

Performance Monitoring of Balancing Services

Quarterly Update Report

October 2021



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Introduction

Our [Roadmap](#) for Enhancements to Performance Monitoring of Balancing Services provides the industry with details on the actions we are taking to provide greater transparency over how we proactively monitor and manage performance of balancing services. Within the roadmap, we have committed to producing quarterly reports which will provide regular updates on the performance of our balancing services. By sharing data on performance, we hope to provide greater transparency around the performance of the contracts that we award.

We welcome feedback on this report. Should you have any questions or comments, please do not hesitate to contact us at commercial.operation@nationalgrideso.com

What's in this report

This quarterly report covers the four-month period from June 2021 to September 2021 for Fast Reserve (FR), Short Term Operating Reserve (STOR), Enhanced Frequency Response (EFR), Firm Frequency Response (FFR), Dynamic Containment (DC) and Electricity System Restoration (ESR). Our ambition is to continue to expand the coverage to other services that we procure and include this in future publications.

Short Term Operating Reserve (STOR)

STOR allows us to have extra power in reserve for when we need it. It helps us meet extra demand at certain times of the day or if there's an unexpected drop in generation. We award firm STOR contracts via the daily auctions where we procure for the next STOR service day across six annual seasons. Non-Balancing Mechanism (NBM) providers can also offer their assets (where eligible) on the day via the Optional STOR service.

What we pay providers

We make two types of payments for STOR:

- Availability payments – Paid (£/MW/Hr) for the hours in which the committed firm service has been made available. This paid as 'pay as clear' through the daily auction.
- Utilisation payments – Applicable to firm and Optional service. Paid £/MWh for the energy delivered.

Performance reports for July 2021 to September 2021*

Availability Windows

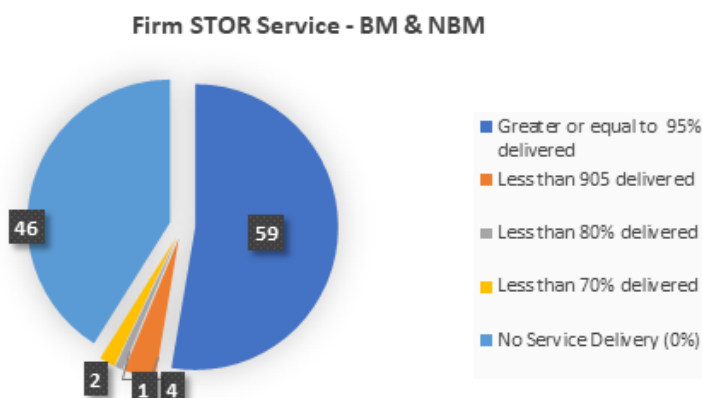
In the reporting period, which covers STOR Seasons 15:02 and 15:04 of the new STOR day ahead service, there were committed STOR Availability Windows across a total of **120,351** half hourly settlement periods (SP) provided by a total of **125 STOR units**. STOR units are monitored to ensure they are available during each SP, and in the reporting period this was achieved in **90%** of SP. Of the 10% of SPs where units were unavailable, a total of **£415,052** of availability payments were withheld.

Table 1 Statistics for STOR Availability July/September 2021

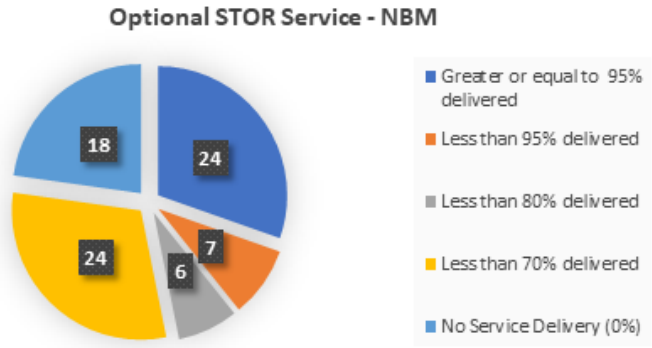
Total Settlement Periods (SP)	120,351
Total SP where units are available	108,340
Total SP where units are unavailable/rejected	12,011
% Unavailable	10%

Utilisation

- For the firm service (BM & NBM) there were a total of 112 dispatch instructions during the reporting period, 59 of which achieved the required $\geq 95\%$, representing 52.6% of all dispatches. There was a total of 46 (NBM) dispatch instructions where the reported performance was 0MW delivery, but these are current under investigation with individual providers due to missing/incomplete performance metering data. A total of **£486,971** of utilisation payments have been withheld which includes the 46 dispatches currently under investigation.



