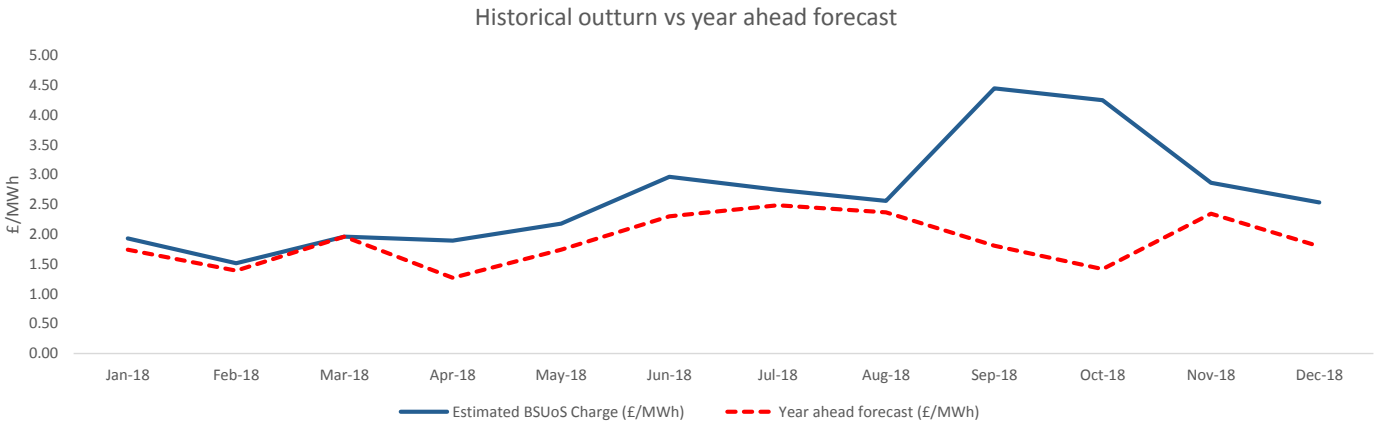
BSUoS Outturn

Average BSUoS charge	£/MWh
Dec-18	2.53
Past 12 months	2.60
2017/18	2.31

Comparing the month ahead forecast published in the November report. Outturn costs for December were £9.2m lower than forecast.
Operating Reserve outturn £3.5m lower than forecast due to the mild weather conditions, and constraint costs were £6.6m lower than forecast.
The BSUoS volume was 3TWh less than forecast. The error in the cost forcast was offset by the error in the demand forecast leading to and overall price error of £0.03/MWh.

The BSUoS volumes for December to March were adjusted down in the December issue.

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



Month	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18
Energy Imbalance	-1.9	-3.0	3.3	-5.7	-6.8	-2.8	-1.1	-3.9	-0.7	0.0	2.5	-2.3
Operating Reserve	8.6	9.2	15.9	4.1	4.4	3.3	4.6	4.5	5.4	8.0	8.5	8.2
STOR	9.4	8.6	8.1	6.1	7.0	6.6	7.4	6.8	5.8	5.4	5.8	5.8
Constraints - E&W	12.3	4.0	14.2	8.8	20.3	32.3	37.2	32.1	77.7	71.0	29.8	26.5
Constraints - Cheviot	11.9	5.4	2.3	13.2	1.5	7.8	1.4	1.6	18.2	8.8	13.9	2.2
Constraints - Scotland	5.4	2.8	1.4	0.4	2.1	6.3	0.2	1.3	4.1	10.9	5.7	16.4
Constraints - AS	0.5	0.4	3.7	2.7	0.9	3.8	0.8	0.4	1.6	13.2	13.3	7.7
Negative Reserve	0.9	0.1	0.4	0.4	2.1	0.4	0.6	0.4	0.6	0.2	0.4	0.4
Fast Reserve	8.1	6.9	7.8	6.5	6.5	6.0	7.6	8.2	7.6	8.5	7.0	7.5
Response	10.4	9.3	11.6	11.0	12.2	11.5	10.5	10.8	11.4	10.5	12.0	11.8
Other Reserve	1.6	1.2	1.1	0.8	0.9	0.8	1.2	1.1	1.1	1.3	0.8	1.6
Reactive	6.6	5.7	5.9	6.5	7.1	7.4	6.6	6.8	6.1	7.0	6.7	7.6
Minor Components	1.8	1.6	1.2	1.5	1.2	1.3	1.3	2.2	1.5	0.6	1.2	1.6
Black Start	3.8	3.4	3.7	3.4	3.7	3.2	3.1	3.6	3.8	5.0	3.5	3.6
Total BSUos	79.4	55.3	80.7	59.7	63.1	87.9	81.4	75.7	144.1	150.5	111.0	98.5
Estimated BSUos Vol (TWh)	48.9	45.4	48.7	40.4	37.0	35.3	36.0	36.4	36.2	39.5	44.7	45.7
Estimated Internal BSUos(£m)	14.0	12.6	14.0	15.6	16.1	15.6	16.1	16.1	15.6	16.1	15.6	16.1
Estimated NGET Profit/(Loss)	0.8	0.8	0.8	1.2	1.3	1.2	1.3	1.3	1.2	1.3	1.2	1.3
Estimated BSUoS Charge (£/MWh)	1.93	1.51	1.96	1.89	2.18	2.96	2.75	2.56	4.45	4.25	2.86	2.53
Year ahead forecast (£/MWh)	1.74	1.39	1.96	1.27	1.74	2.30	2.49	2.37	1.81	1.42	2.35	1.80

BSUoS Forecast

Average BSUoS charge	£/MWh
Jan-19	2.36
2018/19	2.78
2019/20	2.54
Next 12 months	2.62

January forecast includes initial outturn for 1st-16th Jan.

