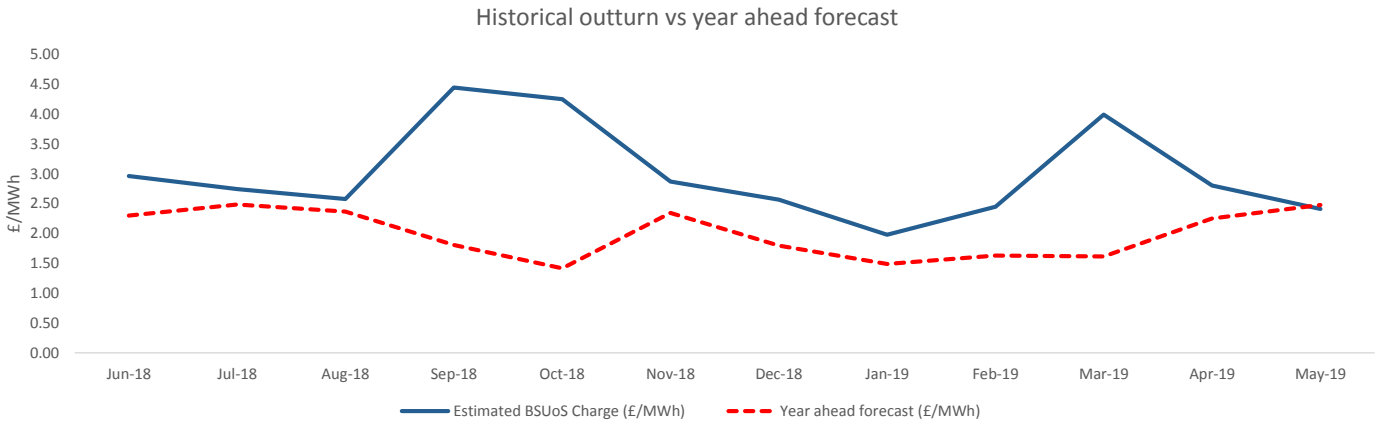
BSUoS Outturn

Average BSUoS charge	£/MWh
May-19	2.41
Past 12 months	2.98
2018/19	2.88

Outturn costs for May were significantly lower than forecast with mild weather and particularly the low wind reducing the expected impact of Western Link HVDC unavailability. The outturn for May was the second lowest outturn of the last 12 months and constraints were at their lowest level.

The BSUoS volume was down 1.5TWh on April.

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.



Month	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19	Apr-19	May-19
Energy Imbalance	-2.8	-1.1	-3.9	-0.7	0.0	2.5	-2.3	-5.5	-5.1	0.2	-0.8	0.0
Operating Reserve	3.3	4.6	4.5	5.4	8.0	8.5	8.2	6.8	4.7	4.4	4.7	4.8
STOR	6.6	7.4	6.8	5.8	5.4	5.8	6.0	6.1	4.6	5.1	3.7	3.9
Constraints - E&W	32.3	37.2	32.1	77.7	71.0	29.8	26.5	9.3	21.2	23.3	16.8	19.2
Constraints - Cheviot	7.8	1.4	1.6	18.2	8.8	13.9	2.2	13.3	11.1	30.8	17.3	0.4
Constraints - Scotland	6.3	0.2	1.3	4.1	10.9	5.7	16.4	10.7	10.5	31.6	4.2	1.6
Constraints - AS	3.8	0.8	1.1	1.6	13.5	13.3	8.2	7.3	6.8	6.5	3.6	0.5
Negative Reserve	0.4	0.6	0.4	0.6	0.2	0.4	0.4	0.2	0.1	0.1	0.3	0.1
Fast Reserve	6.0	7.6	8.2	7.6	8.5	7.0	7.6	9.8	7.8	8.2	8.3	7.1
Response	11.5	10.5	10.8	11.4	10.5	12.1	11.8	9.7	9.1	11.5	9.9	10.8
Other Reserve	0.8	1.2	1.1	1.1	1.3	0.8	1.5	1.4	1.4	1.3	1.5	1.3
Reactive	7.4	6.6	6.8	6.1	6.8	6.9	7.9	7.5	6.1	6.0	5.7	6.7
Minor Components	1.3	1.3	2.1	1.5	0.6	1.2	1.8	1.3	2.0	12.6	2.9	2.0
Black Start	3.2	3.1	3.6	3.8	5.0	3.5	3.8	3.6	3.6	5.3	3.3	3.5
Total BSUos	87.8	81.4	76.4	144.1	150.6	111.4	99.9	81.6	83.8	147.0	81.3	61.9
Estimated BSUos Vol (TWh)	35.3	36.0	36.4	36.2	39.5	44.7	45.7	50.0	40.6	41.2	38.2	36.7
Estimated Internal BSUos(£m)	15.6	16.1	16.1	15.6	16.1	15.6	16.1	16.1	14.5	16.1	24.9	25.7
Estimated NGET Profit/(Loss)	1.2	1.3	1.3	1.2	1.3	1.2	1.3	1.3	1.2	1.3	1.0	1.0
Estimated BSUoS Charge (£/MWh)	2.96	2.75	2.58	4.45	4.25	2.87	2.57	1.98	2.45	3.99	2.80	2.41
Year ahead forecast (£/MWh)	2.30	2.49	2.37	1.81	1.42	2.35	1.80	1.49	1.63	1.62	2.25	2.48