- For the optional service (NBM only) there were a total of 79 dispatch instructions during the reporting period, 24 of which achieved the required $\geq 95\%$, representing 30% of all dispatches. As with the firm service, there were a number of dispatch instructions where the reported performance was 0MW delivery, which is again currently under investigation with the individual service providers. A total of **£280,847** of utilisation payments have currently been withheld.



** Please note that June 2021 performance was included in the previous report*

Fast Reserve (Optional Service)

Fast Reserve provides the rapid and reliable delivery of active power through an increased output from generation or a reduction in consumption from demand sources, following receipt of a dispatch instruction from the ESO.

Optional Fast Reserve is contracted on the day, by instruction from the ESO for a Fast Reserve Unit to be available for instruction under the Optional service.

What we pay providers

We make two types of payments for the Optional Fast Reserve Service:

- Availability payments in £/hours – paid for a unit to be available to supply Fast Reserve
- Utilisation payments in £/MWh – paid for the energy delivered under the service

Payments can be withheld through the monthly delivery reconciliation process based on actual delivery against contracted volume of MW instructed under the service.

Performance reports for July 2021 to September 2021*

Utilisation performance

For the Optional service, a total of 1746 dispatch utilisation instructions were issued by the ESO in the reporting period, across **8 Fast Reserve units**. The overall performance of these units was **90.4%** delivery of MW against the dispatch instruction, a slight downward trend on previous performance in 2021 (see tables below). Through our monthly delivery reconciliation process we withheld over **£2.5m** of utilisation payments for the 9.6% under delivery.

Table 1 Statistics for period July - September 2021

Expected Delivery MWh	166,022.81
Under-delivered MWh	15,813.80
% Delivery	90.47%
Utilisation Payments Withheld	£2,567,418.38

Table 2 Statistics for period April-June 2021

Expected Delivery MWh	200,749
Under-delivered MWh	13,748
% Delivery	93.15%
Utilisation Payments Withheld	£1,434,286.42

Table 3 Statistics for period December 20-February 2021

Expected Delivery MWh	89,753.14
Under-delivered MWh	7,168.92
% Delivery	92.01%
Utilisation Payments Withheld	£665,516.66

** Please note that June 2021 performance was included in the previous report*

Firm Frequency Response (FFR)

Firm Frequency Response is a service we use to keep the system frequency close to 50Hz. Fast acting generation and demand services are held in readiness to manage any fluctuation in the system frequency, which could be caused by a sudden loss of generation or demand. There are three types of frequency response known as “primary”, “secondary” and “high”. The difference between primary and secondary is the speed at which they act to recover the system frequency. Both primary and secondary react to low frequency conditions, and high response reacts to high system frequency conditions, restoring the frequency to normal operational limits.

What we pay providers

FFR service is paid an availability fee on a £/Hr basis to providers for the MW and hours in which the firm service has been Contracted through the monthly tender. There is no utilisation payment for the FFR service.

Performance measures

We have a process for the monitoring of contracted FFR delivery on a monthly basis. Performance monitoring is conducted on a sample period which is selected by the ESO, this period is normally where a frequency excursion either above or below 50Hz has occurred. The Percentage Performance score from this sample period will then have the following key performance factors applied:

Table 1 key performance factors

Percentage Under Delivery	Performance Factor
<10%	100%
>10%<60%	50%
>60%<95%	25%
>95%	0%

Where a unit's performance triggers a performance factor regarding the delivery of the service, it will receive a reduced payment for that month's contracted availability fee. Where a unit persistently under performs, other measures can be taken by us to address this along with any reduced availability payment. These include retesting of the Unit and applying a de-rating factor to future tender assessments.