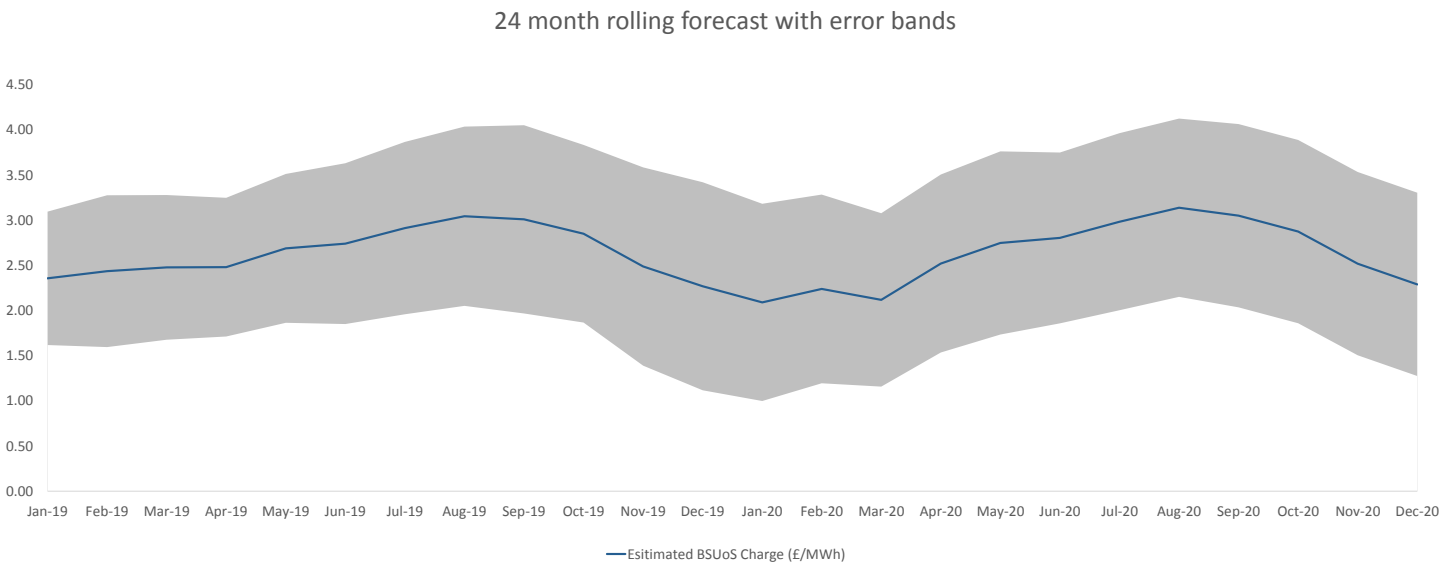
As per the previous issue, we have not increased the Operating Reserve costs as a result of the Capacity Mechanism suspension. Despite some days in December and January experiencing low wind and being relatively cold, we have not seen particular increases in prices. We are already forecasting an icrease in Febuary and March, where there is a risk of colder than average weather and high demands.

We have increased the forecast costs of constraints due to extensions to some Nuclear station outages to the end of March, go-live of the NEMO interconnector, and higher RoCoF cost .

Following the adjustments last month, the BSUoS demand volume was more accurate but was still 1TW underforecast for December. We've not made any further reductions in anticipation of colder weather in January to March.

We also anticipate the possibility of a high margin cost day (~£10m) over the winter (similar to Nov 2016 and March 2018). We have not included this in our forecast due to the uncertainty of when it may happen, but we wish to inform industry and allow you to build into your own forecasts.

£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)



Month	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	Nov-20	Dec-20
Energy Imbalance	-5.5	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	-1.5	-1.7
Operating Reserve	8.6	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	16.1	11.9
STOR	8.0	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	7.4	7.5
Constraints	50.0	36.4	43.9	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	30.5	26.5
Negative Reserve	0.4	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	0.5	0.5
Fast Reserve	7.9	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	9.4	10.0
Response	11.1	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	11.2	11.3
Other Reserve	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	0.9	0.9
Reactive	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	5.8	6.4
Minor Components	-0.3	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	0.6	1.0
Black Start	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	3.5	3.8	3.7	3.8	3.7	3.8	3.8	3.7	3.8	3.7	3.8
Total BSUos	91.9	88.8	92.3	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	84.6	78.1
Esitmated BSUos Vol (TWh)	46.4	42.9	44.3	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	43.9	45.8
Estimated Internal BSUos(£m)	16.1	14.5	16.1	24.9	25.7	24.9	25.7	25.7	24.9	25.7	24.9	25.7	25.7	23.2	25.7	24.9	25.7	24.9	25.7	25.7	24.9	25.7	24.9	25.7
Esitmated NGET Profit/(Loss)	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	1.0	1.0
Esitimated BSUoS Charge (£/MWh)	2.36	2.44	2.48	2.48	2.69	2.74	2.91	3.04	3.01	2.85	2.49	2.27	2.09	2.24	2.12	2.52	2.75	2.80	2.98	3.14	3.05	2.87	2.52	2.29

High Error Band (£/MWh)	3.10	3.28	3.28	3.25	3.51	3.63	3.87	4.04	4.05	3.83	3.59	3.42	3.18	3.28	3.08	3.51	3.76	3.75	3.96	4.13	4.06	3.89	3.53	3.30
Low Error Band (£/MWh)	1.61843	1.59529	1.67636	1.71205	1.86424	1.85091	1.95831	2.05207	1.96802	1.86693	1.38974	1.1168	0.99866	1.19426	1.15736	1.53488	1.73396	1.85798	2.00292	2.1516	2.03536	1.85933	1.5042	1.27451

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.