

ESO Forward Plan 2020-21

Monthly Reporting - April

22 May 2020



Foreword

Welcome to our monthly performance report for April 2020. Each month we report on a subset of metrics, which have data available at monthly granularity. This report provides an update on our performance and metrics against our deliverables set out in the 2020-21 Forward Plan¹.

When we published our 2020-21 Forward Plan in March 2020, we were aware that many of our activities in the coming year would be impacted by COVID-19, but it was too early to set out the precise details of this impact. We have already communicated some changes to the industry via our website² and regular webinars, but over the coming weeks we will pull together our latest view of the changes that will be required to our deliverables. In June we will publish a Forward Plan Addendum, which sets out our latest view of what we will deliver, and where possible takes account of the feedback we received from Ofgem in its Formal Opinion³.

We now report our progress against our deliverables on the [Forward Plan tracker](#)⁴ which is updated monthly on our website. However, please note that this monthly report, and the associated Forward Plan tracker, are based on the original 2020-21 Forward Plan as published on the ESO website on 30 March 2020.

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

Metric	Performance	Status
Balancing cost management	£122m outturn against £67m benchmark	●
Energy forecasting accuracy	Demand forecast error target was met; Wind forecast error target was met.	●
Security of Supply	0 excursions for voltage and frequency	●
System access management	4.89/1000 cancellations	●
Month-ahead BSUoS forecast	22% forecasting error	●
Right first time connection offers	96%	●

- Exceeding expectations
- Meeting expectations
- Below expectations

Table 1: Summary of monthly metrics

Contents

Foreword	2
Role 1 Control Centre operations.	4
Role 2 Market development and transactions	9
Role 3 System insight, planning and network development..	16

¹ <https://www.nationalgrideso.com/document/166441/download>

² <https://www.nationalgrideso.com/keeping-lights-throughout-coronavirus>

³ https://www.ofgem.gov.uk/system/files/docs/2020/05/ofgem_formal_opinion_2020-21.pdf

⁴ <https://www.nationalgrideso.com/document/162046/download>

You can find out about our vision, plans, deliverables and full metric suite in the [Forward Plan pages](#) of our website⁵. We welcome feedback on our performance reporting to box.soincentives.electricity@nationalgrideso.com.



Louise Schmitz
ESO Regulation Senior Manager

⁵ <https://www.nationalgrideso.com/our-strategy/forward-plan>

Role 1 Control Centre operations

1A Balancing cost management

April 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 website⁶.

	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total
Benchmark cost (£m)	67.0	48.4	83.6	71.3	102.6	104.5	127.8	83.7	127.5	134.1	143.3	122.1	1215.9
Additional cost forecast due to WHVDC fault (£m)	0	0	0	0	0	0	0	0	0	0	0	0	0
Benchmark adjusted for WHVDC (£m)	67.0	48.4	83.6	71.3	102.6	104.5	127.8	83.7	127.5	134.1	143.3	122.1	1215.9
Outturn cost (£m)	122.0												122.0 [YTD]
Status													

Table 2: Monthly balancing cost benchmark and outturn.

Supporting information

Balancing costs for April outturned at £122m against a benchmark cost of £67m. April costs are traditionally much lower than March as a result of lower wind and more favourable weather, however this April costs outturned at the same level as March due to the lockdown measures introduced due to COVID-19. We hosted weekly webinars to ensure industry was kept updated on the actions the ESO were taking to deal with the impacts of COVID-19 (see notable events below). Constraints costs were down comparing to March as a result of the better weather and fewer outages from the TOs due to current lockdown measures. However, RoCoF costs were higher as a result of the lower demand, with the lowest demand on Easter Monday setting a new record low of 15.2GW. Energy balancing, Response and Reactive costs were all higher than March as a result of system uncertainty and the lower volumes of energy on the network.

⁶ <https://www.nationalgrideso.com/document/166231/download>

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

April 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.

April 2020 is the first month in the Forward Plan 2020-21 for which the indicative performance has been assessed.

