BSUoS Outturn

national grid ESO

Average BSUoS charge	£/MWh
Oct-18	3.99
Past 12 months	2.48
2017/18	2.31

Outturn costs for October were £55m higher than forecast. At the time of the September publication, we knew about the Western Link fault, however we did not have information regarding its return. Despite increased Operating Reserve costs, Operating Reserve, STOR and Negative Reserve all outturned lower than forecast; the additional £60m of constraint costs (above forecast) contributed to the 38% error.

The blue line on the chart shows the estimated monthly average BSUoS charge for the past 12 months. The red line shows our forecast for each month, made at year ahead. The table shows a breakdown of the elements that make up the BSUoS charge (including volume), broken down by cost category. The total cost divided by the volume gives the estimated average charge.

Historical outturn vs year ahead forecast

Legend: — Estimated BSUoS Charge (£/MWh)   - - - Year ahead forecast (£/MWh)
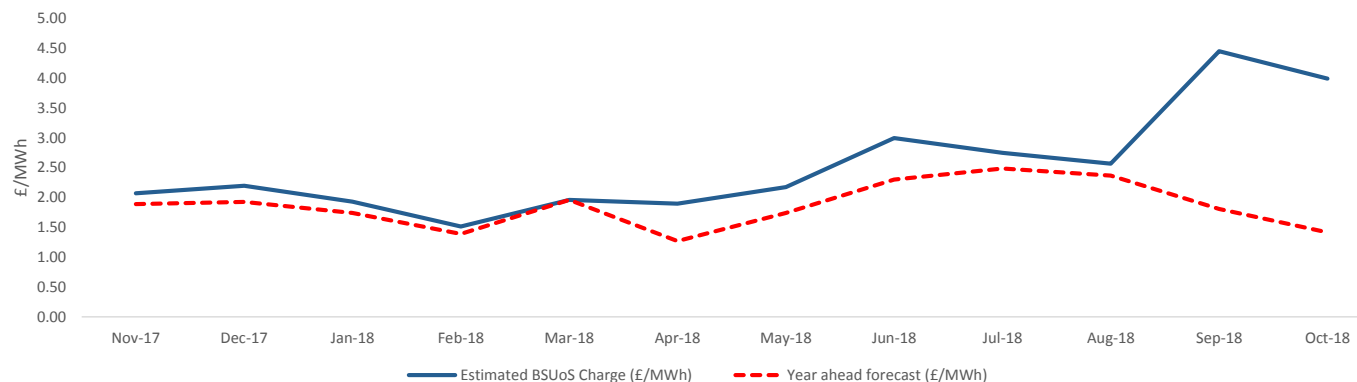
Month	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18
Energy Imbalance	-3.1	5.1	-1.9	-3.0	3.3	-5.7	-6.8	-2.8	-1.1	-3.9	-0.7	0.0
Operating Reserve	6.1	9.0	8.6	9.2	15.9	4.1	4.4	3.5	4.8	4.7	5.5	8.0
STOR	8.9	9.4	9.4	8.6	8.1	6.1	7.0	6.6	7.4	6.8	5.8	5.4
Constraints - E&W	16.3	9.8	12.3	4.0	14.2	9.1	20.3	33.3	37.3	32.3	78.4	71.1
Constraints - Cheviot	15.5	19.2	11.9	5.4	2.3	13.2	1.5	7.8	1.4	1.6	18.2	8.8
Constraints - Scotland	7.1	5.2	5.4	2.8	1.4	0.4	2.1	6.3	0.2	1.3	4.1	10.9
Constraints - AS	2.7	1.9	0.5	0.4	3.7	2.7	0.9	3.8	0.8	0.4	1.6	5.2
Negative Reserve	0.6	0.1	0.9	0.1	0.4	0.4	2.1	0.4	0.6	0.4	0.6	0.2
Fast Reserve	7.0	7.7	8.1	6.9	7.8	6.5	6.5	6.0	7.6	8.2	7.5	8.2
Response	10.3	11.4	10.4	9.3	11.6	11.0	12.2	11.5	10.5	10.8	11.4	10.2
Other Reserve	1.2	1.3	1.6	1.2	1.1	0.8	0.9	0.8	1.2	1.2	1.1	1.2
Reactive	6.2	6.7	6.6	5.7	5.9	6.5	7.1	7.4	6.6	6.7	6.1	6.7
Minor Components	0.9	2.1	1.8	1.6	1.2	1.4	1.0	1.2	1.2	2.1	1.4	0.7
Black Start	3.5	4.5	3.8	3.4	3.7	3.4	3.7	3.2	3.1	3.6	3.4	3.7
Total BSUos	83.4	93.4	79.4	55.3	80.7	59.8	63.0	89.0	81.5	76.0	144.2	140.3
Estimated BSUos Vol (TWh)	47.2	49.2	48.9	45.4	48.7	40.4	37.0	35.3	36.0	36.4	36.2	39.5
Estimated Internal BSUos(£m)	13.5	14.0	14.0	12.6	14.0	15.6	16.1	15.6	16.1	16.1	15.6	16.1
Estimated NGET Profit/(Loss)	0.8	0.8	0.8	0.8	0.8	1.2	1.3	1.2	1.3	1.3	1.2	1.3
Estimated BSUoS Charge (£/MWh)	2.07	2.20	1.93	1.51	1.96	1.90	2.17	3.00	2.75	2.57	4.45	3.99
Year ahead forecast (£/MWh)	1.89	1.92	1.74	1.39	1.96	1.27	1.74	2.30	2.49	2.37	1.81	1.42