Performance reports for June 2021 to September 2021

In the reporting period, covering delivery from FFR tenders TR137 (June), 138 (July), 139 (July) and 140 (September) there was a total of 72 units contracted to deliver Frequency Response over the period of 1st June 2021 to 30th September 2021. The number of Units providing dynamic FFR has continued to reduce from previous months as assets move into the Dynamic Containment (DC) service, however with DC now being procured in EFA blocks we expect to see some Units return to FFR tenders as they bid around periods of Low DC requirement. For this period, there was a total of £4.01m paid for the availability to deliver the FFR service. Over the four months the performance of Units averaged at 98.8% delivery, resulting in us looking to recover circa £9k for under performance for the same period. A breakdown of these figures can be seen in the charts below.

Figure 1 Performance Monitoring June - September

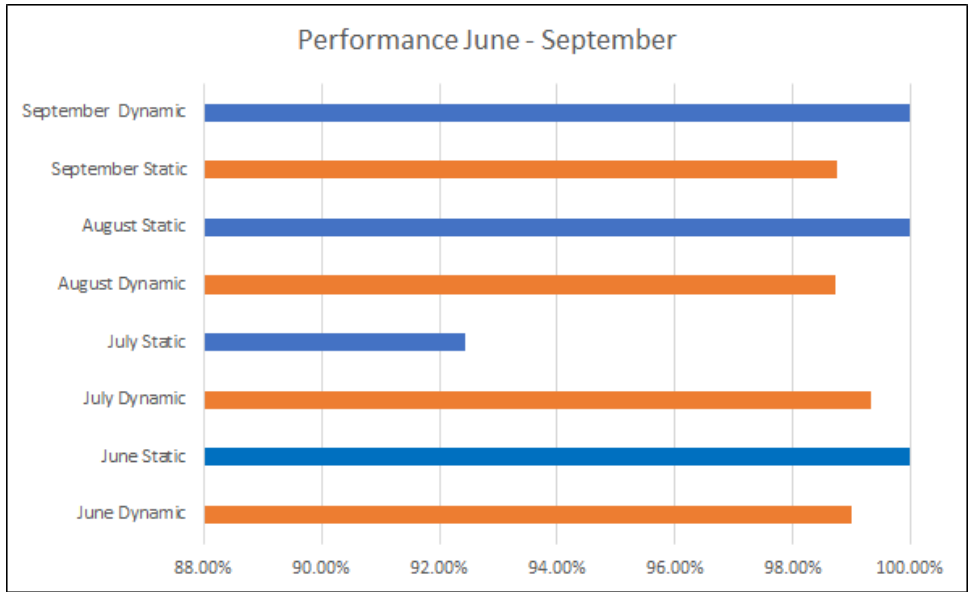


Figure 2 FFR TR137- 140 Tendered costs £/K

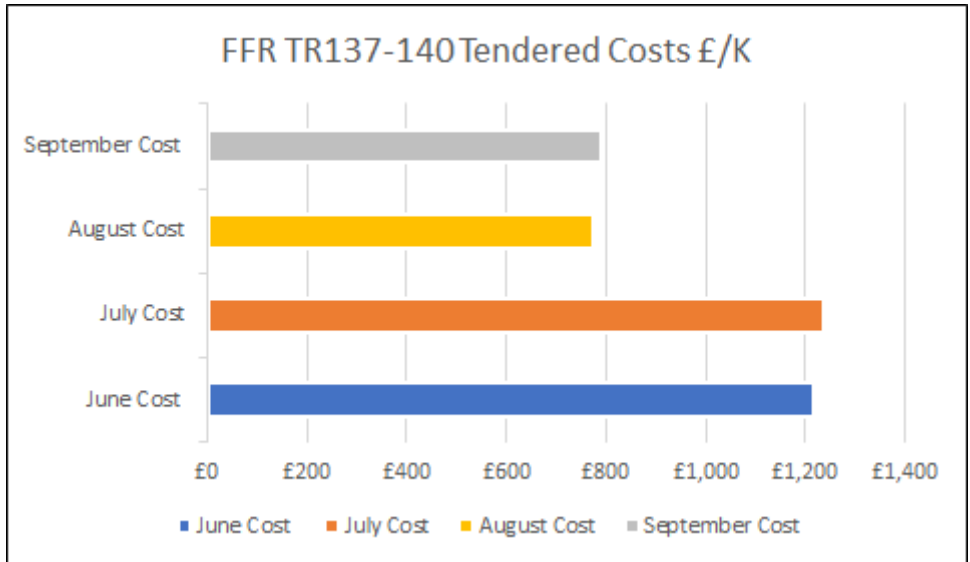
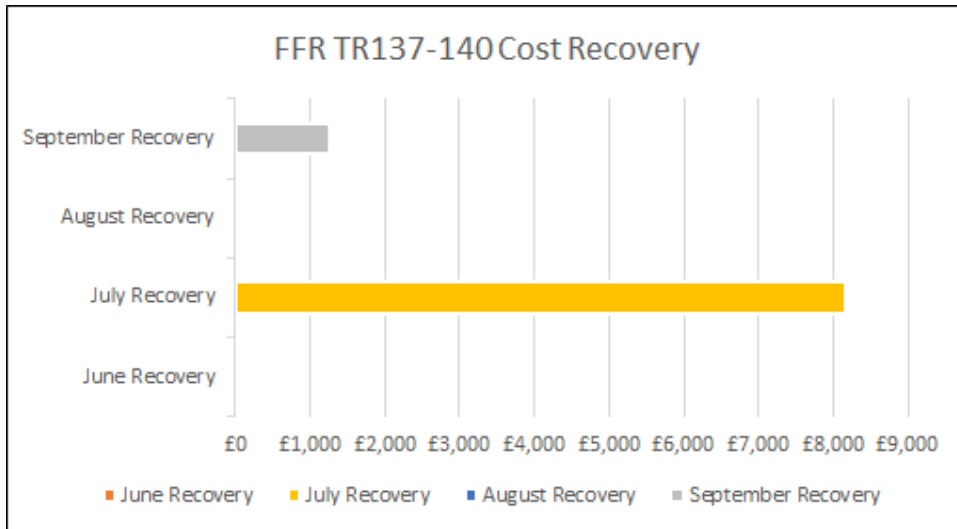


