ESO RIIO2 Business Plan 2 (2023-25)

May 2024-25 Incentives Report

25 June 2024

ESO

Contents

Introduction

As part of the RIIO-2 price control, we submitted a second Business Plan to Ofgem in August 2022. It sets out our proposed activities, deliverables, and investments for years three and four of RIIO-2 (2023-2025) as we respond to the rapidly changing external environment.

The ESO's Delivery Schedule sets out in more detail what the ESO will deliver, along with associated milestones and outputs, for the "Business Plan 2" period.

Ofgem, as part of its Final Determinations for the RIIO-2 price control, set out that the ESO would be subject to an evaluative incentive framework, assessing our performance in delivering the Business Plan.

The updated ESO Reporting and Incentives (ESORI) guidance sets out the process and criteria for assessing the performance of the ESO, and the reporting requirements which form part of the incentive scheme for the BP2 period. Every month, we report on a set of monthly performance measures; Performance Metrics (which have benchmarks) and Regularly Reported Evidence items (which do not have benchmarks). This report is published on the 17th working day of each month, covering the preceding month.

Every quarter, we report on a larger set of performance measures, and also provide an update on our progress against our Delivery Schedule in the RIIO-2 deliverables tracker. Our six-month and eighteen-month reports will broadly be similar to our usual quarterly report.

Our mid-scheme and end of scheme reports will be more detailed, covering all of the criteria used to assess our performance.

Following our Business Plan 2 (BP2) submission, Ofgem outlined the requirement for a Cost Monitoring Framework (CMF). The objective of the CMF is to provide visibility of our BP2 Digital, Data and Technology (DD&T) delivery progress and cost management, and the value being delivered across the BP2 DD&T investment portfolio. As per the ESORI guidance, we are required to provide quarterly reports directly to Ofgem as part of the CMF. We feel it is important to share updates with our external stakeholders and industry as part of the framework. So, we'll be including a summary of the CMF update every six months alongside our incentives reporting.

Please see our website for more information.

Summary of Notable Events

In May we successfully delivered the following notable events and publications. We provide further detail on each of these under the role sections:

- On 17 May, we held a webinar for our new Annual Balancing Cost Report 2024, which was published on the same day. The session looked back at balancing cost trends over the past six years, our latest projection of future balancing costs out to 2040, and a summary of the initiatives that are underway as part of our balancing cost strategy to minimise costs.
- On 14 May, the Spring Markets forum took place in Glasgow, with 68 industry colleagues attending in person and 90 participants streaming the event. The forum covered various topics, including the future of markets, balancing improvements, and updates on products and services. Post-event feedback was positive, with 82% of attendees stating that the event met their expectations.
- On 20 May, we initiated a call for input on our proposed Flexibility Markets Strategy, inviting stakeholders to contribute to the design of the strategy. The goal is to enable flexibility at all levels, address barriers, and provide a competitive and coordinated approach. Stakeholders have until the end of June to respond. For more information, visit our website Flexibility Markets Strategy – Call for input.
- By the end of May, a huge milestone on our journey to improve the connections process was achieved. All the two steps and BAU (business-as-usual) offers were issued. The two-step offer process was developed as part of our five-point plan to accelerate connections and enable more generation to connect to the electricity network.
- Throughout April and May, we have been hosting teach-in sessions to provide industry members with information and answer questions about the TMO4+ proposal. In our latest webinar more than 250 people joined the session, where we discussed our progress to date, next steps, our rationale for TMO4+ and what we what it to achieve, a run through of what the process would look like, and plenty of time for Q&A. These sessions provided an opportunity for industry members to ask questions and gain confidence in the TMO4+ proposal. The next webinars on TMO4+ will be held in July, and details can be found on our website and in our monthly newsletter, which you can sign up for here.

Summary of Metrics and RREs

The tables below summarise our Metrics and Regularly Reported Evidence (RRE) for May 2024.

Metric/RRE		Performance	Status
Metric 1A	**Balancing Costs**	£135m vs benchmark of £167m	●
Metric 1B	**Demand Forecasting**	Forecasting error of 610MW vs indicative benchmark of 588MW	●
Metric 1C	**Wind Generation Forecasting**	Forecasting error of 3.73% vs indicative benchmark of 3.85%	●
Metric 1D	**Short Notice Changes to Planned Outages**	0 delays or cancellations per 1000 outages due to an ESO process failure (vs benchmark of 1 to 2.5).	●
RRE 1E	**Transparency of Operational Decision Making**	90.9% of actions taken in merit order or driven by an electrical parameter	N/A
RRE 1G	**Carbon intensity of ESO actions**	3.93gCO_2/kWh of actions taken by the ESO	N/A
RRE 1I	**Security of Supply**	0 instances where frequency was more than ±0.3Hz away from 50Hz for more than 60 seconds. 0 voltage excursions	N/A
RRE 1J	**CNI Outages**	0 planned and 0 unplanned system outages	N/A
RRE 2E	**Accuracy of Forecasts for Charge Setting**	Month ahead BSUoS forecasting accuracy (absolute percentage error) of 19%	N/A

Below expectations ● **Meeting expectations** ● **Exceeding expectations** ●

We welcome feedback on our performance reporting to box.soincentives.electricity@nationalgrideso.com

Hannah Kruimer

Interim Head of Regulation

Role 1 (Control Centre operations)

ESO

Metric 1A Balancing cost management

This metric measures the ESO's outturn balancing costs (including Electricity System Restoration costs) against a balancing cost benchmark.

A new benchmark was introduced for BP2. Analysis has shown that the two most significant measurable external drivers of balancing costs are wholesale price and outturn wind generation. The new benchmark was derived using the historical relationships between those two drivers and balancing costs:

i. The benchmark was created using monthly data from the preceding 3 years.

ii. A straight-line relationship has been established between historic constraint costs, outturn wind generation and the historic wholesale day ahead price of electricity.

iii. A straight-line relationship has been established between historic non-constraint costs and the historic wholesale day ahead price of electricity.

iv. Ex-post actual data input into the equation created by the historic relationships to create the monthly benchmarks.

The formulas used are as follows (with Day Ahead Baseload being the measure of wholesale price):

Non-constraint costs = 62.25 + (Day Ahead baseload x 0.478)
Constraint costs = -33.49 + (Day Ahead baseload x 0.39) + (Outturn wind x 23.51)

Benchmark (Total) = 28.76 + (Day Ahead baseload x 0.87) + (Outturn wind x 23.51)

**Constants in the formulas above are derived from the benchmark model*

ESO Operational Transparency Forum: The ESO hosts a weekly forum that provides additional transparency on operational actions taken in previous weeks. It also gives industry the opportunity to ask questions to our National Control panel. Details of how to sign up and recordings of previous meetings are available here.

May 2024-25 performance

Figure: 2024-25 Monthly balancing cost outturn versus benchmark

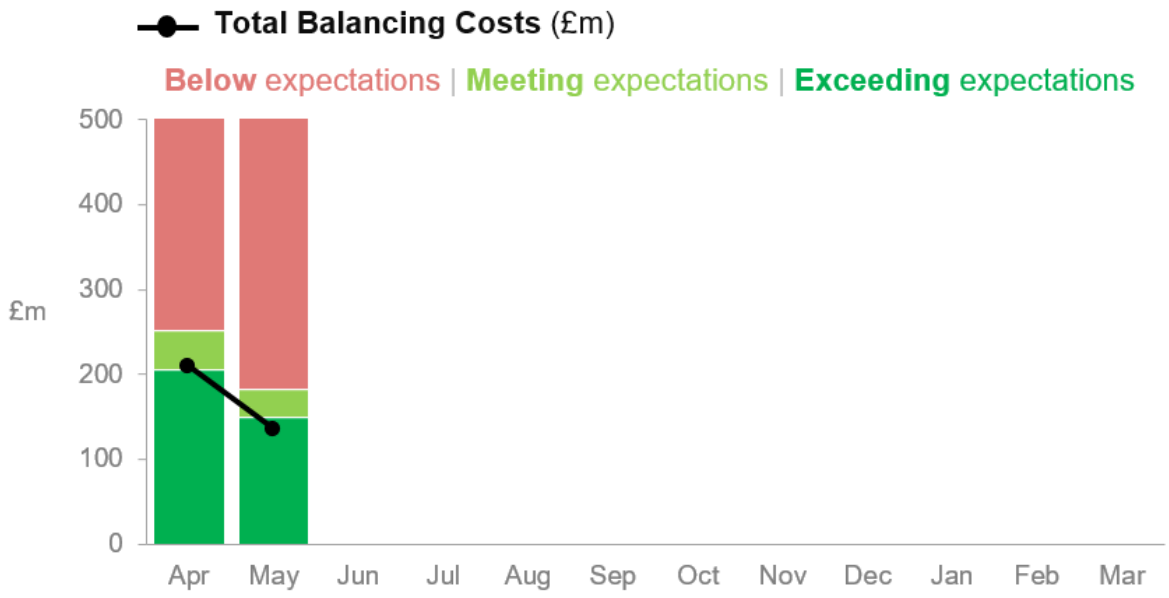


Table: 2024-25 Monthly breakdown of balancing cost benchmark and outturn

All costs in £m	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	YTD
Outturn wind (TWh)	6.3	3.2											9.5
Average Day Ahead Baseload (£/MWh)	59	72											n/a
Benchmark	228	167											395
Outturn balancing costs[1]	**209**	**135**											**344**
Status	●	●											●

Previous months' outturn balancing costs are updated every month with reconciled values. Figures are rounded to the nearest whole number, except outturn wind which is rounded to one decimal place.