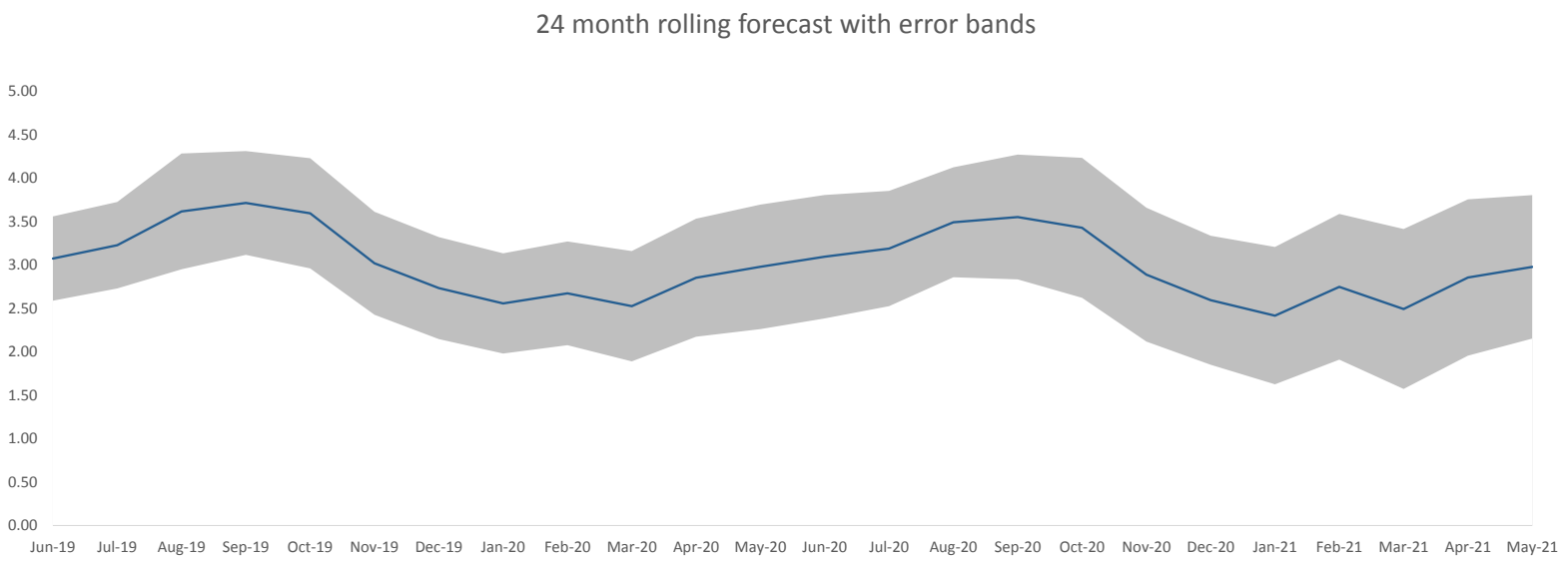
BSUoS Forecast

Average BSUoS charge	£/MWh
Jun-19	3.07
2019/20	2.96
2020/21	2.94
Next 12 months	3.01

We have decreased our forecast for energy imbalance slightly as high levels of renewables and low demand are likely to lead to the system being long more often. Constraints have been reduced with the return to service of the Western Link HVDC. There has been an increase in managing RoCoF in 2018/19, and we anticipate that cost will remain at similar levels for the next 2 years while RoCoF relay changes are being made. The cost of managing thermal constraints has also been increased based on outturn costs for 2018/19.