Figure 3 FFR TR137-140 Cost recovery



Enhanced Frequency Response (EFR)

Enhanced Frequency Response is a service we use to keep the system frequency close to 50Hz. EFR is a Faster acting generation and demand service than FFR and like FFR is held in readiness to manage any fluctuations in the system frequency, which could be caused by a sudden loss of generation or demand.

What we pay providers

EFR service is paid availability on a £/Hr basis to providers for the MW in which they have been contracted to provide. There is no utilisation payment for the EFR service.

Performance measures

EFR availability is automatically monitored through declared unavailability. Availability payments are reduced according to the declared unavailability during the monthly period. Providers who have encountered high periods of unavailability are contacted and if persistent then additional measures can be taken.

Performance reports for June 2021 to September 2021

In the reporting period, covering delivery from EFR Contracts during June 2021 – September 2021 the total number of units contracted to deliver EFR was 9 for this period. For this period, there was a total of circa **£7.3m paid for the availability** to deliver the EFR service. During this reporting period, there was an **average availability of 98.5%**. Over the reporting period this resulted circa **£384K of availability payments not being paid** to providers. A breakdown of these figures can be seen in the charts below.

The overall performance of the EFR over this quarter is in line with our expectations and within the contractual requirements, however we continue to monitor the performance and report back to individual providers where necessary.

