

ESO Forward Plan 2020-21

Monthly Reporting: October

20 November 2020



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Foreword

Welcome to our monthly performance report for October 2020. Each month, we report on a subset of metrics and performance indicators. This report provides an update on our performance and metrics against our deliverables set out in the 2020-21 [Forward Plan Addendum](#)¹.

We report our progress against our deliverables on the [Forward Plan tracker](#)² which is updated monthly on our website. The Forward Plan tracker has been updated to take account of the revisions to deliverables set out in the Forward Plan Addendum.

Summary

In October we have successfully delivered the following notable events:

- Dynamic Containment ‘soft launch’.
- Started the first end-to-end live trial for Power Potential.
- Published our Winter Outlook Report
- Opened window 5 of the Accelerated Loss of Mains Change Programme.
- Held a workshop for Future Energy Scenarios (FES) - Bridging the Gap to Net Zero

With regards to our monthly performance metrics, Balancing Costs were slightly higher in October than September. This was due to high winds combined with outages on the transmission system leading to congestion, as well as products and services implemented to assist with COVID-19 operational challenges ceasing. The System Access Management benchmark and Wind Forecasting Accuracy were unfortunately not met. We did, however, meet our target for Demand Forecasting Accuracy and Right First Time Connection Offers. We exceeded expectations for Month Ahead Balancing Service Use of System (BSUoS) Forecasting and Security of Supply.

¹ <https://www.nationalgrideso.com/document/173131/download>

² <https://www.nationalgrideso.com/document/162046/download>

A summary of our monthly metrics and performance indicators covering October is shown in Table 1 below.

Metric/Performance Indicator	Performance	Frequency	Status
Balancing Cost Management	£142.4m outturn against £126.9m benchmark	Monthly	●
Energy Forecasting Accuracy	Demand MMAE ³ : 547.5MW; wind MAPE ⁴ : 6.31%	Monthly	●
Security of Supply	0 excursions for voltage and frequency	Monthly	●
System Access Management	2.74/1000 cancellations	Monthly	●
Month-ahead BSUoS Forecast	0.3% forecasting error	Monthly	●
Right First Time Connection Offers	96% first time connection offers	Monthly	●

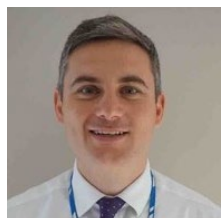
Table 1: Summary of metrics and performance indicators

- Exceeding expectations
- Meeting expectations⁵
- Below expectations

You can find out about our vision, plans, deliverables and full metric suite in the Forward Plan pages of our website⁶. We welcome feedback on our performance reporting to box.soincentives.electricity@nationalgrideso.com

Gareth Davies

ESO Regulation Senior Manager



³ MMAE (Monthly Mean Average Error) corrected on 16 November 2020

⁴ MAPE (Monthly Average Percentage Error) corrected on 28 January 2021

⁵ We have updated the colour scheme for our metrics to give increased transparency of our performance, noting that meeting expectations still represents good performance. This should give a clearer representation of the status of our activities.

⁶ <https://www.nationalgrideso.com/our-strategy/forward-plan>

Role 1 Control Centre operations

1A Balancing cost management

October 2020 Performance

The approach we use for measuring our Balancing Costs performance is based on a linear trend in a five year rolling mean, based on annual Balancing Services Costs (excluding Black Start). In order to meaningfully employ a linear trend, the data points need to handle one-off permanent changes to the system network which would not be captured by the five-year trend. So far, the only change modelled in this way has been the Western Link. We also make adjustments for significant events which we expect to have an impact on balancing costs, whether this is an upwards or downwards adjustment. These are trends which we would not expect to be captured in the 5-year rolling average, because they relate to either new assets or new trends in market behaviour. Additional information regarding balancing costs calculation and benchmark adjustment can be found on our website⁷.