BSUoS Forecast

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Average BSUoS charge	£/MWh
Nov-18	2.86
2018/19	2.62
2019/20	2.30
Next 12 months	2.39

November forecast includes outturn for 1st-7th Nov. The remainder of the month includes increased Constraint and Operating Reserve costs due to extended generator outages, and accepting prices in excess of £200/MWh for Operating Reserve. Following a policy change, forecast STOR costs have been reduced up to October 2019.

December Constraint costs have increased to account for the possibility that certain generators won't return from outages, and the continuation of the NEMO interconnector commissioning programme. In addition, Fast Reserve and Response forecast costs have decreased in December to reflect recent outturn.

The chart shows the average monthly BSUoS forecast for the next 24 months. The grey band shows the upper and lower range of the forecast. The forecast uses a combination of forecast models and historical data. Constraint costs are adjusted in line with major changes to the outage plan, system faults, and commissioning programmes. The other energy cost categories are forecast using a baseline of historical trends with adjustments for expected changes in system operation or balancing services markets.

24 month rolling forecast with error bands

Esitmated BSUoS Charge (£/MWh)
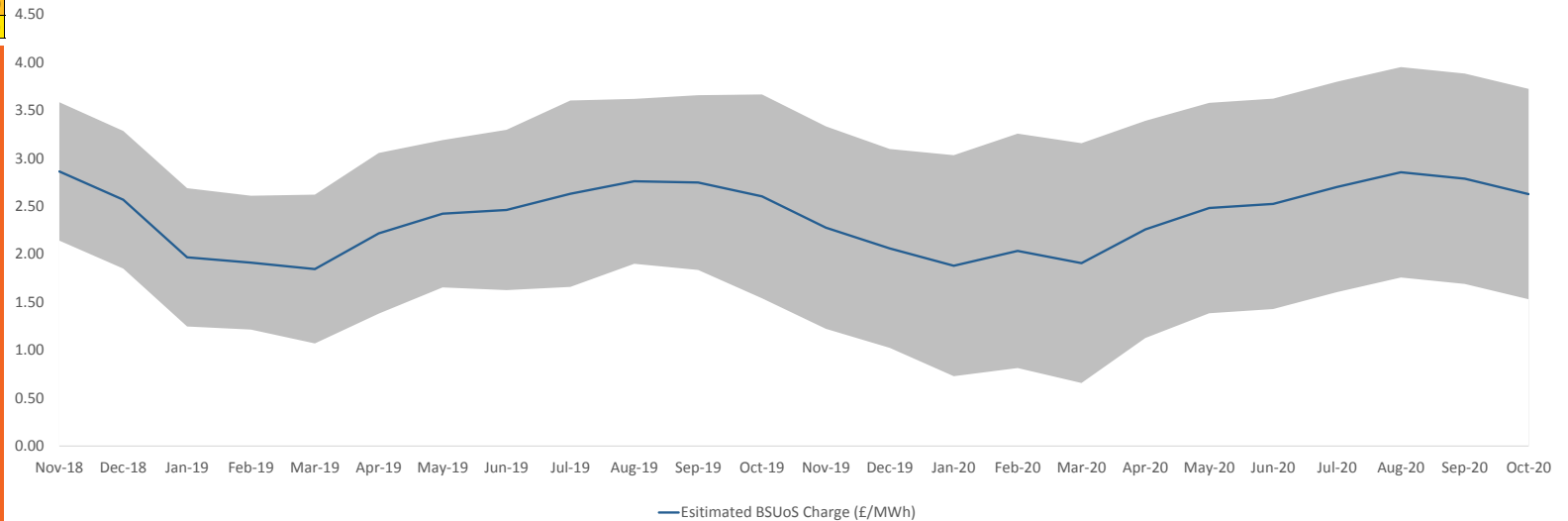
Month	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20
Energy Imbalance	0.0	-1.7	-0.9	1.1	-1.9	-6.9	-4.9	-4.2	-3.5	-4.1	-2.3	-1.5	-1.5	-1.7	-0.9	1.0	-2.0	-6.9	-4.9	-4.2	-3.5	-4.1	-2.3	-1.5
Operating Reserve	11.7	11.7	9.8	12.8	13.1	8.2	8.9	5.8	7.0	8.2	14.1	16.3	16.1	11.8	10.0	13.0	12.9	8.3	9.0	5.8	7.0	8.2	14.1	16.4