Figure 1 EFR Unit Availability June - September

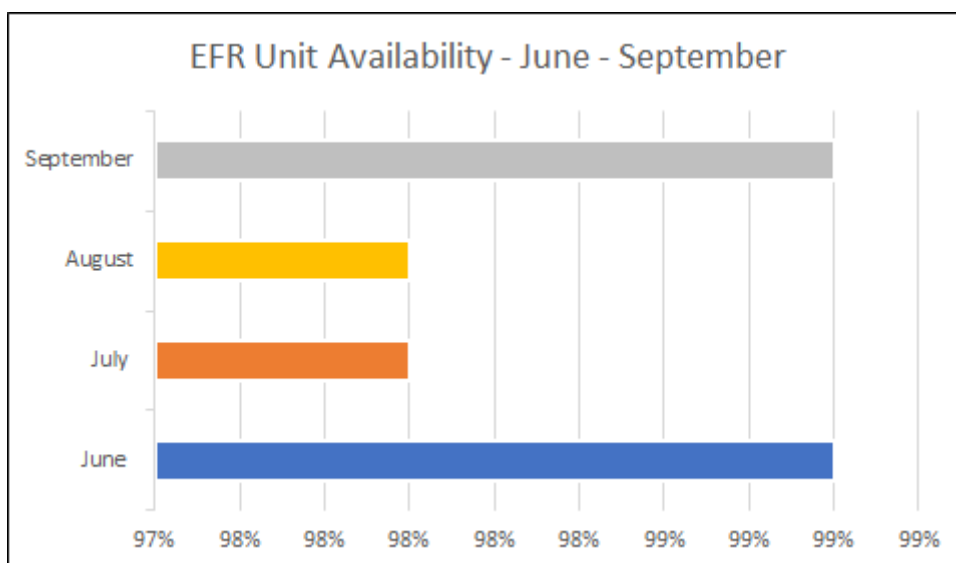


Figure 2 EFR Availability Paid £/K

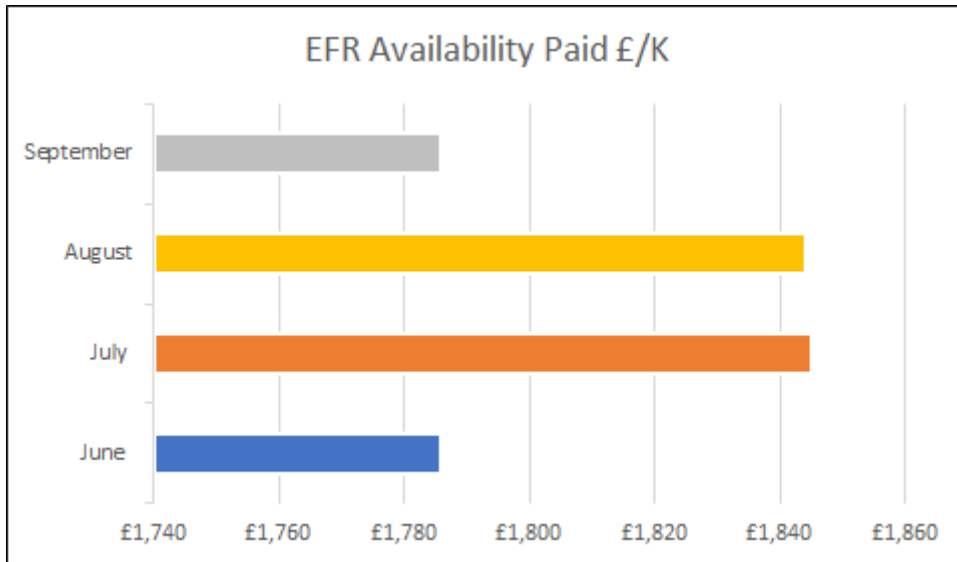
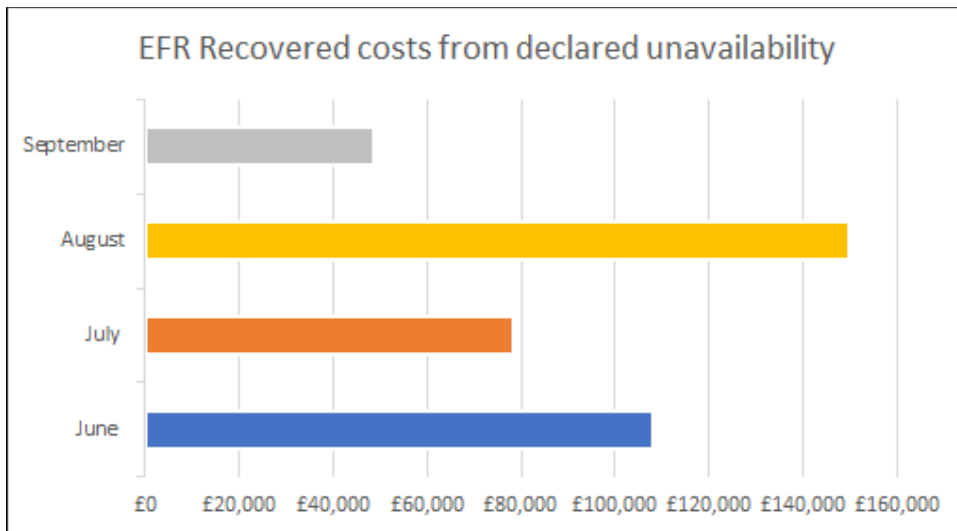


Figure 3 EFR Recovered costs from declared unavailability



Dynamic Containment (DC)

Dynamic Containment is designed to operate post-fault, i.e. for deployment after a significant frequency deviation in order to meet our need for faster-acting frequency response.