Low demand periods are challenging to manage and the volume of actions required by the ESO to ensure the system remains secure lead to higher costs. During the period where demand is impacted by the COVID-19 pandemic, the ESO's balancing costs spend is expected to be significantly higher than the benchmarks stated here. During this period, we will continue to report our performance in comparison to the benchmark but will focus on providing a detailed narrative which explains the costs we have incurred. We also welcome Ofgem's review of costs incurred over the summer period and will be transparent with our stakeholders about the actions we have taken.

Please note that the benchmarks were re-calculated in July 2020 to remove the ElecLink adjustor since the interconnector go-live date has been delayed.

	Apr	May	Jun	Jul	Aug	Sep	Oct
Benchmark cost (£m)	67.0	48.2	82.6	65.5	102.0	103.7	126.9
Additional cost forecast due to WHVDC fault (£m)	0	0	0	0	0	0	0
Benchmark adjusted for WHVDC (£m)	67.0	48.2	82.6	65.5	102.0	103.7	126.9
Outturn cost (£m)	122.4	159.1	135.6	136.0	117.7	135.6	142.4
Status							

Table 2: Apr-Sep 2020 Monthly balancing cost benchmark and outturn.

	Nov	Dec	Jan	Feb	Mar	Total
Benchmark cost (£m)	82.8	126.6	133.2	142.5	118.3	1199.3
Additional cost forecast due to WHVDC fault (£m)	0	0	0	0	0	0
Benchmark adjusted for WHVDC (£m)	82.8	126.6	133.2	142.5	118.3	1199.3
Outturn cost (£m)						948.8 [YTD]
Status						

Table 3: Oct-Mar 2020-21 Monthly balancing cost benchmark and outturn.

⁷ <https://www.nationalgrideso.com/document/166231/download>

Supporting information

The balancing costs for October were slightly higher than September, but with a different breakdown as costs rose across most categories offset by a reduction in Ancillary service constraint costs as the Optional Downward Flexibility Management (ODFM) and Sizewell contracts ceased. This meant the large upfront costs were moved to shorter term balancing actions to manage system security. Costs for most of the month were steady with benign weather and low demands leading to low balancing costs. However late in the month high winds combined with outages on the transmission system, leading to congestion on the system and resulting in some high cost days.

Performance benchmarks

- **Exceeding expectations:** at least 10% lower than the figure implied by the benchmark.
- **Meeting expectations:** within 10% of the figure implied by the benchmark.
- **Below expectations:** at least 10% higher than the figure implied by the benchmark.

1B Energy forecasting accuracy

October 2020 Demand Forecasting Performance

As outlined in the Forward Plan Role 1 Energy Forecasting Accuracy metric (Metric 1b), the ESO's forecasting performance will be assessed at the end of the performance year. Annual performance targets have been calculated with exceeding, in-line with and below expectations values set out. To allow transparency of our performance during the year, each month we will report an indicative performance for both metrics.