Performance benchmarks:

- ● **Exceeding expectations:** 10% lower than the annual balancing cost benchmark
- ● **Meeting expectations:** within ±10% of the annual balancing cost benchmark
- ● **Below expectations:** 10% higher than the annual balancing cost benchmark

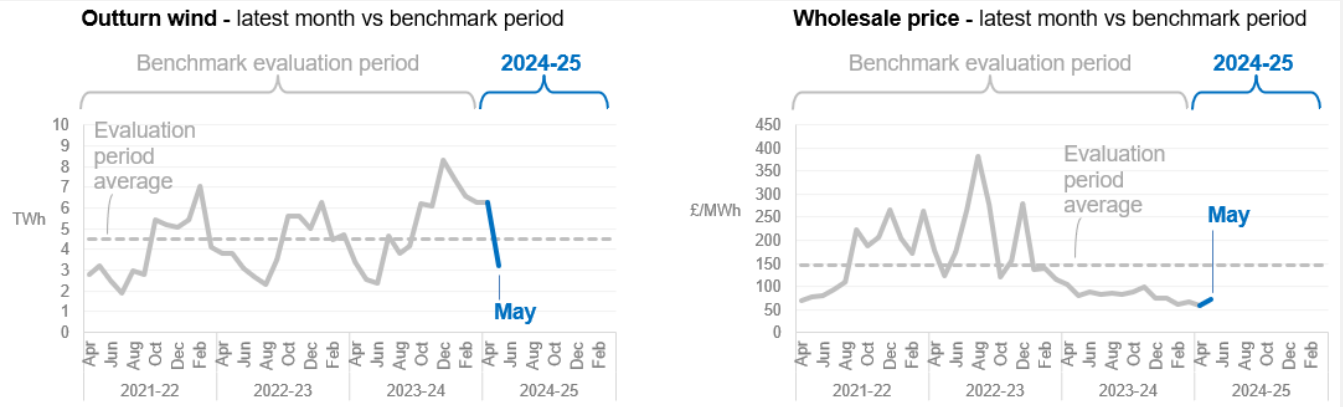
Supporting information

This month's benchmark

The May benchmark of £167m is £61m lower than April 2024 (£228m) and reflects:

- An **outturn wind** figure of 3.2TWh that is relatively low compared to the benchmark evaluation period (the last three years) and is almost half of last month's figure (April 2024).
- An increase of £13/MWh in the average monthly **wholesale price** (Day Ahead Baseload) this month compared to April 2024.

The significant reduction in wind outturn is the driver of the decrease in the overall benchmark compared to last month. The May 2024 figure is much lower than the average wind outturn (4.5TWh) across the benchmark evaluation period (the last three years).



[1] Outturn balancing costs excludes Winter Contingency costs for comparison to the benchmark as agreed with Ofgem. However, in the rest of this section we continue to include those costs for transparency and analysis purposes.

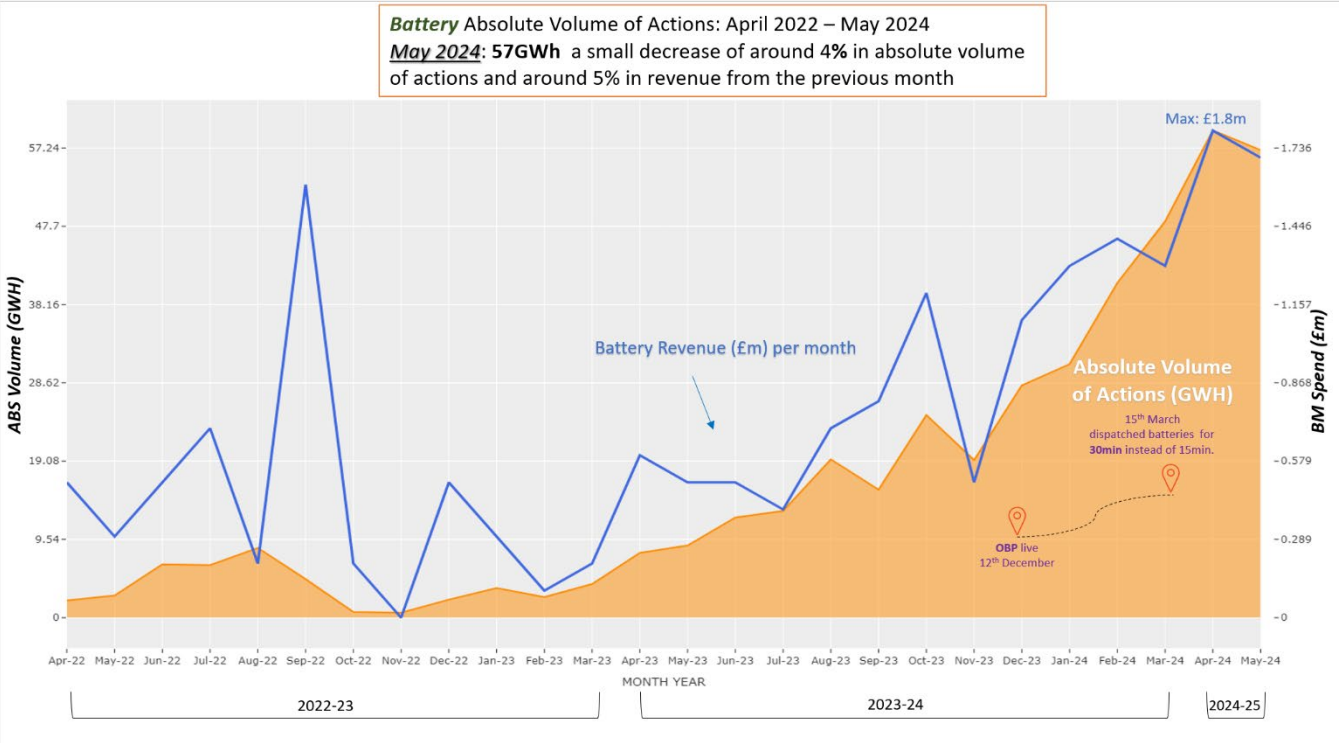
May Performance

May's total balancing costs were £135m which is £32m (~19%) below the benchmark of £167m, and therefore performance is exceeding expectations. May's overall outturn wind is approximately half of April 2024 and is the third lowest (followed by 2.4TWh in Jun 2023 and 2.6TWh in May 2023) among the rest of the months in 2023-2024. The volume weighted average price for bids has decreased by £22/MWh compared to last month and is significantly lower than the previous three months, whilst the volume weighted average offer price is in line with last month and relatively higher than the previous three months.

As discussed in December's incentives report, the first stage of our new platform to support the bulk dispatch of battery storage and small Balancing Mechanism Units, the Open Balancing Platform (OBP), went live on 12 December. Since then, our ability to dispatch a greater number of typically smaller BMUs within a settlement period has increased. This has unlocked greater capability to dispatch batteries in the Balancing Mechanism (BM).

May had the second highest battery dispatch absolute volume (57 GWh) and the second highest battery (£1.7m) revenue since April 2022 in the BM, as show on the graph below. This illustrates our commitment to maximising the flexibility of energy offered by battery storage over the last year.

Monthly Absolute Volume of actions and spend for Batteries in the Balancing Mechanism
April 2022 to May 2024



May saw a significantly lower cost than the previous three months – with lower wind generation and slightly higher wholesale price, whilst remaining in line with last May's costs. The total constraint volumes and costs have decreased by 541GWh and £71m in part due to much lower wind generation. The non-constraint costs have been in line with April 2024, with the total absolute volumes of actions for non-constraint decreasing by 110 GWh. We continue to make significant savings through optimising outages and trading activities.

The total savings from outage optimisation were £22.4m in May 2024. Whilst still a significant amount of savings, they were reduced from £31.1m in April 2024. The action that yielded the greatest value was related to an outage in Scotland which was rejected due to its associated costs. The outage was later aligned with another one in the same region over a two-week period. This delivered savings of roughly £12.6m and enabled 168 GWh in the system.

A thermal constraint in the east of England was particularly expensive to manage over May, with an estimated cost of roughly £23m. The transfer capacity has been impacted by the identification of hot joints in the boundary.

The Trading Team were able to make a total saving of £37m in May through trading actions compared to alternative BM actions, representing a 17.8% increase in savings compared to the previous month. One of the reasons for this was that, due to issues with a thermal constraint in the east of England, a high volume of energy was sold back

across the interconnectors to Europe. There was also a need to sell for downwards regulation at negative prices due to a combination of issues with the constraint, strong renewable generation, and periods of lower demand. With strong generation on the continent also, there were periods of selling energy at negative prices, often due to the constraint being priced against Emergency Instruction. Finally, higher wind generation led to lower voltage trading as units were self-dispatching, reducing the need to bring them on to help manage the system. The day with the greatest spends on Trades was 12 May at a cost of £3.3 million, of which over half was driven by trades to manage the aforementioned constraint.

Work is still ongoing to quantify the value of savings from the Operational Balancing Platform, but as can be seen from the graph above, more batteries have been dispatched in the BM every month since its introduction.

Breakdown of costs vs previous month

Balancing Costs variance (£m): May 2024 vs April 2024

		(a) Apr-24	(b) May-24	(b) - (a) Variance	decrease ◄► increase Variance chart
Non-Constraint Costs	Energy Imbalance	-0.1	0.3	0.4	
	Operating Reserve	12.2	9.0	(3.2)	
	STOR	3.1	3.8	0.7	
	Negative Reserve	0.2	0.4	0.2	
	Fast Reserve	14.2	15.9	1.6	
	Response	15.8	13.9	(2.0)	
	Other Reserve	2.1	2.9	0.8	
	Reactive	11.0	12.5	1.5	
	Restoration	3.5	2.6	(0.9)	
	Winter Contingency	0.0	0.0	0.0	
	Minor Components	4.3	4.5	0.2	
Constraint Costs	Constraints - E&W	47.1	40.4	(6.7)	
	Constraints - Cheviot	0.4	0.3	(0.1)	
	Constraints - Scotland	68.4	16.0	(52.3)	
	Constraints - Ancillary	0.2	0.6	0.5	
	ROCOF	0.8	2.3	1.5	
	Constraints Sterilised HR	23.6	9.9	(13.7)	
Totals	Non-Constraint Costs - TOTAL	66.3	65.7	(0.7)	
	Constraint Costs - TOTAL	140.4	69.6	(70.9)	
	Total Balancing Costs	**206.7**	**135.2**	**(71.5)**	

As shown in the total rows from the table above, constraint costs decreased by £70.9m and non-constraint costs decreased by £0.7m, resulting in an overall decrease of £71.5m compared to April 2024.