As we progress towards net-zero by 2050, we are seeing increasing amounts of renewable generation being used to meet electricity demand. However as renewable generation is more variable than traditional generation, such as coal and gas, we need faster acting frequency response products to help us maintain the frequency at 50Hz.

We aim to deliver a new suite of faster-acting frequency response services to support our operations as the electricity system is decarbonised and to make sure that these new services enable a level playing field for all technologies. Dynamic Containment is the first of our new frequency response services that had its soft launch in October 2020. We currently have circa 1000 MW of capacity registered in the service which, we anticipate this will grow as the market becomes more mature.

What we pay providers

Dynamic containment is paid via a £/MW/h availability fee for the service. As delivery is reflective of current frequency conditions parties are contracted for set periods for which they are remunerated, should the contracted volumes be delivered in accordance with the service specification.

Dynamic containment is procured on a day ahead basis and is currently one of the most valuable frequency response services.

Service Development

Over the last few months, we have been working with industry to further develop the DC service. We have run two EBGL Consultations, one was to introduce a new interim auction platform and the other was to introduce DC High.

For the interim Auction Platform, we suggested some changes to DC procurement bringing it in line with the weekly auction. These included:

- Automated assessment – Reduced operational risk from manual assessment process currently involved. By automating the assessment process, providers get real-time validation of orders and immediate feedback if orders fail validation so this can be rectified. Providers will also be able to review and modify orders until the gate closure
- PAB to PAC – we want to move from PAB to PAC auctions, the EPEX platform runs PAC auctions on the weekly auction. Pay-as-cleared (PAC) settlement mechanism promotes market efficiency and increases price transparency. Each individual provider will receive a contract for the same price at the end of the auction and bidders are encouraged to bid their marginal cost. A single clearing price creates a signal that can be used for other commercial markets and decisions
- EFA block procurement – move to daily procurement by six 4-hour EFA blocks. This was done to improve cost effectiveness by procuring different volumes in different periods depending on the system requirements.

As part of this consultation, we also suggested we would slightly move the daily auction timings, with a position this would be held at 10.00. The current weekly auction takes place at 10.30 on Friday's therefore this daily auction was planned to avoid confusion with the current timings already in place at EPEX.

For DC High we suggested a number of changes to the Performance Monitoring to allow for DC Low and DC High service delivery. These included:

- Asymmetric LF/HF - The new version of the formulae has a single ramp limited component for the combined LF/HF curves, and swaps ramp rate as the curve crosses zero
- Minimum lag time has been removed as it doesn't help with frequency measurement standards and in combination with the upper ramp rate makes providers respond to small changes in an erratic manner
- Maximum ramp time has also been removed as it does not improve stability.
- Providing a formal specification of how we handle changes in contracted MW and changes from unavailable to available
- Updating the performance monitoring technical specifications to include import and export capacity

As part of this consultation, we also suggested we would move the Auction timings, with a minded to position this would be held at 14.30. This is because Interconnectors form an important part of the frequency loss risks in the GB system due to their relatively high capacity. Dynamic Containment mitigates these loss risks by replacing the energy lost if an interconnector trips and helps manage the frequency to within 49.2Hz for low frequency and 50.5Hz for high frequency events. As a result, reduced uncertainty in the interconnector positions day-ahead enables more efficient procurement of DC. Interconnector nominations are only known after 1330 day ahead, therefore we have recommended the DC auction be run at 1430 to allow interconnector flows to be included in the DC requirements.

Performance for June 2021 to September 2021

Over the period June 2021 to September 2021 DC was activated for 1 significant event. On average, we **received performance data for 90%** of the contracted volume. Of the data received, an average of **96% of the volume was declared available** for the whole duration of the settlement periods.

The overall performance of DC over this quarter is in line with our expectations and within the contractual requirements, however we continue to monitor the performance and report back to individual providers where necessary.

Electricity System Restoration (ESR)

Electricity System Restoration (ESR) is the procedure we use to restore power in the event of a total or partial shutdown of the national electricity transmission system (NETS).