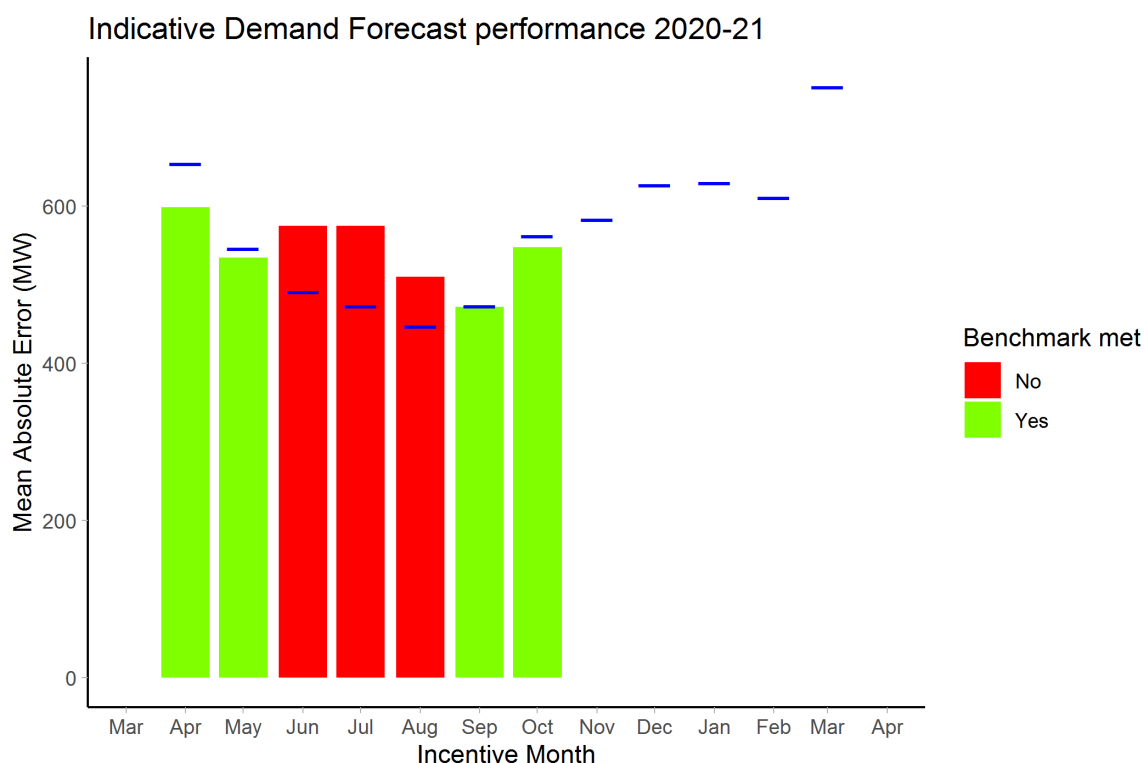


Figure 1: Demand Forecasting , shows our performance from April to October as the green histogram against the blue target line.

Day ahead demand forecast benchmarks for financial year 2020-21

Month	Benchmark (MW)	Month	Benchmark (MW)
April	654	October	562
May	546	November	583
June	491	December	627
July	473	January	630
August	447	February	611
September	473	March	752

Table 4: Demand Forecasting Benchmarks

Supporting information

DA Demand Indicative Performance for October: 547.5MW

In October 2020, our day ahead demand forecast indicative performance was within the benchmark of 562MW. October's MMAE (monthly mean average error) was 547.5MW, beating the monthly target by 14.5MW. Note that the ODFM service was not enacted during October.

Despite the country being in differing levels of local lockdown due to the implementation of the 3-tiered COVID-19 restriction system, which was rolled out in phases, the day ahead demand indicative performance was still within the target.