Constraint costs: The main drivers of the variances this month are detailed below:

- **Constraint-Scotland & Cheviot***: The constraint costs in Scotland and Cheviot decreased by £52.4m in part due to significant lower curtailed volume of actions by 580 GWh than April 2024.
- **Constraint-England & Wales***: The constraints cost in England & Wales decreased by £6.7m with a decrease in volume by 575 GWh. This is mainly due to a decrease in the import constraint actions by 229 GWh for voltage control and to support system inertia.
- **Constraints Sterilised Headroom***: £13.7m decrease due to a decrease of 582GWh total volume of replacement energy.

*41 fewer planned outages compared to last month and 125 fewer planned outages than May 2023. This month also saw a slight increase in the volume weighted average price for offers following a slightly higher electricity price.

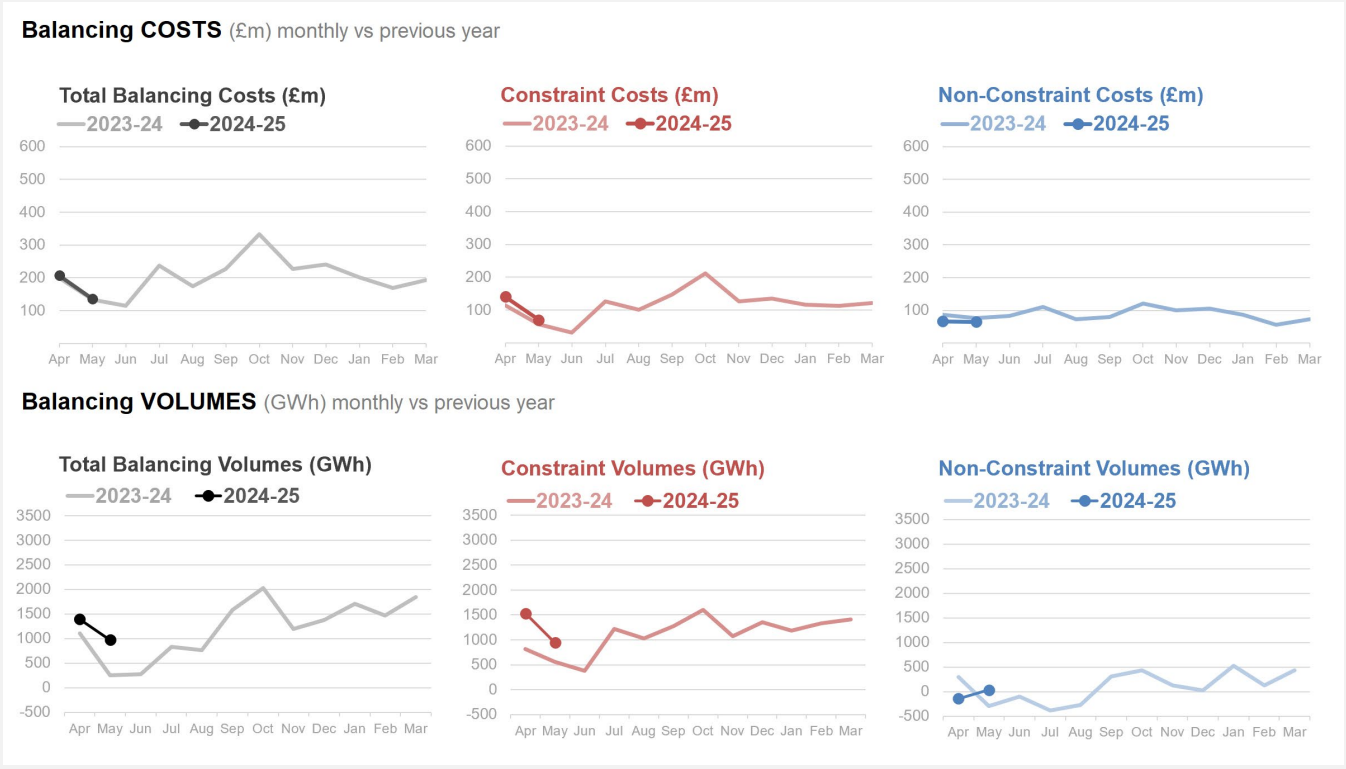
Non-constraint costs*: The main driver of the variance this month is:

- **Energy Imbalance**: slightly higher cost by £0.4m than April 2024, despite a reduction of 109 GWh in the absolute volume of actions.

- **Operating Reserve**: £3.2m lower in cost due to a decrease of 103 GWh reserve required to secure the system.
- **Fast Reserve**: £3.9m increase despite a minor decrease of 2.2 GWh in volume.
- **Response**: £3.6m decrease due to a decrease of 8.2 GWh in the absolute volume of actions, in part due to less negative bids for response.
- **Reactive**: £6.8m decrease despite a minor increase in the volume average price from £3.4/MVAr to £3.5/MVAr compared to last month.

*Excluding the volume of actions from ancillary services as not yet quantified at the time of writing this report.

Constraint vs non-constraint costs and volumes



Please note that a portion of the **Minor Components spend** contributing to non-constraint cost and volume is Operating Reserve cost and volume. The figures will be revised once the data issue is resolved.

In summary, the total constraint costs and non-constraint costs are featured below.

Constraint costs	
Compared with the same month of the previous year:	We observe an increase of £12.6m in constraint costs compared to May 2023, due to a slight increase of 56 GWh in volume of constraint actions.
Compared with last month:	Constraint costs decreased by £71m than in April 2024, due to 541GWh less volume of constraint actions, because of less wind generation.

Non-constraint costs**	
Compared with the same month of the previous year:	Non-Constraint costs were £10.5m lower than in May 2023 due to: • Slightly lower average wholesale prices* • The total volume has been raised from –304 GWh last May to 31 GWh this May, resulting in an increase of 335 GWh in net volume of actions and a decrease of 273 GWh in absolute volume of actions.

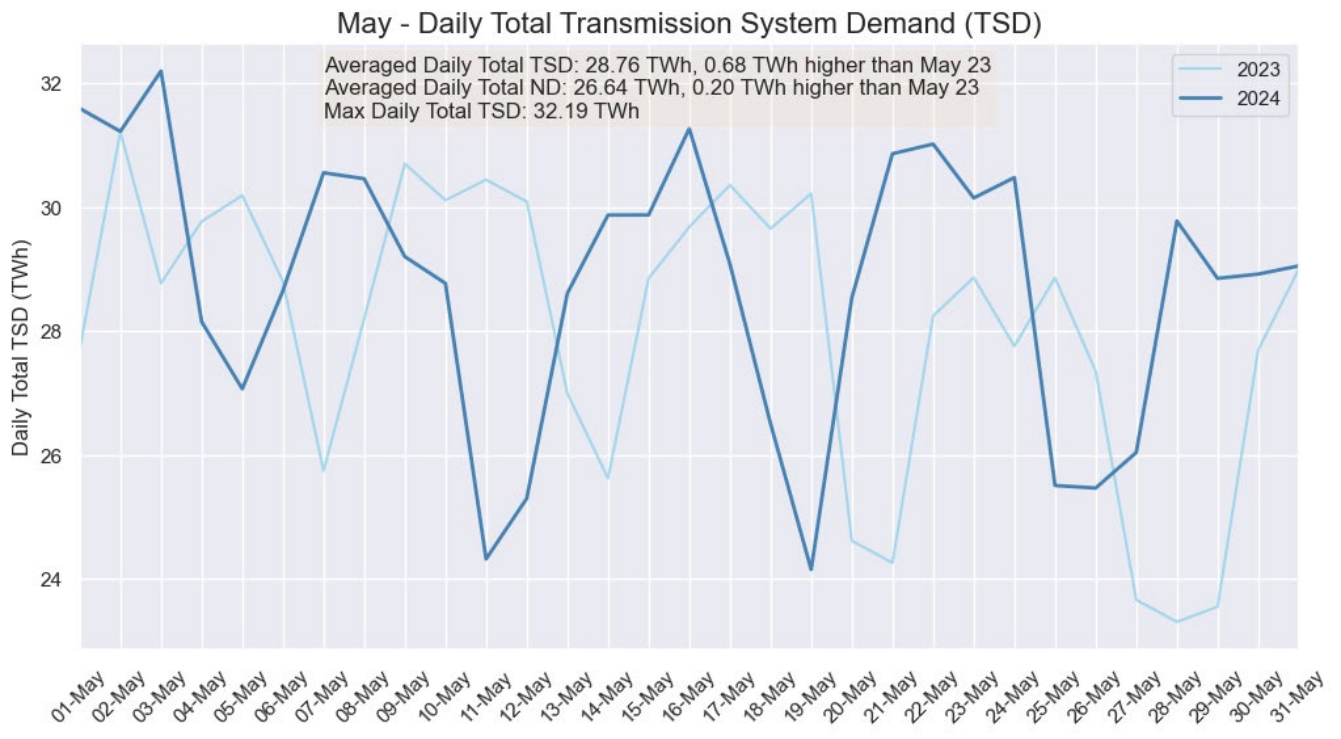
Compared with last month:	Non-Constraint costs were £0.7m lower than April 2024, the total volume has been raised to positive as 31 GWh in May, higher than –140 GWh in April as shown in the chart above, resulting in an increase of 171 GWh in net volume of actions and a decrease of 110 GWh in absolute volume of actions.

* Average wholesale price for May 24: £72/MWh compared to £81/MWh for May 23.