A total or partial shutdown of the NETS is an unlikely event. However, if it happens, we are obliged to make sure that there are contingency arrangements in place to ensure electricity supplies can be restored in a timely and orderly way. ESR is a procedure to recover from such a shutdown.

It is possible to provide other balancing services, if doing so does not interfere with your ability to deliver ESR.

The ESR service is procured from power stations that have the capability to start main blocks of generation onsite, without reliance on external supplies.

During an ESR event, the service requires the provider to start up its main generator(s), carry out initial energisation of sections of the NETS and distribution network, and support sufficient demand to create and control a stable 'power island'.

The ESR generator may be required to provide start up supplies to other power stations as the system restoration progresses and will eventually be required to synchronise to other power islands.

Not all generators have, or are required to have, the capability to provide ESR.

This capability is typically considered when the plant is being built, although we may procure ESR service where this capability can be retrofitted to a generator if this is an economic alternative.

What we pay providers

Availability payment - (£/settlement period) – a payment for being available to provide ESR services.

Works Contribution sums – these payments are available to new or refurbishing plant only. Where the installation or refurbishment of capital assets at a power station would return a valuable ESR service, we may choose to contribute towards the provider's costs. This may be in the form of profiled (staged) or upfront payments, all supported by valid invoices.

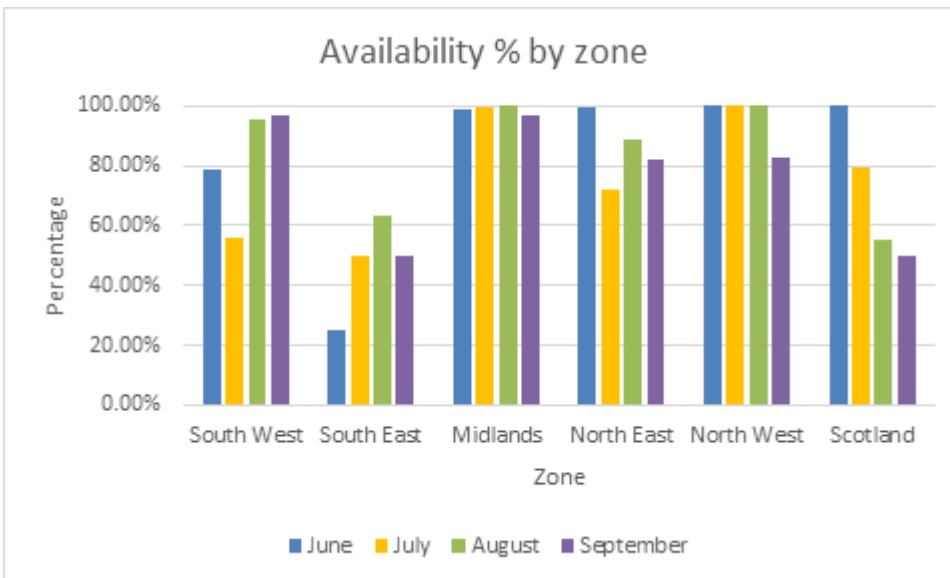
We reserve the right to request further evidence to verify that the works have been completed.

Not all payments will be applicable as some depend on the type, age and status of the generating unit.

Performance

In the reporting period covering June 21 – September 21 there were a total of 20 stations contracted to provide the ESR service, during this period the ESR service was not utilised.

Graph 1 Total availability by zone



The main reason that a station declares itself unavailable is for planned outages.

Several of our providers have been or currently on outage, usually planned over the summer period. We have been made aware of unplanned extended outages for a couple of units especially in the South East region. We always have at least one service provider available which meets our minimum summer requirement.

Table 1 availability payment statistics

Month	Sum of Payment if fully available	Actual Sum of Payment
June	£3,635,726.40	£2,753,842.97
July	£3,756,917.28	£2,653,462.33
August	£3,756,917.28	£3,074,950.45
September	£3,635,726.40	£2,749,188.59

We will be looking to add more data regarding ESR Performance Monitoring over the next few quarters, please let us know if there is any information that you would like to see.

Moving forwards

We intend to continuously build on the content of this report and to include further Balancing Services.

We welcome feedback on this report. Should you have any questions or comments, please do not hesitate to contact us at commercial.operation@nationalgrideso.com



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