STOR	6.6	7.0	7.1	6.5	6.4	5.0	5.4	5.2	5.8	5.6	6.1	6.0	7.4	7.5	7.6	6.5	7.6	5.2	5.6	5.4	6.0	5.8	6.3	6.2
Constraints	69.3	59.4	30.9	17.8	23.3	21.3	25.2	23.7	27.5	31.6	29.6	28.6	30.5	26.5	19.9	19.1	19.5	21.3	25.2	23.7	27.5	31.6	29.6	28.6
Negative Reserve	0.5	0.5	0.6	0.1	0.2	0.4	0.9	1.6	1.8	1.7	1.8	1.2	0.5	0.5	0.6	0.1	0.2	0.4	0.9	1.6	1.8	1.7	1.8	1.2
Fast Reserve	7.5	8.0	8.6	8.7	9.7	9.0	9.0	8.8	9.1	9.6	8.8	9.1	9.4	10.0	10.3	8.7	9.9	9.0	9.0	8.8	9.1	9.6	8.8	9.1
Response	10.8	11.6	11.9	12.3	11.4	11.8	11.6	11.2	11.8	11.6	11.5	11.7	11.3	11.4	11.2	11.1	11.6	11.8	12.6	11.9	12.6	13.1	11.3	11.2
Other Reserve	1.2	1.3	1.6	1.2	1.1	1.1	0.9	1.0	1.2	1.3	1.0	0.9	0.9	0.9	0.9	0.9	1.0	1.1	0.9	1.0	1.2	1.3	1.0	0.9
Reactive	5.8	6.4	6.3	5.1	5.4	6.0	6.8	6.4	6.2	6.1	5.9	6.1	5.8	6.4	6.3	5.1	5.4	6.0	6.8	6.4	6.2	6.1	5.9	6.1
Minor Components	-0.3	-0.3	-2.0	1.1	-0.8	1.8	2.1	1.4	1.1	0.1	-0.3	0.9	-0.8	0.0	-1.6	1.3	-0.6	3.0	3.0	2.6	2.6	1.5	1.1	2.1
Black Start	3.7	3.8	3.8	3.5	3.8	3.7	3.8	3.7	3.8	3.8	3.7	3.8	3.8	3.7	3.8	3.8	3.5	3.7	3.8	3.7	3.8	3.8	3.7	3.8
Total BSUos	116.8	107.7	77.7	70.2	71.6	61.6	69.6	64.8	71.9	75.5	79.9	83.2	83.3	77.2	68.2	70.4	69.3	63.0	71.7	66.9	74.2	78.6	81.3	84.1
Esitmated BSUos Vol (TWh)	46.7	48.7	48.4	44.9	48.3	35.3	35.8	33.1	33.8	33.6	35.1	38.6	43.9	45.8	45.4	42.2	45.3	35.3	35.8	33.1	33.8	33.6	35.1	38.6
Estimated Internal BSUos(£m)	15.6	16.1	16.1	14.5	16.1	15.6	16.1	15.6	16.1	16.1	15.6	16.1	15.6	16.1	16.1	14.6	16.1	15.6	16.1	15.6	16.1	16.1	15.6	16.1
Esitmated NGET Profit/(Loss)	1.2	1.3	1.3	1.2	1.3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Esitmated BSUoS Charge (£/MWh)	2.86	2.57	1.97	1.91	1.84	2.22	2.42	2.46	2.63	2.76	2.75	2.60	2.28	2.06	1.88	2.03	1.91	2.26	2.48	2.52	2.70	2.85	2.79	2.63