£110m was added to the Internal BSUoS figure in the December issue for 2019/20 following the BSUoS circular sent on 5th December (also available on our website - https://www.nationalgrideso.com/charging/balancing-services-use-system-bsuos-charges).

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.



Month	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	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21
Energy Imbalance	-0.3	-2.8	-3.4	-1.7	-0.8	-0.9	-1.0	-0.2	1.5	-1.4	-6.4	-4.4	-3.7	-2.9	-3.6	-1.8	-0.9	-1.0	-1.1	-0.3	1.7	-1.2	-6.4	-4.4
Operating Reserve	5.3	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	16.1	11.9	10.1	12.9	13.2	8.3	9.0
STOR	5.3	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	7.4	7.5	7.6	6.5	7.4	5.2	5.6
Constraints	31.8	36.8	49.5	53.1	56.0	52.6	46.5	39.8	36.4	36.8	38.9	39.5	39.2	40.5	49.5	53.1	56.0	52.6	46.5	39.8	45.3	41.6	38.9	39.5
Negative Reserve	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	0.5	0.5	0.6	0.1	0.2	0.4	0.9
Fast Reserve	7.9	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	9.4	10.0	10.3	8.7	9.7	9.0	9.0
Response	11.0	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	11.2	11.3	11.1	10.5	11.4	11.8	12.6
Other Reserve	1.2	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	0.9	0.9	0.9	0.9	1.0	1.1	0.9
Reactive	6.7	6.9	6.8	6.6	6.7	6.5	7.1	7.0	5.7	6.1	6.7	7.5	7.0	6.9	6.8	6.6	6.7	6.5	7.1	7.0	5.7	6.1	6.7	7.5
Minor Components	1.5	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	0.6	1.0	-0.6	2.3	0.3	3.0	3.0
Black Start	3.7	3.8	3.8	3.7	3.8	3.7	3.8	3.8	3.5	3.8	3.7	3.8	3.7	3.8	3.8	3.7	3.8	3.7	3.8	3.8	3.8	3.8	3.8	3.8
Total BSUos	75.8	82.5	94.7	104.7	111.9	106.6	98.5	89.5	88.7	87.8	81.8	87.2	83.5	88.5	97.7	105.9	112.7	107.9	99.3	90.3	98.4	93.6	81.9	87.2
Esitmated BSUos Vol (TWh)	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	43.9	45.8	45.4	42.2	45.3	35.3	35.8
Estimated Internal BSUos(£m)	24.9	25.7	25.7	24.9	25.7	24.9	25.7	25.7	23.2	25.7	17.9	18.5	17.9	18.5	18.5	17.9	18.5	17.9	18.5	18.5	16.7	18.5	17.9	18.5
Esitmated NGET Profit/(Loss)	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	1.0	1.0	1.0	0.9	1.0	1.0	1.0
Esitimated BSUoS Charge (£/MWh)	3.07	3.23	3.62	3.71	3.60	3.02	2.73	2.56	2.67	2.53	2.85	2.98	3.10	3.19	3.49	3.55	3.43	2.89	2.59	2.42	2.75	2.49	2.86	2.98
High Error Band (£/MWh)	3.56	3.73	4.28	4.31	4.23	3.61	3.32	3.13	3.27	3.16	3.53	3.70	3.81	3.85	4.13	4.27	4.23	3.66	3.34	3.21	3.59	3.41	3.76	3.80
Low Error Band (£/MWh)	2.59	2.73	2.95	3.12	2.96	2.43	2.15	1.98	2.08	1.89	2.17	2.26	2.39	2.53	2.86	2.83	2.62	2.12	1.85	1.63	1.91	1.57	1.96	2.15

BSUoS Volatility and Forecast Accuracy

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. Month ahead is the month ahead of the reporting month.