** The non-constraint category consists of several subcategories including energy imbalance, response, reserve, and restoration

May daily Transmission System Demand (TSD*)

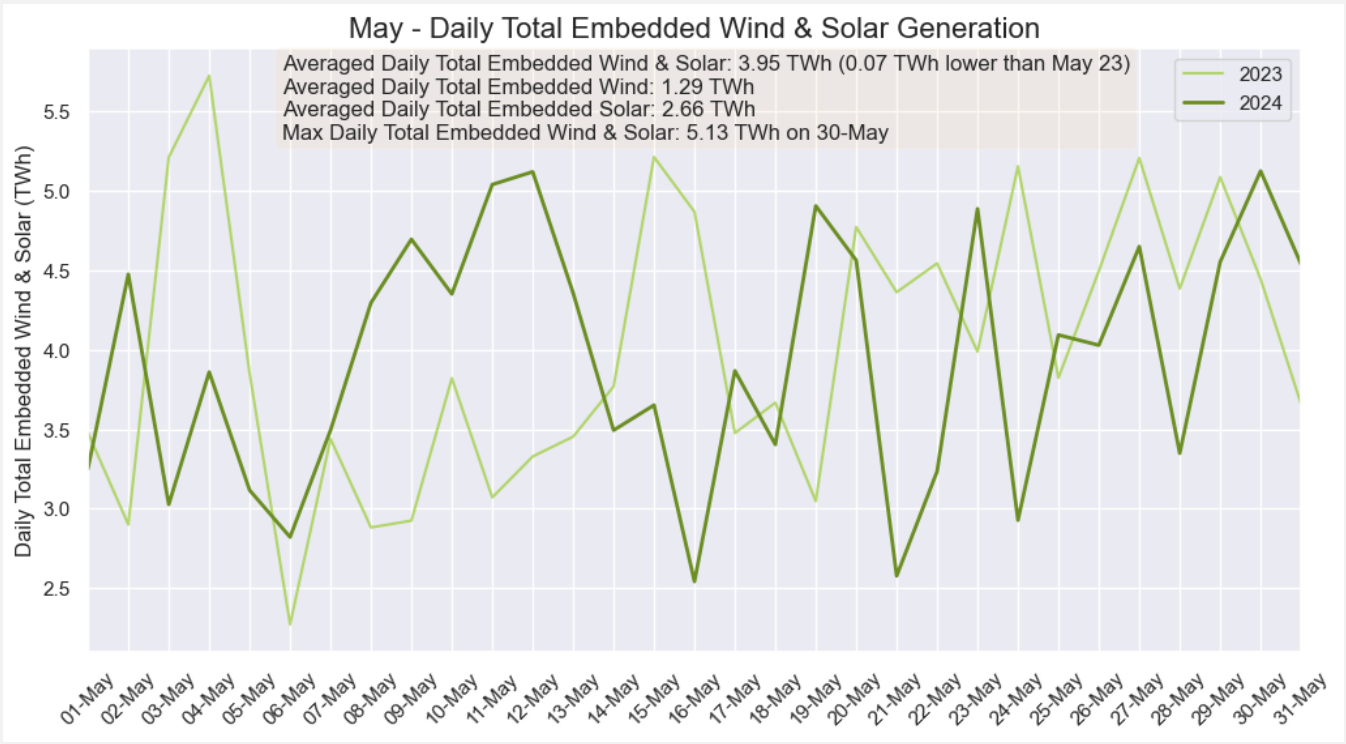
- Total Monthly National Demand (not shown below) was 6.2TWh higher than May 2023.
- **Total Monthly Transmission System Demand*** was 21TWh higher than May 2023.



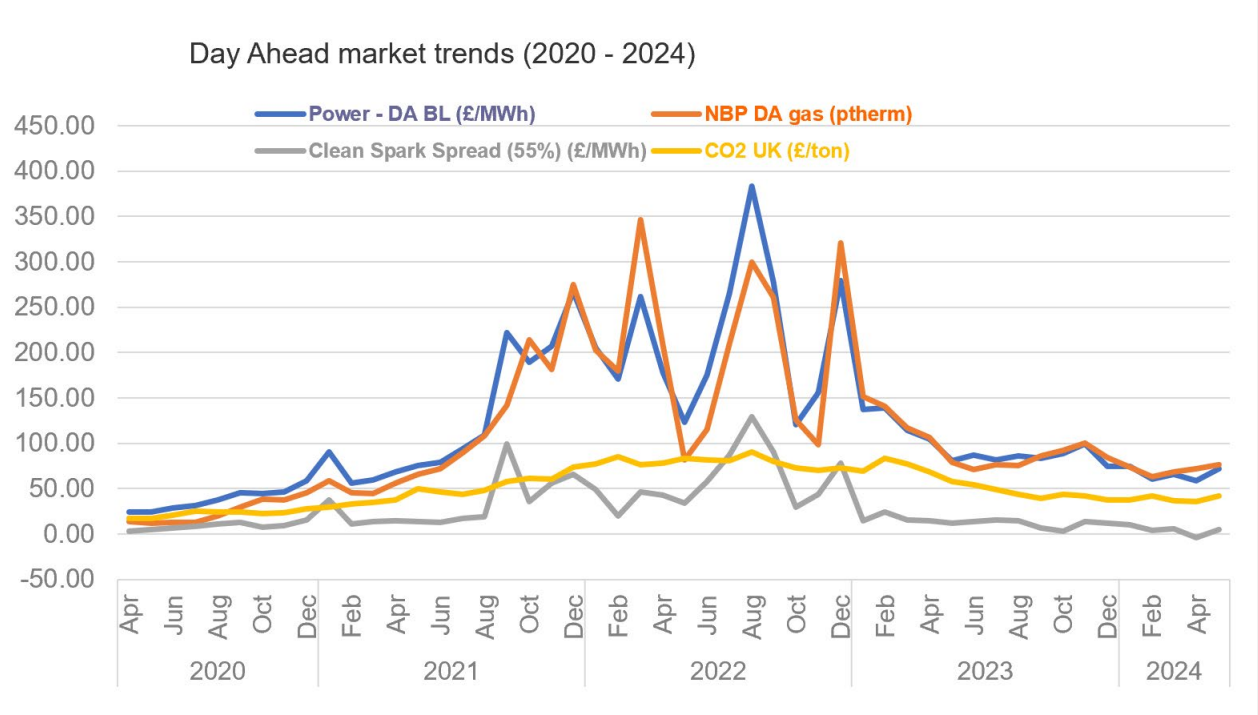
* Transmission System Demand is equal to the National Demand (ND) plus the additional generation required to meet station load, pump storage pumping and interconnector exports. Transmission System Demand is calculated using National Grid ESO operational metering. Note that the Transmission System Demand includes an estimate of station load of 500MW in BST (British Summer Time) and 600MW in GMT (Greenwich Mean Time).

May daily Embedded Wind and Solar Generation

- **Monthly Total Embedded wind & solar generation** was 2.17TWh lower than in May 2023.
- The maximum daily total embedded wind & solar generation occurred on 30 May 2024 (5.13TWh).



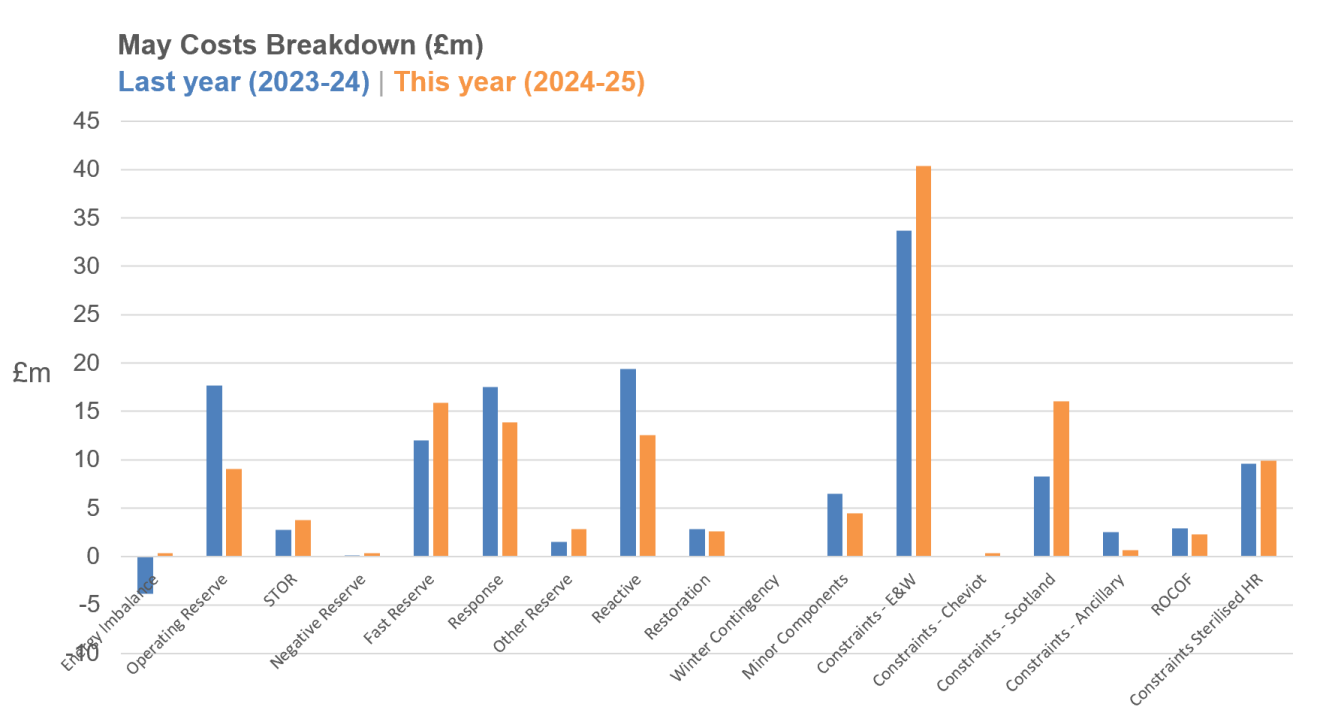
Price Trends in energy markets



DA BL: Day Ahead Baseload **NBP DA:** National Balancing Point Day Ahead

Power and gas had an upward trajectory compared to last month with CO2 and Clean Spark Spread steadily picking up. All trends remain lower compared to the previous year.

