter graph of Net Imbalance Volume and System Prices. The dashed lines display a 0MWh NIV and a £0.00/MWh System Price, the red line is a trendline with the

expected System Price from a particular NIV based on the month's data.

There were 755 long Settlement Periods in October, 45 of which occurred on 27 October. The average NIV on this day was -302MWh, with the lowest NIV (-997MWh) occurring in Settlement Period 24.

PAR Tagging

PAR Tagging is the final step of the Imbalance Price calculation. It takes a volume-weighted average of the most expensive 1MWh of actions left in the stack. The value of PAR is set at 1MWh.

PAR Tagging is active in almost all Settlement Periods, the only periods not affected by the parameter have a NIV of less than 1MWh.

During October, there were 12 Settlement Periods where PAR Tagging was inactive. The average NIV in these Settlement Periods was -0.08MWh. Settlement Period 33 on 19 October had the lowest absolute NIV (0.01MWh), and therefore was the most balanced Settlement Period of the month.

DMAT and Arbitrage Tagged Volumes

Some actions are always removed from the price calculation (before NIV Tagging). These are actions which are less than the 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). The DMAT is set at 0.1MWh.

Daily Volume of DMAT Tagged volume

This graph shows the volumes of actions removed due to DMAT Tagging.

275.8MWh of total Buy and Sell volume was removed by DMAT Tagging in October, compared to 240.4MWh the previous month. 91% of the DMAT Tagged volume came from other BMUs, 4% from CCGT BMUs and 2% from Wind BMUs.

Daily volume of Arbitrage Tagged volume

This graph shows the volumes of actions that were removed due to Arbitrage Tagging.

5,919MWh of total Buy and Sell volume was removed by Arbitrage Tagging in October. 32% of the Arbitrage Tagged came from Wind BMUs, 22% from CCGT BMUs and 15% from BSAAs.

In October, the average initial price of an Arbitrage Tagged Buy action was £57.98/MWh, and for a Sell action was £73.11/MWh. The maximum initial price of an Arbitrage Tagged Sell action was £178.97/MWh, and the lowest priced Arbitrage Tagged Buy action was -£104.82/MWh.

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 affect 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).

Daily STOR vs Non-BM STOR volume

This graph gives STOR volumes that were called upon during the month split into BM STOR and non-BM STOR. 0% of the total STOR volume utilised in October came from outside of the Balancing Mechanism.

Daily STOR vs Non-BM STOR utilisation costs

This graph shows the utilisation costs of this capacity. The average Utilisation Price for STOR capacity in October was £145.61/MWh; £145.61/MWh for BM STOR and £0.00/MWh for non-BM STOR.

On 15 October the largest amount was spent on STOR volume for the month (£112994), of which 100% of the cost was BM STOR and 0% was non-BM STOR. The utilised BM STOR volume on this day was 833MWh, compared to the average of 178MWh across the month.

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 (RSVP)** in order to calculate System Prices. The RSVP 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, set at £6,000/MWh from 1 November 2018).

Minimum and average DRMs

This graph shows the daily minimum and average Gate Closure DRMs for October 2024.

The System Operator has determined a dynamic relationship between each DRM and the LoLP, which will determine the RSVP.

The minimum DRM in October was 0.239GW on 13 October in Settlement Period 38 (compared to 3.276GW in September). This DRM corresponded to a LoLP of 0.348 and a RSVP of £2,088.16/MWh.

Contact information

- Elexon Support
  (https://support.elexon.co.uk/csm)

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