October 2020 Wind Generation Performance

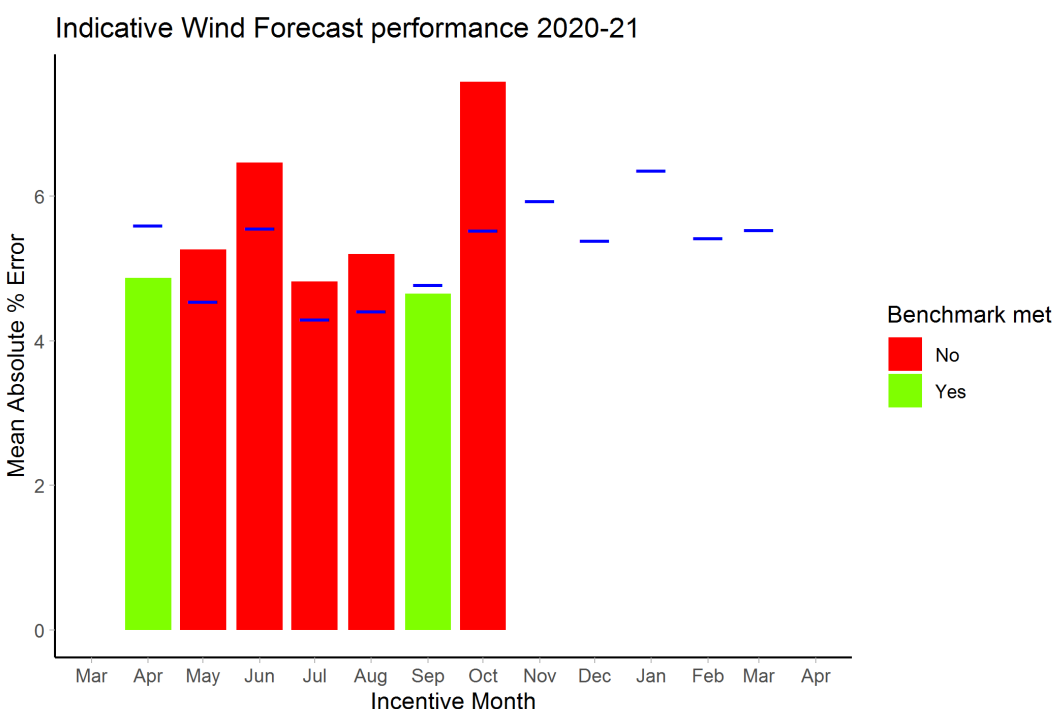


Figure 2 shows our performance this month as the green histogram, against the blue monthly target.⁸

BMU wind generation forecast benchmarks for financial year 2020-21

Month	Benchmark (%)	Month	Benchmark (%)
April	5.60	October	5.53
May	4.54	November	5.93
June	5.56	December	5.38
July	4.29	January	6.36
August	4.41	February	5.42
September	4.77	March	5.54

Table 5: Wind Forecasting Benchmarks

⁸ Corrected on 28 January 2021

Supporting information

DA Wind Indicative Performance for October: 6.31%⁹

In October 2020, our day ahead wind forecast indicative performance was not within the monthly MMAPE (monthly mean absolute percentage error) target of 5.53%. October's MAPE (mean average percentage error) was 6.31%⁹.

The top five days with the greatest wind forecasting errors were: 12th, 13th, 24th, 25th and 31st October. The mean percentage error from those days alone was 18.2%. These days coincided with storms (Alex, Barbara and Aiden) and gusty and squally weather conditions. These sorts of conditions have a high impact on the performance of the forecast. This is due to difficulties in forecasting the arrival and departure times of weather fronts.

As we obtain more operational data from recently added wind farms, we will be able to improve the power curves assigned to those units. Typically, it takes three months to have a meaningful data set to train a model.

October is normally the month where wind power output records are set. Significant lightning activity happened on the 6th, 10th, 25th and 28th. Lightning indicates atmospheric instability, which makes it difficult to forecast wind output.

Negative prices only occurred for 3 consecutive hours, on the 25th. It is unlikely that this had an influence on overall wind power forecasting accuracy.

Performance benchmarks

- **Exceeding expectations:** Error which is at least 5% lower than the benchmark
- **Meeting expectations:** Error which is within 5% of the benchmark
- **Below expectations:** Error which is at least 5% higher than the benchmark

⁹ Corrected on 28 January 2021

1C Security of Supply

October 2020 Performance

Quality of service delivered in running the electricity network by providing the number of reportable voltage and frequency excursions that occurred during the previous month, and a total for the year to date.

	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Voltage excursions	0	0	0	0	0	0	0					
Frequency excursions	0	0	0	0	0	0	0					

Table 6: voltage and frequency excursions over 2020-21

Supporting information

There were no excursions on both voltage and frequency. Our performance was therefore exceeding expectations in October.

Performance benchmarks

- **Exceeding expectations:** 0 excursions for both voltage and frequency over 2020-21
- **Meeting expectations:** 1 excursion for either voltage or frequency over 2020-21
- **Below expectations:** More than 2 excursions in total over 2020-21

1D System Access Management

Publishing this metric encourages the ESO to investigate the causes of outage cancellations and amend processes where appropriate to prevent a repeat. We will ensure that we seek to minimise costs across the whole system and all timescales when making a decision to recall or delay an outage on the transmission system.