Balancing costs increases/decreases compared with the same period from last year



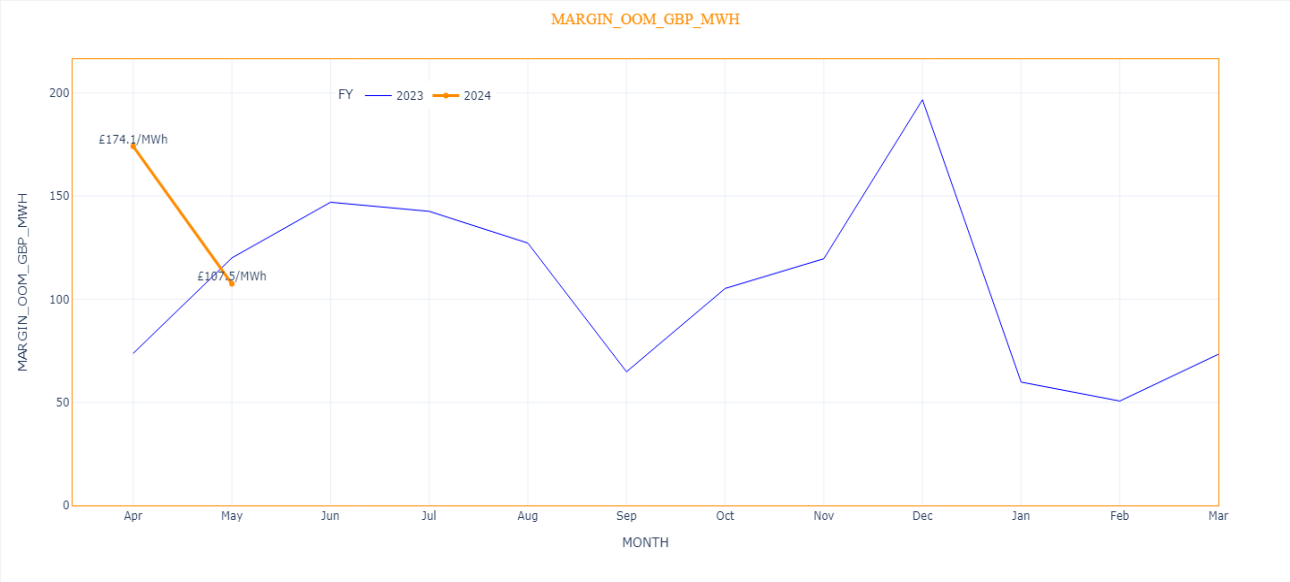
Comparing the non-constraint costs of May 2024 with those of May 2023, most categories showed a small deviation:

- **Reactive:** £6.8m decrease, due to the decrease in the weighted average price, from £5.2/MVAR to £3.5/MVAR.
- **Operating Reserve** £8.6m decrease despite a minor increase of 50 GWh of reserve required to balance the system. The lower cost this year is in part due to the slightly lower energy related prices compared to May 2023.
- **Response**: £3.6m decrease due to 36 GWh less volume of actions taken.
- **Energy Imbalance:** £4.2 increase despite 93 GWh less absolute volume of actions taken to balance the system.

Comparing the constraint costs of May 2024 with those of May 2023, most categories had small deviations, except:

- **Constraints – Scotland**: £7.8m increase due to 78 GWh more absolute volume of actions.
- **Constraints – E&W**: £6.7m increase despite taking 149 GWh less volume of actions.

Drivers for unexpected cost increases/decreases



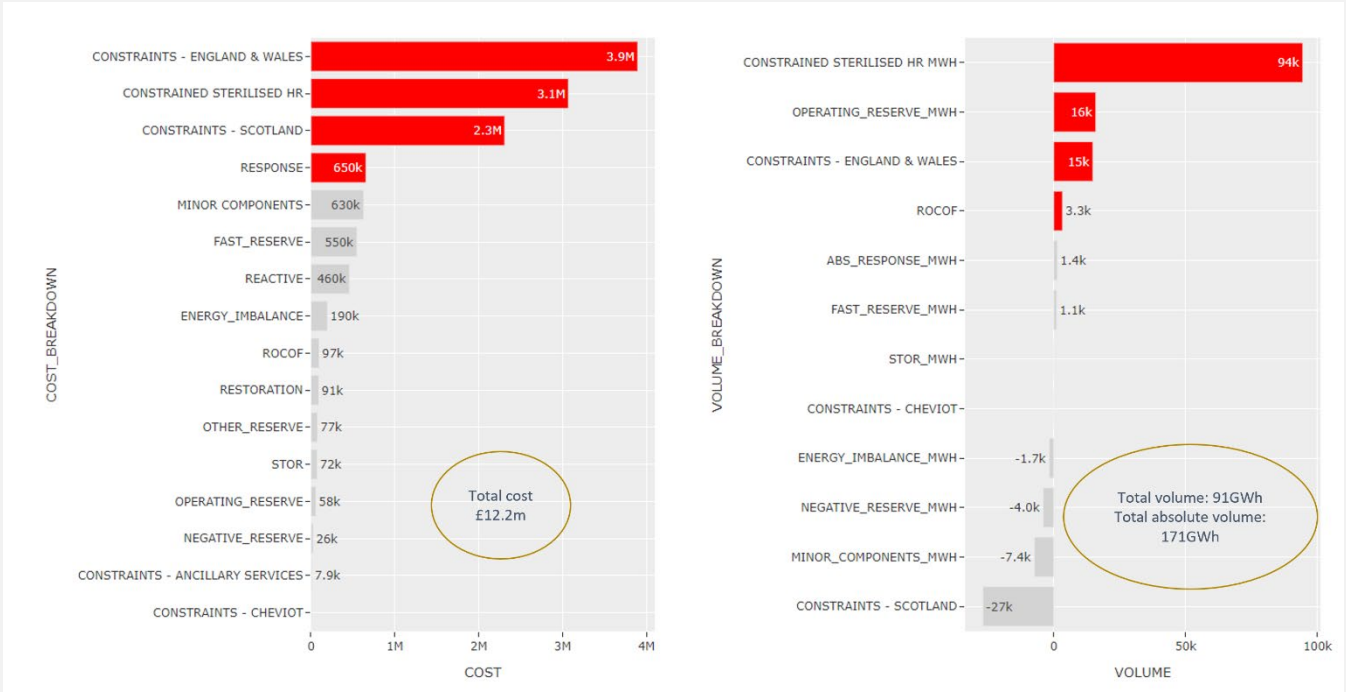
Margin prices (the amount paid for one MWh) have been returning to a comparable position as £107.5/MWh in May as to May 2023, with a sharp decrease compared to April 2024.

Daily Costs Trends

May's balancing costs were £135m which is £74m lower than the previous month. One day had a daily total cost over £10m, resulting in a decrease of the average monthly daily cost by £1.8m (from £6.2m to £4.4m).

The lowest total daily cost of £1.9m was observed on 10 May, whilst the highest total cost was observed on 12 May when the total spend was £12.2m. Constraints in England & Wales were the major cost component driven by export constraint. No individual action was expensive, but high volumes of wind curtailment also contributed to the high total balancing costs for the day.

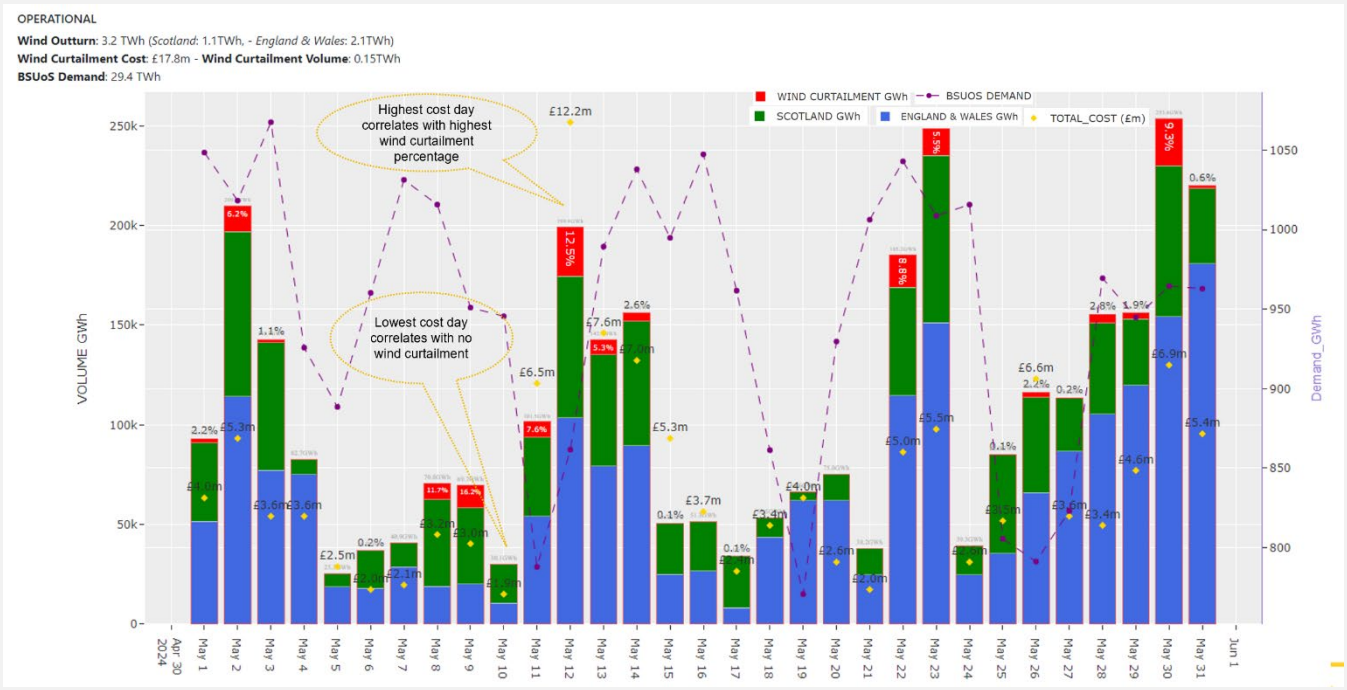
Cost breakdown for 12 May 2024



May Daily Wind Outturn – Wind Curtailment, Daily Costs and BSUoS Demand

The chart below serves the purpose of supporting the transparency and the descriptions above. It is the daily "tour" of wind performance (wind generation: **blue** & **green** bars, and wind curtailment: **red** bars, demand resolved by the balancing mechanism and trades – **purple** dotted line and daily cost – **orange** diamonds).

With this graph we can trace, for example, the relationship that may exist in how wind performance and low demand affect the cost of each day.



High-cost days and balancing cost trends are discussed every week at the Operational Transparency Forum to give ongoing visibility of the operability challenges and the associated ESO control room action.