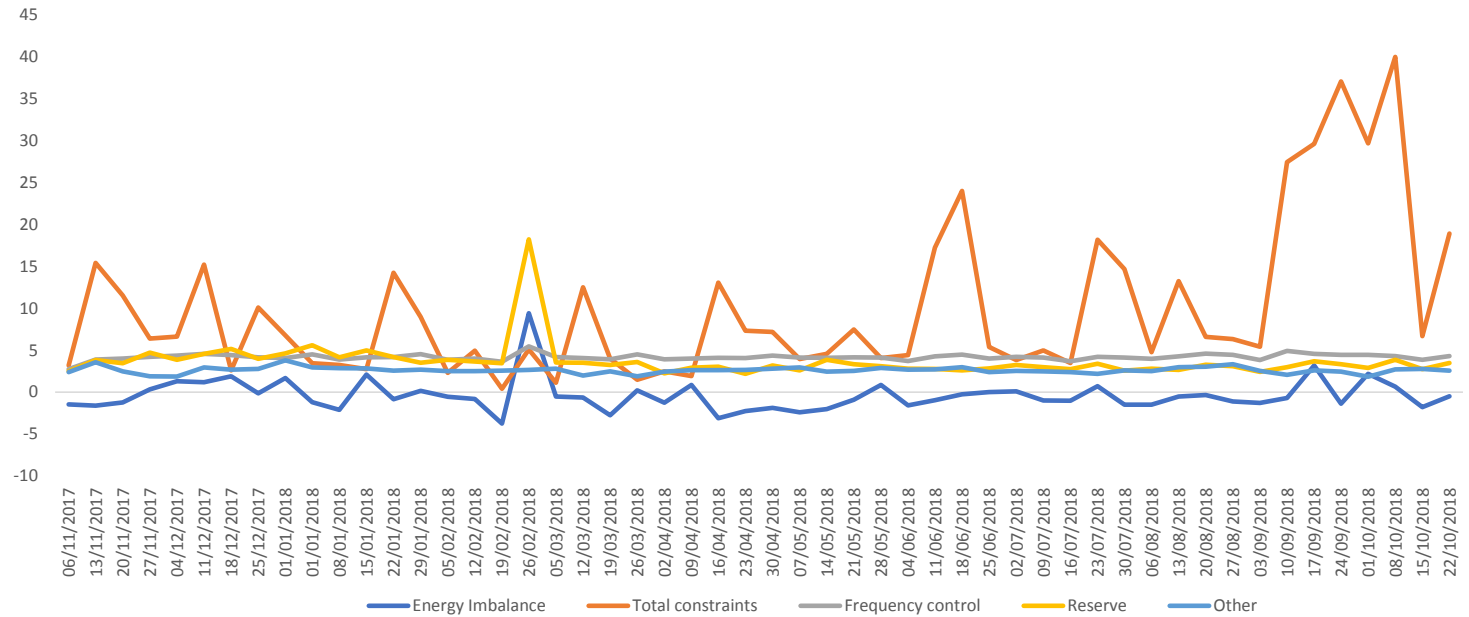|																								
High Error Band (£/MWh)	3.58	3.28	2.69	2.61	2.62	3.05	3.19	3.30	3.60	3.62	3.66	3.66	3.33	3.10	3.03	3.26	3.16	3.39	3.58	3.62	3.80	3.95	3.88	3.72
Low Error Band (£/MWh)	2.14083	1.84914	1.24527	1.21418	1.06876	1.37989	1.65302	1.625	1.65779	1.89968	1.83532	1.53948	1.221	1.02295	0.72708	0.81257	0.6564	1.12577	1.38422	1.42722	1.60399	1.75662	1.68967	1.52908

BSUoS Volatility and Forecast Accuracy

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The first chart shows the volatility of the cost categories that make up BSUoS. Constraint costs shown in red are the most variable and difficult to predict, mainly driven by the output of wind generation combined with the transmission outage plan at the time. A fault on the transmission system can add to the underlying volatility and cause large unforeseen increases in constraint costs. Reserve, shown in yellow, is generally stable but can have large deviations when the cost of generator margin increases significantly when generation is short. Predicting increases in the cost of reserve is difficult at long timescales, and can have a significant impact on the average BSUoS charge. Energy Imbalance is the other category that contributes to BSUoS volatility, which is the cost of residual balancing when the energy market is long or short. The other cost categories are relatively stable across the year, although there may be longer term trends that we consider.
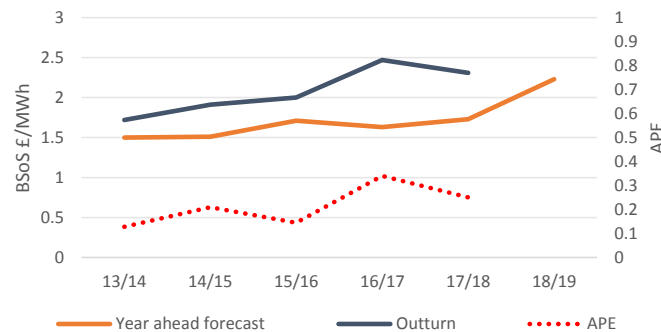
The second chart shows the annual outturn BSUoS charge compared with the forecast made at 12 months ahead, and the absolute percentage error for each year.

The third chart shows the month ahead forecast compared with outturn and absolute percentage error.

Cost volatility by category over past 12 months

Legend: Energy Imbalance — Total constraints — Frequency control — Reserve — Other

Yearly History and APE

Legend: Year ahead forecast — Outturn — APE

Month ahead forecast vs actual and APE

Legend: Actual — Month ahead forecast — APE