October 2020 Performance

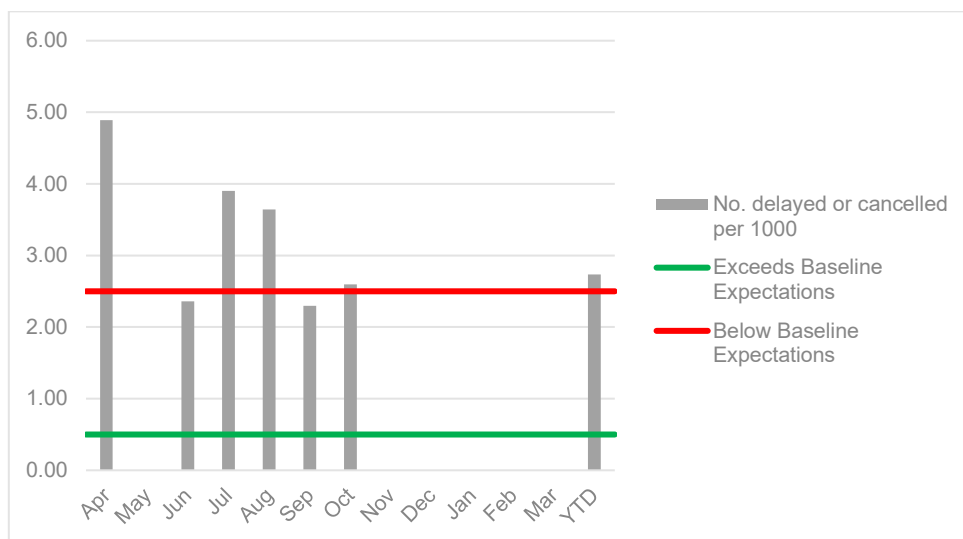


Figure 3: Number of outages delayed by > 1 hour, or cancelled, per 1000 outages

	Number of outages	Outages delayed/cancelled	Number of outages delayed or cancelled per 1000 outages
Apr	409	2	4.89
May	629	0	0
Jun	847	2	2.36
July	769	3	3.90
Aug	824	3	3.64
Sep	870	2	2.3
Oct	770	2	2.60
Nov			
Dec			
Jan			
Feb			
YTD	5118	14	2.74

Table 7: Number of outages delayed by > 1 hour, or cancelled, per 1000 outages

Supporting information

For October, the number of delays or stoppages per 1000 outages has had a small reduction from 2.76 to 2.74, with one event occurring that delayed two outages. This event was caused by a circuit rating discrepancy between two databases which store circuit ratings identified by the control room prior to releasing the outage. Confirmation of the correct rating was essential before releasing the outage, as pre-fault overloading was witnessed on our Offline Transmission Analysis (OLTA) tool, the overloading was driven by system conditions on the day. Therefore, it was decided to delay this outage to re-study the outage to ensure there would no pre-fault overloads and to avoid unnecessarily restricting generation. There is an on-going investigation to determine the root cause of the rating discrepancy.

Aside from the above, we successfully released 768 outages without any delays. The liaison between the TOs/DNOs is continuing for outage prioritisation to maximise cost-effective system access.

Performance benchmarks

- **Exceeding expectations:** < 1 outage cancellations per 1,000 outages
- **Meeting expectations:** 1 - 2.5 outage cancellations per 1,000 outages
- **Below expectations:** > 2.5 outage cancellations per 1,000 outages

Role 2 Market development and transactions

2E Month ahead forecast vs outturn monthly BSUoS

BSUoS forecasts are important to our stakeholders, although we note that our ability to forecast BSUoS is impacted by factors outside of our control. BSUoS costs are factored into the wholesale price of energy charged by generators, and therefore a forecast is vital for those parties when working out where to price their generation.

Due to the volatility in the comparison of our month ahead forecast with the outturn, we report the percentage variance so there can be large swings in accuracy. This metric does not just look explicitly at the volatility, but at the number of occurrences outside of a 10% and 20% band.