Metric 1B Demand forecasting accuracy

This metric measures the average absolute MW error between day-ahead forecast demand (taken from Balancing Mechanism Report Service (BMRS[2]) as the National Demand Forecast published between 09:00 and 10:00) and outturn demand (taken from BMRS as the Initial National Demand Outturn) for each half hour period. The benchmarks are drawn from analysis of historical errors for the five years preceding the performance year.

A 5% improvement in historical 5-year average performance is required to exceed expectations, whilst coming within ±5% of that value is required to meet expectations.

In settlement periods where the Demand Flexibility Service (DFS) is instructed by the ESO, this will be retrospectively accounted for in the data used to calculate performance.

Performance will be assessed against the annual benchmark, but monthly benchmarks are also provided as a guide. The ESO will report against these each month to provide transparency of its performance through the year.

May 2024-25 performance

Indicative benchmark figures for 2024-25: Please note that the benchmark figures used below are indicative only. We have calculated these in line with the method specified by Ofgem, but we have not yet received the confirmed figures from Ofgem. We will update previous performance figures in subsequent reports once the benchmarks have been finalised.

Figure: 2024-25 Monthly absolute MW error vs Indicative Benchmark

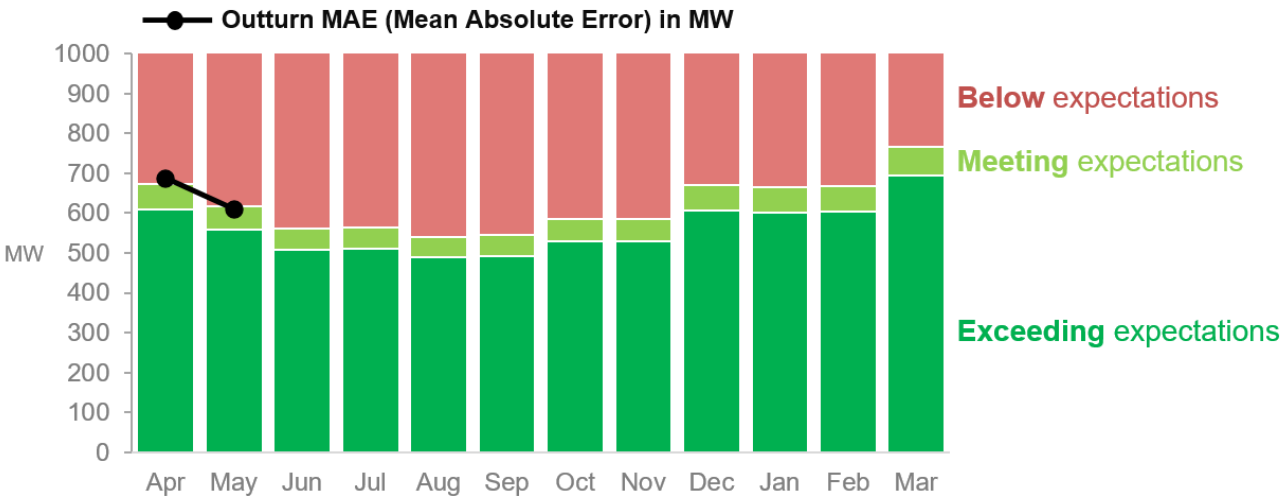


Table: 2024-25 Monthly absolute MW error vs Indicative Benchmark

	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Indicative benchmark (MW)	642	588	534	538	515	519	558	557	639	632	636	730
Absolute error (MW)	**687**	**610**										
Status	●	●										

[2] Demand | BMRS (bmreports.com)

Performance benchmarks:

- **Exceeding expectations:** >5% lower than 95% of average value for previous 5 years
- **Meeting expectations:** ±5% window around 95% of average value for previous 5 years
- **Below expectations:** >5% higher than 95% of average value for previous 5 years

Supporting information

In May 2024, the mean absolute error (MAE) of our day ahead demand forecast was 610 MW compared to the indicative benchmark of 588 MW. As the error was within 5% of the benchmark value, we are 'meeting expectations' for May.

The UK experienced its warmest May on record and the weather was largely unsettled throughout the entire month. Sunshine hours were slightly below average. Two Bank Holiday weekends and school half-term brought their usual challenges.

The largest demand errors occurred on 9 and 23 May and were mainly attributed to solar. The peak solar error was 3.5GW, recorded on 23 May.

The distribution of settlement periods by error size is summarised in the table below:

Error greater than	Number of SPs	% out of the SPs in the month (1488)
1000 MW	296	20%
1500 MW	144	10%
2000 MW	58	4%
2500 MW	19	1%
3000 MW	8	1%

The days with largest MAE were 8th, 9th and 23rd May.

Missed / late publications

There were 0 occasions of missed or late publications in May.

Triads

Triads run between November and February (inclusive) each year and therefore did not affect this month's performance.

Metric 1C Wind forecasting accuracy

This metric measures the average absolute percentage error (APE) between day-ahead forecast (between 09:00 and 10:00, as published on ESO Data Portal here) and outturn wind generation (settlement metering as calculated by Elexon) for each half hour period as a percentage of capacity for BM wind units only. The data will only be taken for sites that did not have a bid-offer acceptance (BOA) during the relevant settlement period.

We will publish this data on our Data Portal for transparency purposes. The benchmarks are drawn from analysis of historical errors of the five years preceding the performance year. 5% improvement in performance expected on the 5-year historical average, with range of ±5% used to set benchmark for meeting expectations.

May 2024-25 performance

Indicative benchmark figures for 2024-25: Please note that the benchmark figures used below are indicative only. We have calculated these in line with the method specified by Ofgem, but we have not yet received the confirmed figures from Ofgem. We will update previous performance figures in subsequent reports once the benchmarks have been finalised.

Figure: 2024-25 BMU Wind Generation Forecast APE vs Indicative Benchmark

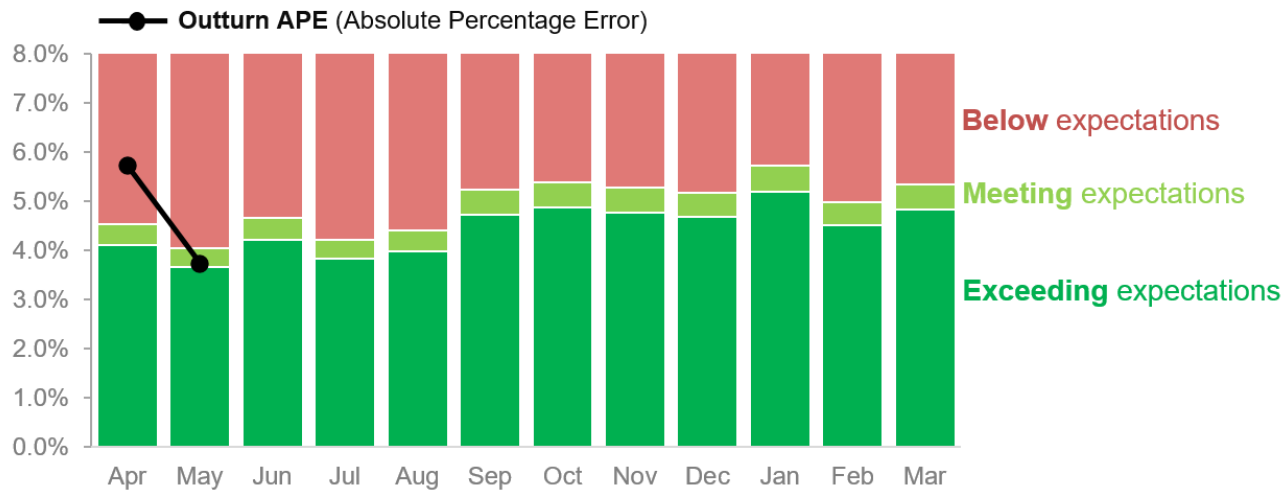


Table: 2024-25 BMU Wind Generation Forecast APE vs Indicative Benchmarks

	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Indicative benchmark (%)	4.32	3.85	4.43	4.02	4.19	4.98	5.13	5.02	4.93	5.46	4.74	5.09
APE (%)	**5.73**	**3.73**										
Status	●	●										

Performance benchmarks:

- **Exceeding expectations:** < 5% lower than 95% of average value for previous 5 years
- **Meeting expectations:** ±5% window around 95% of average value for previous 5 years
- **Below expectations:** > 5% higher than 95% of average value for previous 5 years.

Alternative view of BMU Wind Generation Forecast APE

We have agreed with Ofgem that for 2024-25, alongside the above monthly figures we will include a post-report updated APE% view which aims to exclude some of the factors that are outside of our control. This view excludes sites that have redeclared to zero, and incorporates Initial Settlement Runs (+16 Working Days). Both the benchmark and APE% reported below use this approach. A performance status is shown, but please note that this is for information only and is not part of the 2024-25 incentives assessment.

Please note that this new approach has also been proposed in the Consultation on Associated Documents to the proposed NESO licences – regulatory framework documents, which will come into effect when ESO transitions into NESO.

May 2024

This month we have populated the alternative view of actuals in the table below. The alternative view of the corresponding benchmark is not yet ready to share, but we plan to update this in subsequent reports.

	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Indicative benchmark (%)	#	#	#	#	#	#	#	#	#	#	#	#
APE (%)	4.61	3.72										
Status	●	●										

Supporting information

In May 2024, the mean absolute percentage error (APE) of our day ahead Wind forecast was 3.73% compared to the indicative benchmark of 3.85%. Performance is within 5% of the benchmark and therefore meeting expectations.

The post-report APE is currently 3.72%, once downward redeclarations have been removed and the latest Initial Settlement Runs completed. Note – the post-report APEs are dynamic and can vary, until such time the entire Settlement process for that month is concluded.

We suffered sustained periods of over-forecasting and this peaked on 12 May, with an error of 2.2GW. There was no Contracts for Difference (CfD) market activity this month.

The tactical manual entry of outage data continues to be a major source of forecast error, of which the process is largely dictated by limitations of our legacy system.

Offshore forecasts, particularly in the North Sea, remain challenging. The quality of the weather data continues to be variable in this region and contributes to most of the metric error.

The highest wind error (under-forecast) was 2.5GW on 22 May.

Withdrawal of wind units

No units withdrew availability between time of forecast and time of metering.

Missed / late publications

In May there were no occasions of late or missing publications of the forecast.