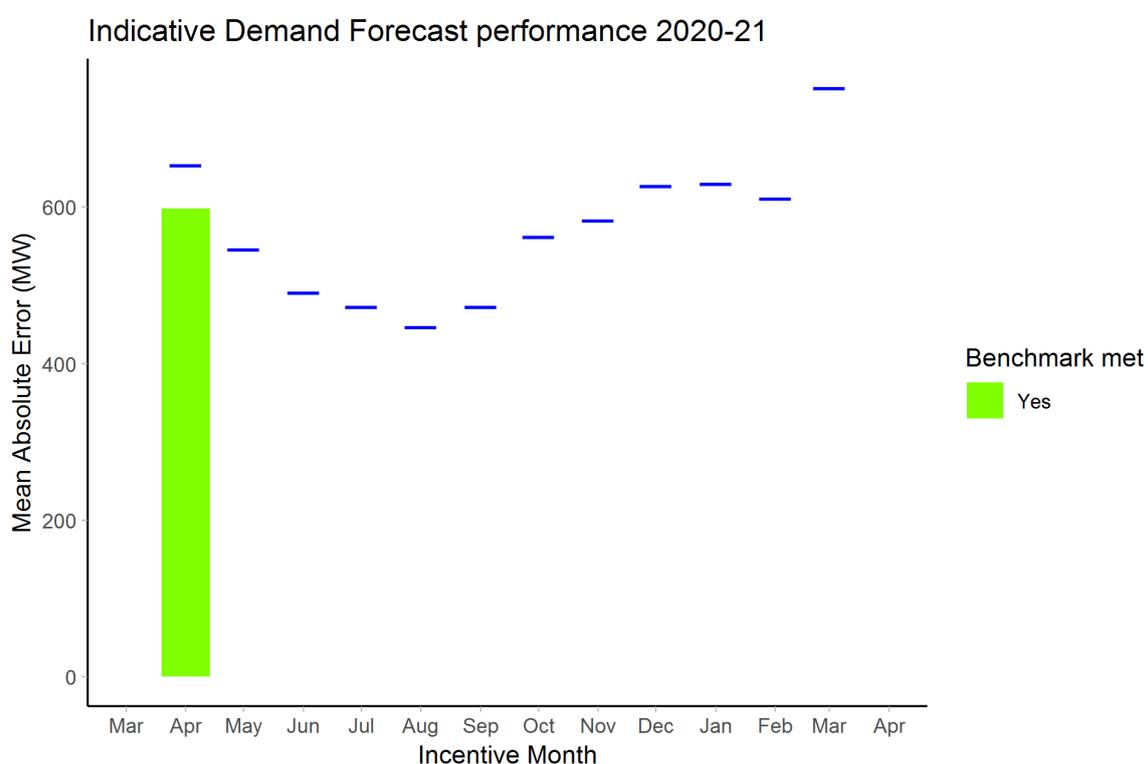


Figure 1: Demand Forecasting Performance, shows our performance for April as the green histogram against the blue target line.

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 3: Demand Forecasting Benchmarks

Supporting information

Day Ahead Demand Indicative Performance: 598MW

In April 2020, our day ahead demand forecast indicative performance **exceeded the benchmark** target of 654MW. April's MMAE (monthly mean average error) was 598MW.

April was unprecedentedly challenging to forecast. Even without COVID-19 lockdown which began on 23 March, April is one of the most variable months. It is just after clock change, Easter and the Easter Bank Holidays fall on a different week in the year in relation to previous years, and school holidays change their position accordingly to the date of Easter. However, none of these can compare to the additional uncertainty introduced by the COVID-19 pandemic and the lockdown in the UK. The first two weeks after the lockdown which included the first week of April saw continually changing demand levels as people adapted to the new conditions. Our preparations meant that we avoided some of the big day ahead errors observed in European system operators.

In April, we observed record low demands on the system. Both overnight and afternoon minimums set new records. The forecasting team have been engaging both internally and externally to highlight these very low demands, to allow the creation of mitigating strategies as early as possible.