October 2020 Performance

Month	Actual	Month-ahead Forecast	APE	APE>20%	APE<10%
April-20	4.74	3.69	22%	1	0
May-20	6.24	3.87	38%	1	0
June-20	5.28	7.18	36%	1	0
July-20	4.79	5.56	16%	0	0
Aug-20	4.09	5.61	37%	1	0
Sept-20	4.68	5.16	10%	0	1
Oct-20	4.26	4.24	0.3%	0	1
Nov-20					
Dec-20					
Jan-21					
Feb-21					
Mar-21					

Table 8: Month ahead forecast vs. outturn BSUoS (£/MWh) Performance

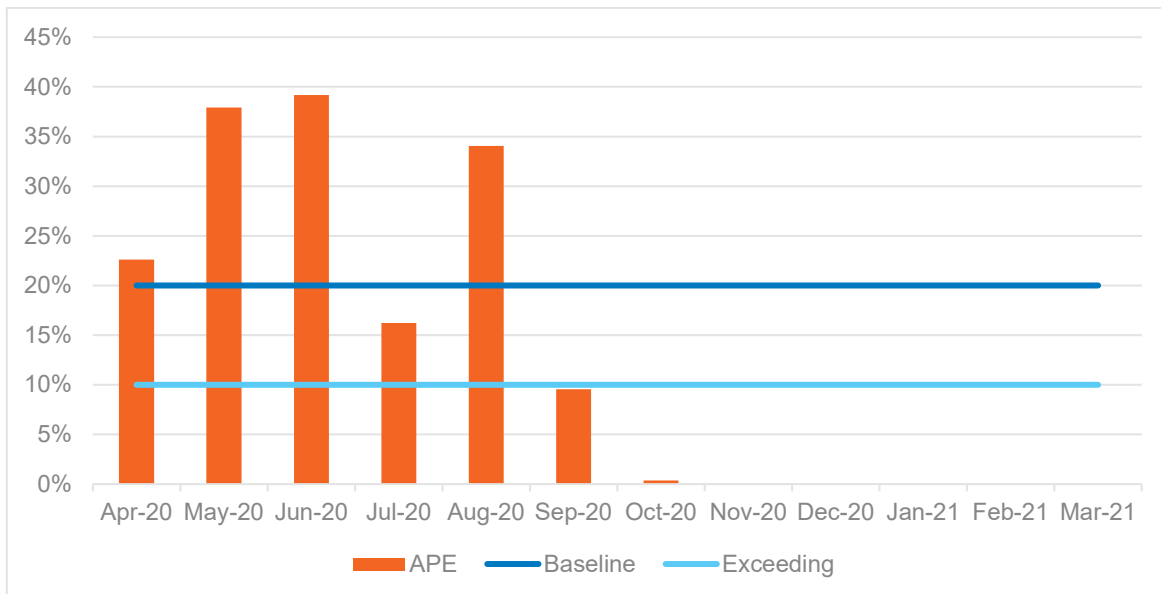


Figure 4: Monthly BSUoS forecasting performance

Supporting information

As we move towards winter and associated higher demand levels we have seen less reduction from pre-COVID expectations and less volatility in the BSUoS outturn which has enabled us to achieve a much lower Average Percentage Error (APE). Our forecast BSUoS for the month was only £0.02 away from the outturn giving an APE of 0.3%.

Balancing costs were slightly higher than September with an increase across most categories offset by a reduction in constraint costs as the Sizewell contract and Optional Downward Flexibility Management (ODFM) services have finished. Constraint costs are still high with wind and system outages driving thermal constraints; however, we are no longer seeing the additional costs driven by extremely low demands.