Metric 1D Short Notice Changes to Planned Outages

This metric measures the number of short notice outages delayed by > 1 hour or cancelled, per 1000 outages, due to ESO process failure.

May 2024-25 performance

Figure: 2024-25 Number of outages delayed by > 1 hour, or cancelled, per 1000 outages

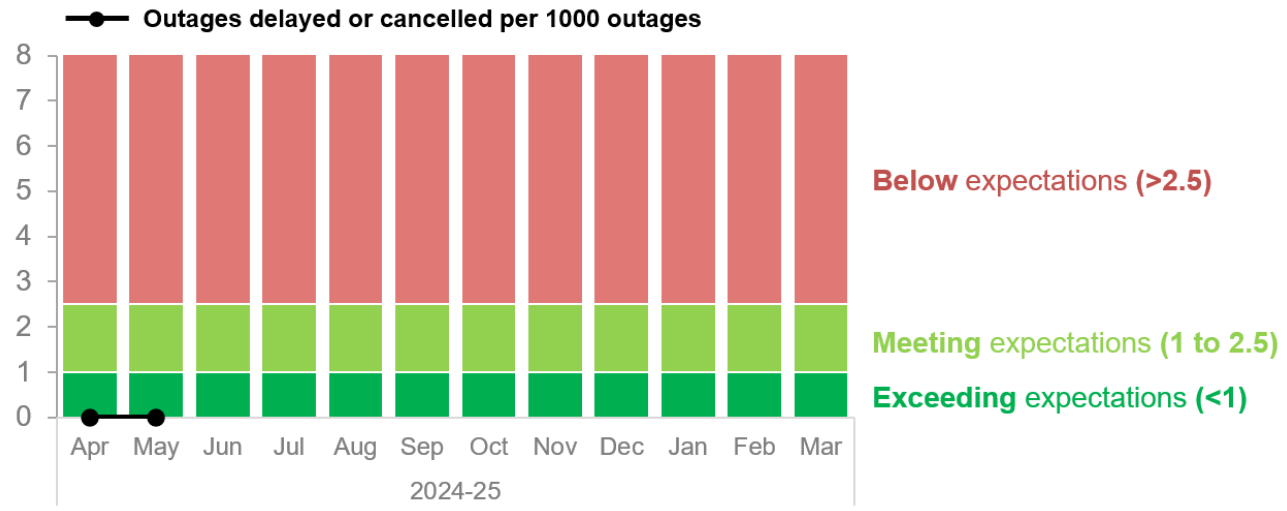


Table: Number of outages delayed by > 1 hour, or cancelled, per 1000 outages

	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	YTD
Number of outages	673	614											1287
Outages delayed/cancelled due to ESO process failure	0	0											0
Number of outages delayed or cancelled per 1000 outages	0	0											0
Status	●	●											●

Performance benchmarks:

- ● **Exceeding expectations:** Fewer than 1 outage delayed or cancelled per 1000 outages
- ● **Meeting expectations:** 1-2.5 outages delayed or cancelled per 1000 outages
- ● **Below expectations:** More than 2.5 outages delayed or cancelled per 1000 outages

Supporting information

Data Update: The April event previously reported has been discarded as a ESO process failure following a deeper investigation into the sequence of events that identified the DNO as the root cause of the outage not proceeding. An Operational Learning Note has been written to capture learnings from the ESO side and this has been distributed across the planning department.

For May, the ESO has successfully released 614 outages. There was 0 delays or cancellations due to an ESO process failure. The number of stoppages or delays per 1000 outages for May was also 0, which is within the ‘Exceeds Expectations’ target of less than 1 delays or cancellations per 1000 outages.

The number of outages released in May 2023 was 739 and has decreased in May 2024 to 614, this is due to a reduced number of outage requests received from the TOs/DNOs for this period. We are continuing to liaise with the TOs and DNOs to effectively facilitate system access through weekly or monthly liaison meetings to maximize system access.

RRE 1E Transparency of operational decision making

This Regularly Reported Evidence (RRE) shows the percentage of balancing actions taken outside of the merit order in the Balancing Mechanism each month.

We publish the Dispatch Transparency dataset on our Data Portal every week on a Wednesday. This dataset details all the actions taken in the Balancing Mechanism (BM) for the previous week (Monday to Sunday). Categories and reason groups are allocated to each action to provide additional insight into why actions have been taken and ultimately derive the percentage of balancing actions taken outside of merit order in the BM.

Categories are applied to all actions where these are taken in merit order (Merit) or an electrical parameter drives that requirement. Reason groups are identified for any remaining actions where applicable. Additional information on these categories and reason groups can be found on our Data Portal in the Dispatch Transparency Methodology.

Categories include: System, Geometry, Loss Risk, Unit Commitment, Response, Merit

Reason groups include: Frequency, Flexibility, Incomplete, Zonal Management

The aim of this evidence is to highlight the efficient dispatch currently taking place within the BM while providing significant insight as to why actions are taken in the BM. Understanding the reasons behind actions being taken out of pure economic order allows us to focus our development and improvement work to ensure we are always making the best decisions and communicating this effectively to our customers and stakeholders.

We have been publishing the Dispatch Transparency dataset since March 2021, and it has sparked many conversations amongst market participants. As we continue to publish this dataset for BP2 we will also be providing additional narrative to help build trust by explaining:

- actions we are taking to increase understanding of the ESO's operational decision making
- insight into the reasons why actions are taken outside of merit order in the Balancing Mechanism
- activity planned and taken by the ESO to address and reduce the need for actions to be taken out of merit order.

May 2024-25 performance

Figure: 2024-25 Percentage of balancing actions taken in merit order to meet requirements in the Balancing Mechanism

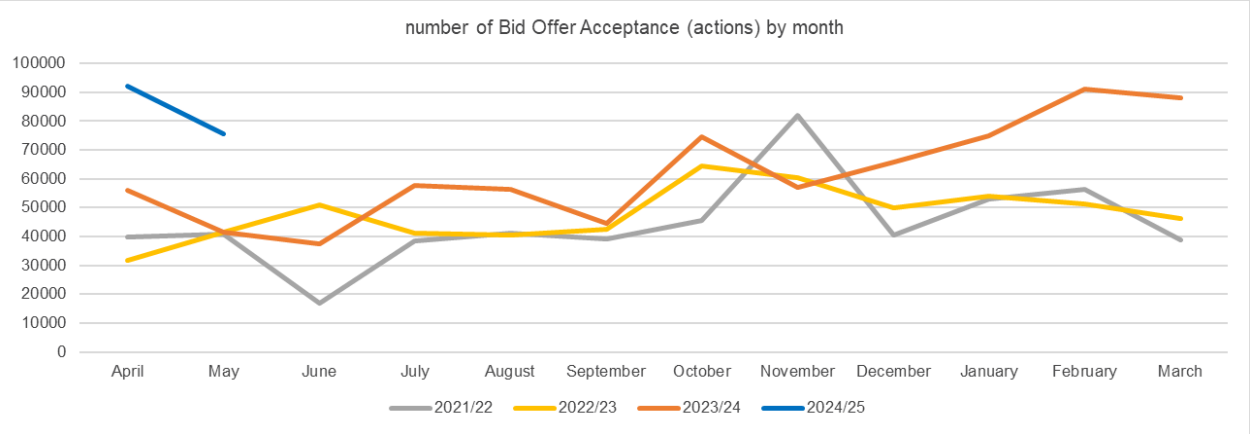
Table: Percentage of balancing actions taken outside of merit order in the BM

	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Percentage of actions taken in merit order, or out of merit order due to electrical parameter (category applied)	90.9%	90.9%										
Percentage of actions that have reason groups allocated (category applied, or reason group applied)	99.4%	99.5%										
Percentage of actions with no category applied or reason group identified	0.6%	0.5%										

Supporting information

May performance

This month 90.9% of actions were either taken in merit order or taken out of merit order due to an electrical parameter. 8.6% of actions were allocated to reason groups for the purposes of our analysis, and the percentage of actions with no category applied or reason group identified remained in line with previous months. During April, there were 75,444 BOA (Bid Offer Acceptances) and of these, only 403 remain with no category or reason group identified, which is 0.5% of the total.



Other activities

We continue to closely support LCP for the second phase of their independent analysis, which is due to be delivered in June 2024.

RRE 1G Carbon intensity of ESO actions

This Regularly Reported Evidence (RRE) measures the difference between the carbon intensity of the combined Final Physical Notification (FPN) of machines in the Balancing Mechanism (BM) and the equivalent profile with balancing actions applied.

This takes account of both transmission and distribution connected generation and each fuel type has a Carbon Intensity in gCO2/kWh associated with it. For full details of the methodology please refer to the Carbon Intensity Balancing Actions Methodology document. The monthly data can also be accessed on the Data Portal here. Note that the generation mix measured by RRE 1F and RRE 1G differs.

It is often the case that balancing actions taken by the ESO for operability reasons increase the carbon intensity of the generation mix. More information about the ESO's operability challenges is provided in the Operability Strategy Report.

May 2024-25 performance

Figure: 2024-25 Average monthly gCO2/kWh of actions taken by the ESO (vs 2023-24)

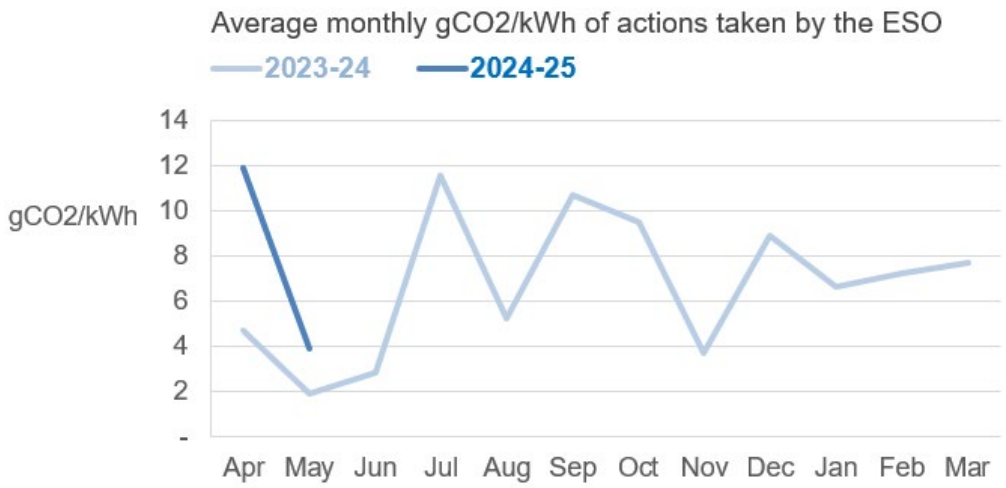


Table: Average monthly gCO2/kWh of actions taken by the ESO

	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Carbon intensity (gCO2/kWh)	11.87	3.93										

Supporting information

In May 2024 the average carbon intensity of balancing actions was 3.93gCO2/kWh. This is 7.94gCO2/kWh lower than last month and 2.02gCO2/kWh higher than the 1.91gCO2/kWh reported for May 2023

The majority of carbon intensity increase from ESO actions was seen between 11-13 May and on 26 May.