April 2020 Wind Generation Performance

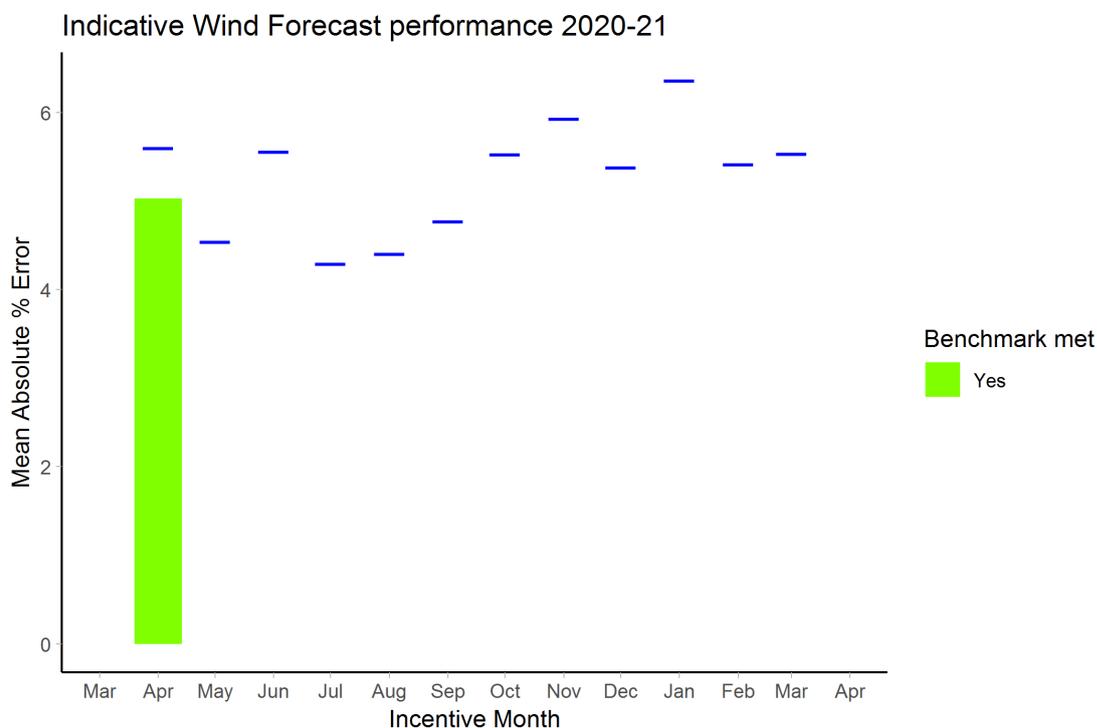


Figure 2: Wind Forecasting Performance, shows our performance this month as the green histogram, against the blue monthly target⁷.

⁷ Corrected on 28 January 2021

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 4: Wind Forecasting Benchmarks

Supporting information

Day Ahead Wind Indicative Performance: 4.88%⁸

In April 2020, our day ahead wind forecast indicative performance **exceeded the benchmark** target of 5.6 %. April's MMAPE (monthly mean absolute percentage error) was 4.88%.⁷

The majority of the month had benign wind conditions and straightforward weather patterns, with clear blue skies for many days in April. During these types of weather conditions greater forecast accuracy can be expected.

On 2 April there were strong gale force winds across the north west, followed by warm and cold air masses moving together on 3 April. This caused a typical phase error where the timing of the arrival and departure of the windy conditions resulted in the large forecast error for some half hours. A similar occurrence took place on 6 April. We also experienced large errors on 29 and 30 April, which are explained by the frontal system that moved across the country on those days interacting with the offshore wind farms.

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

⁸ Corrected on 28 January 2021

1C Security of Supply

April 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	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Voltage excursions	0											
Frequency excursions	0											

Table 5: 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 April.

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.