Our latest view of BSUoS can be found at the following link:

<https://data.nationalgrideso.com/balancing/bsuos-monthly-forecast>

Performance benchmarks

- **Exceeding expectations:** Less than 5 out of 12 monthly forecasts are above 20% Absolute Percentage Error, and 5 or more forecasts less than 10% Absolute Percentage Error
- **Meeting expectations:** Less than 5 out of 12 monthly forecasts are above 20% Absolute Percentage Error
- **Below expectations:** 5 or more out of 12 monthly forecasts above 20% Absolute Percentage Error

Notable events this month

Dynamic Containment 'soft launch'

On 1 October 2020, we launched the Dynamic Containment (DC) with new sub-second, post-fault response capability following an extensive consultation with industry. Six tenders have been received and two battery energy storage units accepted in the first round to provide 90MW of fast response services over 24 hours – with six units and 165MW available to compete in the following day's day ahead tender.

The soft launch will see the ESO running tenders for Dynamic Containment (DC) seven days a week, procuring from 11pm-11pm, moving the frequency response market closer to real-time in a similar arrangement to the model the ESO has been trialling through its frequency response auction trial.

Initially 500MW of low frequency response will be bought from providers, which is set to evolve to 1GW next year and to include high frequency response. All technology types can participate, with batteries anticipated to make up the majority of providers in the early phase while the service is being developed in conversation with industry. DC will sit alongside the ESO's existing frequency products for now, rather than replacing any.

The tool is the first in a suite of new fast-acting frequency services to be introduced by the ESO to maintain the system close to 50Hz.

Power Potential technical trials

The Power Potential project, a world-first project to create a new market for renewable energy, has reached a major milestone by starting its first end-to-end live trial.

UK Power Networks and the ESO established Power Potential to enable distributed energy resources connected to the local electricity network to provide the only market-based reactive power source to the national electricity system.

Power Potential was established to help manage the rapid increase in the volume of renewable energy connecting to distribution networks without breaching safe limits. The south and east of England has seen a significant rise in distributed energy resources in the last decade, with more than 7GW of generators now connected to its networks in London, the South East and East of England.

The general shift in balance of generation from transmission to distribution means the ESO is seeking new ways to manage voltage and system stability. By using generators on the distribution network to support national voltage control, co-ordination between the generators and network operators can be part of the solution.

Up until now voltage on the national transmission system has been controlled by a combination of power electronics and support from larger generators. By connecting more distributed energy sources as new sources of voltage control, it's anticipated that current constraints on the system can be better managed, making it more stable and affordable to run, while creating new opportunities for distributed energy businesses.

Power Potential stands to save energy consumers over £400m by 2050 and enable connection of up to an additional 4GW of local generation in the South East region of the UK.

Role 3 System insight, planning and network development

3A Right First Time connection offers

October 2020 Performance

This metric measures whether the ESO aspects of connection offers were correct the first time they were sent out to customers.

Connections Offers	Results
Year to date number of connections offers	130
Year to date ESO related reoffers	6
Year to date percentage of Right First Time connections offers determined from ESO related reoffers	96%