April 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			
Jun			
July			
Aug			
Sep			
Oct			
Nov			
Dec			
Jan			
Feb			
YTD	409	2	4.89

Table 6: Number of outages delayed by > 1 hour, or cancelled, per 1000 outages

Supporting information

For April, there was a total of 4.89 cancellations per 1000 outages, which is worse than our new target of 2.50 cancellations or delays per 1000 outages. There were two outages delayed, of the 409 outages delivered, as the demand at risk process had not been fully discussed and agreed within planning timescales with the control room on a rather complex outage combination, this was mostly due to communication issues with remote working. This led to the outage being delayed approximately three hours before being released to the TO. The communication issues have been rectified by fully engaging and communicating between planning and the control room, by ensuring our regular weekly handovers continue effectively now that they take place remotely.

In April, there has been a significant amount of change to the outage plan as the TOs assessed their delivery plans and implemented new working practices in order to meet the 'social distancing' measures specified by the government for COVID-19. This has resulted in far fewer outages delivered in April, but with more churn in the plan than we would normally expect to see at this time of year. NGESO has taken several actions to ensure we are effectively working with the TO by introducing weekly managerial calls specified to help with outage prioritisation and communications between parties during the lockdown. Another example is weekly DNO meetings set up to discuss the upcoming outages to ensure all parties are aware of the plan and in agreement. When comparing the start of 2020-21 to 2019-20, we have seen slightly worse performance this year compared to the 2.48 cancellations per 1000 outages we saw during April 2019, but we are continuing to work to drive our performance through the above actions.

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

Notable events this month

COVID-19 Webinars

To ensure industry is kept updated on the actions the ESO are taking and observations from the electricity system regarding the impacts of COVID-19, we are hosting a weekly webinar at 2pm every Wednesday. This includes an opportunity for stakeholders to ask questions, raise concerns and ideas through a live Q&A.

To register and see all post event materials, please go to our webpage:

<https://data.nationalgrideso.com/plans-reports-analysis/covid-19-preparedness-materials>

New record for coal-free electricity generation

Thursday 9 April saw a new record of 19 days for the longest period of coal-free electricity generation in Great Britain. So far 2020 has seen a new solar generation record, and the longest period of coal-free operation. That follows two of the greenest months on record at the start of the year, underlining the progress that has been made towards our target of being able to operate the electricity system entirely with zero carbon sources by 2025.

Carbon Intensity Green App

National Grid ESO launched its new green app in April. The ESO created a website in partnership with science teams at the World Wildlife Fund, Environmental Defence Fund Europe and the University of Oxford Department of Computer Science. The website received an impressive 10 million plus hits a month. Building on this, the ESO's team developed an app that brought this valuable information to an even wider audience of consumers. The app allows users to see when electricity suppliers are at their greenest, consumers can then use this information to make decisions to lower their carbon footprint. This can also save money for consumers if they are signed up to a smart meter tariff with their electricity supplier.

More information can be found here:

<https://www.nationalgrid.com/app-helps-you-work-out-how-green-your-power>

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.

April 2020 Performance

Month	Actual	Month-ahead Forecast	APE	APE>20%	APE<10%
April-20	4.74	3.69	0.22	1	0
May-20					
June-20					
July-20					
Aug-20					
Sept-20					
Oct-20					
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

For April BSUoS outturned at £4.74/MWh against a forecast value of £3.69/MWh. The April forecast was created on 13 March, roughly two weeks before the lockdown due to COVID-19. We forecast £106m of balancing costs and a volume of 35.3TWh. Due to the lockdown the volume outturned significantly lower at 30.2TWh whilst additional costs were incurred managing a low demand system leading to a higher BSUoS figure.

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

Wider access to the Balancing Mechanism

On 23 April we saw the first ever Balancing Mechanism (BM) transaction with Flexitricity as a Virtual Lead Party (VLP) through the BM Wider access route to market.

The Balancing Mechanism (BM) has so far only been accessible to energy suppliers and licensed generators; through the introduction of a new market structure, Virtual Lead Parties (VLP), the ESO is opening up access to this real-time balancing market for all sources of electrical flexibility.

Role 3 System insight, planning and network development

3A Right First Time connection offers

April 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	27
Year to date ESO related reoffers	1
Year to date percentage of Right First Time connections offers determined from ESO related reoffers	96%

Table 9: Connections re-offers data

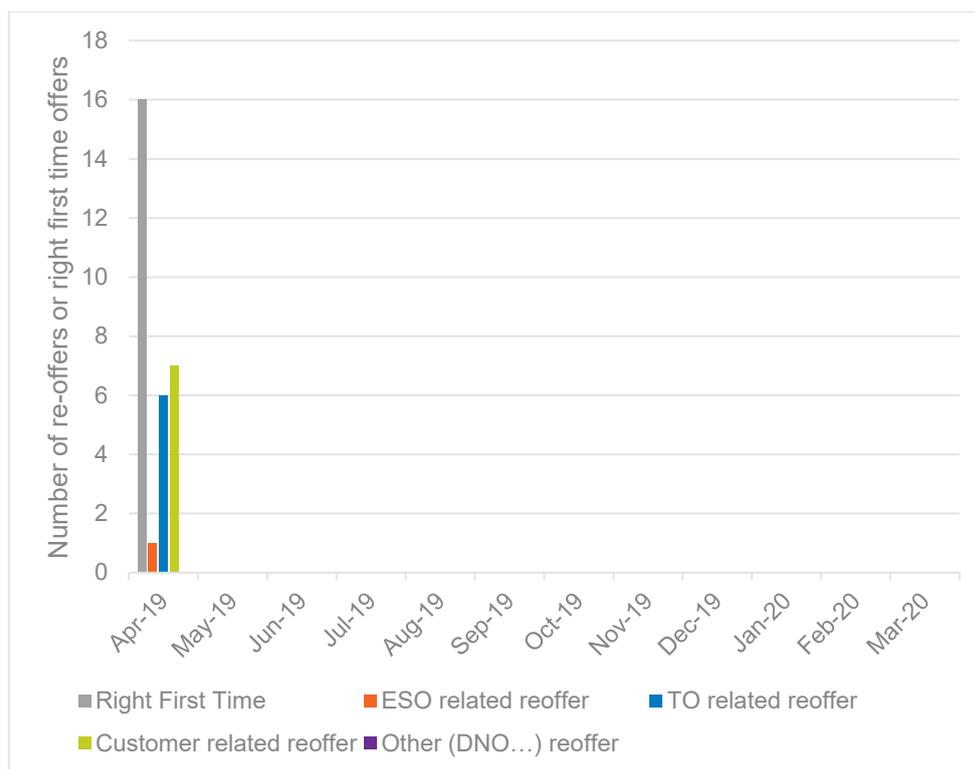


Figure 1: Connections offers monthly performance

Supporting information

We saw 27 offers returned in April, 11 of which were subject to a re-offer. There was one ESO related re-offer on contracts signed in this period which means that we are meeting our target at 96% Right First Time. The issue that led to an ESO related re-offer was due to:

- Transmission Owner Reinforcement Instructions (TORIs) incorrectly included in Attributable Works

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

System Operability Framework document: the potential operability benefits of Virtual Synchronous Machines and related technologies

We published a system operability framework document in April 2020 to describe the potential operability benefits of Virtual Synchronous Machines and related technologies. A virtual synchronous machine is one type of grid forming converter which applies power electronic technology to maintain the voltage and frequency of the grid as a synchronise machine. This is essential to our current power system which has high penetration of non-synchronous renewable generators that cannot provide voltage or frequency support. At the same time, the transmission network is witnessing reducing demand due to the increasing amount of embedded generation connecting on the distribution networks. This means the percentage of synchronous generation running at any time is reducing and without system operator intervention, it is becoming challenging to maintain system stability.

Virtual synchronous machines provide stability support to the system on the following aspects:

- Inertia – which helps to control and stabilise system frequency
- Fault level (or short circuit level) – which provide the maximum fault current that helps the power system protection react quickly to the fault and stabilise local voltage
- Ability to limit vector shift and Rate of Change of Frequency (RoCoF)

The ESO published document can be found here:
<https://www.nationalgrideso.com/document/168376/download>

nationalgrideso.com

Faraday House, Warwick Technology Park,
Gallows Hill, Warwick, CV34 6DA

nationalgridESO