Table 9: Connections re-offers data

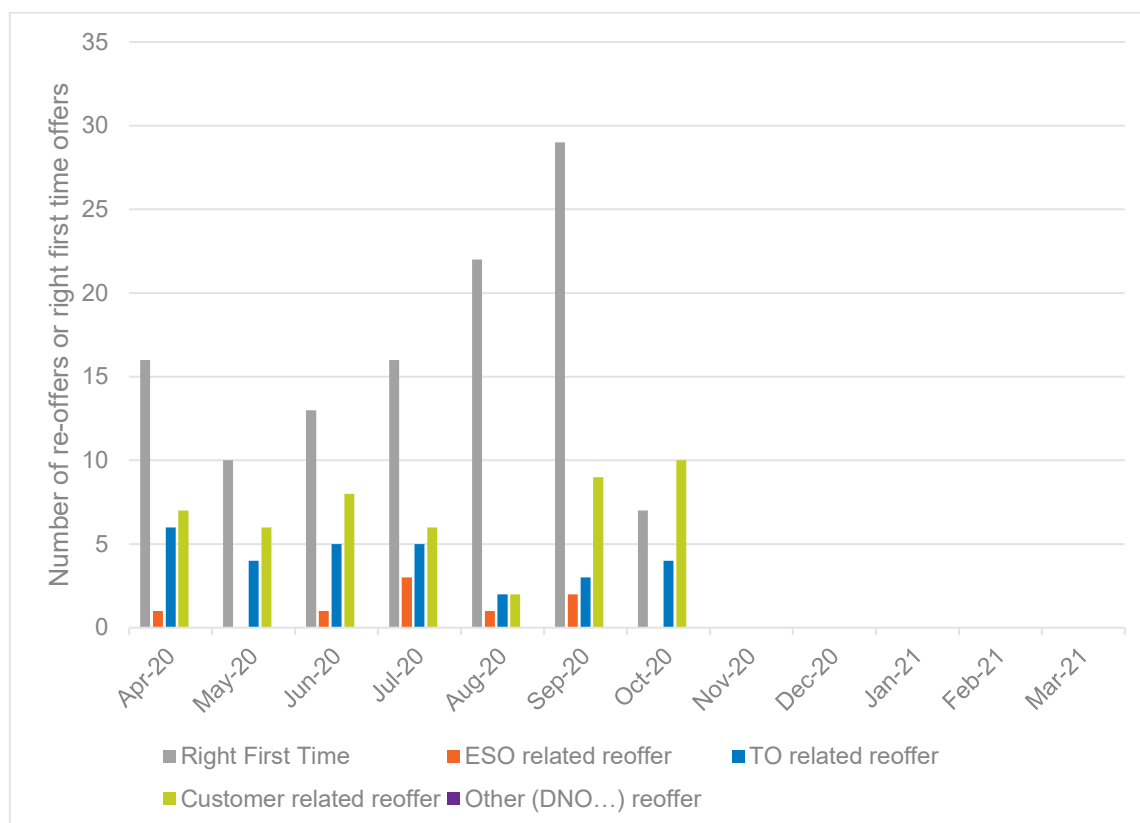


Figure 5: Connections offers monthly performance

Supporting information

We saw 18 offers returned in October, 11 of which were subject to a re-offer. There were no recorded ESO related re-offer on contracts signed in this period which means that we are still meeting our target at 96% Right First Time.

Performance benchmarks

- **Exceeding expectations:** 100% of connection offers Right First Time (excluding those where the error was not due to the ESO)
- **Meeting expectations:** 95-99.9% of connection offers Right First Time (excluding those where the error was not due to the ESO)
- **Below expectations:** Less than 95% of connection offers Right First Time (excluding those where the error was not due to the ESO)

Notable events this month

Winter Outlook Report published

On 15 October, our 2020-21 Winter Outlook Report was published. Winter Outlook reports are designed to inform the energy industry and support its preparations for the winter ahead. The report presents our view of the electricity system between October and March.

Accelerated Loss of Mains Change Programme Window 5

On 5 October, Window 5 of the Accelerated Loss of Mains Change Programme was opened. It is a mandatory requirement that all generators connected to the electricity network have to make to be compliant by 2022 and the funding is available to make the change.

The change itself requires generators to relax the settings on the relays that connect their assets to the electricity network, which will make generators less sensitive to any network disturbances.

The Accelerated Loss of Mains Change Programme has been designed to help prevent power outages by protecting generators from any disturbances that occur on the electricity network, and likewise protect the network from any problems that may occur to generators.

Future Energy Scenarios (FES) - Bridging the Gap to Net Zero Workshop

On 21 October, we held the first online FES- Bridging the Gap workshop, attended by over 130 people. We discussed the peaks and troughs of a decarbonised energy system and how markets, technology and digitalisation can help to achieve our Net Zero target. We received a positive Net Promoter Score (NPS) for the event.

The FES - Bridging the gap to net zero programme takes a closer look at what needs to be done to reach the UK's 2050 net zero target. Through the programme, we identify and investigate the areas from our recent Future Energy Scenarios publication that we consider to be the most important and the most uncertain. We intend to bring together a wide range of stakeholders to progress the debate, and recommend actions for policymakers and industry to move towards net zero.

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