The largest increase to carbon intensity was on 11 May at 1030 (50.89 gCO2/kWh). This was due to a hot joint leading to the downrating of local circuits. This reduced the Estuary export (ESTEX) constraint considerably, which required trading to resolve. The ESTEX transmission constraint continued throughout the month, requiring careful management of constraint flow, interconnector trading and use of Operational Intertrips.

Due to high solar output, the minimum demand out turned lower than the minimum allowance. This required significant volumes of downward trades on the continental interconnectors to resolve.

RRE 1l Security of Supply

This Regularly Reported Evidence (RRE) shows when the frequency of the electricity transmission system deviates more than ± 0.3Hz away from 50 Hz for more than 60 seconds, and where voltages are outside statutory limits. On a monthly basis we report instances where:

- The frequency is more than ± 0.5Hz away from 50 Hz for more than 60 seconds
- The frequency was 0.3Hz - 0.5Hz away from 50Hz for more than 60 seconds.
- There is a voltage excursion outside statutory limits. For nominal voltages of 132kV and above, a voltage excursion is defined as the voltage being more than 10% away from the nominal voltage for more than 15 minutes, although a stricter limit of 5% is applied for where voltages exceed 400kV.

For context, the **Frequency Risk and Control Report** defines the appropriate balance between cost and risk, and sets out tabulated risks of frequency deviation as below, where 'f' represents frequency:

Deviation (Hz)	Duration	Likelihood
f > 50.5	Any	1-in-1100 years
49.2 ≤ f < 49.5	up to 60 seconds	2 times per year
48.8 < f < 49.2	Any	1-in-22 years
47.75 < f ≤ 48.8	Any	1-in-270 years

At the end of the year, we will report on frequency deviations with respect to the above limits and communicate any plans for future changes to the methodology.

May 2024-25 performance

Table: Frequency and voltage excursions (2024-25)

	2024-25											
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Frequency excursions (more than 0.5 Hz away from 50 Hz for over 60 seconds)	0	0										
Instances where frequency was 0.3 – 0.5 Hz away from 50Hz for over 60 seconds	0	0										
Voltage Excursions defined as per Transmission Performance Report[3]	0	0										

Supporting information

May performance

There were no reportable voltage or frequency excursions in May.

[3] https://www.nationalgrideso.com/research-publications/transmission-performance-reports

RRE 1J CNI Outages

This Regularly Reported Evidence (RRE) shows the number and length of planned and unplanned outages to Critical National Infrastructure (CNI) IT systems.

The term ‘outage’ is defined as the total loss of a system, which means the entire operational system is unavailable to all internal and external users.

May 2024-25 performance

Table: 2024-25 Unplanned CNI System Outages (Number and length of each outage)

Unplanned	2024-25											
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Balancing Mechanism (BM)	0	0										
Integrated Energy Management System (IEMS)	0	0										

Table: 2024-25 Planned CNI System Outages (Number and length of each outage)

Planned	2024-25											
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Balancing Mechanism (BM)	0	0										
Integrated Energy Management System (IEMS)	0	0										

Supporting information

May performance

There were no outages, either planned or unplanned, encountered during May 2024.

Notable events during May 2024

Annual Balancing Cost Report Webinar

On 17 May, we held a webinar for our new Annual Balancing Cost Report. The session covered a look back at balancing cost trends over the past six years, our latest projection of future balancing costs out to 2040, and a summary of the initiatives that are underway as part of our balancing cost strategy to minimise costs. We also held a question and answer session within to provide the opportunity for industry feedback related to balancing costs.

On the same day, we published the Annual Balancing Cost Report 2024 which outlined three key messages for balancing costs:

Balancing costs are projected to rise out to 2030	Constraint costs are rising due to significant changes to the GB generation mix and will be the main driver of future balancing costs, but our initiatives are mitigating this increase.
Decisions made now will shape balancing costs into the 2030s	As we take on new roles in whole system planning, we can have a positive impact post-2030.
Our initiatives will create savings worth ~£18bn before 2030	Future balancing costs are not fixed and can still be influenced by proactive initiatives from the ESO and industry to reduce costs. We have been undertaking a wide range of initiatives within our balancing costs strategy that are aimed at minimising balancing costs.

Further information related to our balancing cost strategy, portfolio of initiatives to minimise balancing costs, and other insights and analysis related to balancing costs can be found on our balancing costs webpage.

Role 2 (Market developments and transactions)

ESO

RRE 2E Accuracy of Forecasts for Charge Setting – BSUoS

This Regularly Reported Evidence (RRE) shows the accuracy of Balancing Services Use of System (BSUoS) forecasts used to set industry charges against the actual outturn charges.

The BSUoS charge (£/MWh) is now based upon a fixed tariff that was published in January 2023 and implemented in April 2023. Daily balancing costs (and other costs that ultimately make up the costs recovered through the BSUoS charge) were forecast for the year ahead, and two 6-month tariffs were set to cover the 2023/24 charging year.

We continue to forecast balancing costs monthly and measure our performance against this forecast. It remains an important metric to support the fixed tariff methodology by being the main component of the fixed BSUoS tariff. The BSUoS cost forecast (costs rather than what is charged against the fixed tariff) is probabilistic and therefore produces percentile values. The published forecast for each month is based on the central value of the BSUoS cost forecast (50th percentile). If the outturn BSUoS costs are below the 50th percentile of the cost forecast, then the actual costs for that month would be lower than the forecast predicted, provided the actual volume is at or above the estimate (and vice versa).

May 2024-25 performance

Figure: 2024-25 Monthly BSUoS forecasting performance (Absolute Percentage Error)

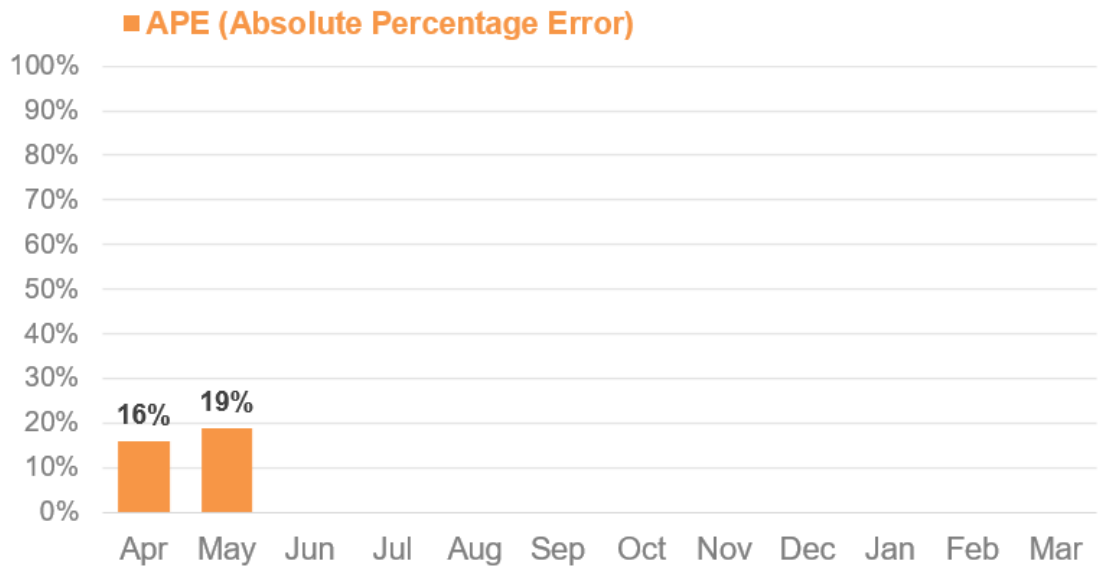


Table: Month ahead forecast vs. outturn BSUoS (£/MWh) Performance[4] - one-year view

	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Actual (£ / MWh)	11.5	8.5										
Month-ahead forecast (£ / MWh)	9.7	10.2										
APE (Absolute Percentage Error)[5]	**16.0**	**19.0**										

[5] Monthly APE% figures may change with updated settlements data at the end of each month. Therefore, subsequent settlement runs may impact the end of year outturn.

Supporting information

May Performance:

Actuals outturned below forecast for May, with an Absolute Percentage Error of 19.0%. The increase in absolute percentage error was as a result of below forecast costs, with minimal variance on volumes.

Costs:

May outturn costs were around the 30th percentile of the forecast produced at the beginning of April, primarily driven by constraint costs out turning 25% below our forecast. One of the key drivers of the BSUoS forecast is the proportion of demand met by renewable generation. The April forecast estimated this to be 32% for May, however it out turned at 18%.

Volumes:

May actual volume was just below the forecast produced in April. This small variance could be due to weather and temperature fluctuations.

Forecast for May made at the start of April: 20.6TWh

May outturn: 20.5TWh

Notable events during May 2024

Spring Markets Forum

On 14 May 2024 we held our Spring Markets forum. This was the first forum held in Scotland. As a result of customer feedback, we have committed to varying the location of our in person forums (i.e. not all events being held in London) and this was the first of those events, held in Glasgow. This forum was attended in-person by 68 industry colleagues and live streamed for those unable to attend in person. At its peak- there were 90 people streaming the event.

The event covered various topics including looking into the future of Markets, improvements to balancing and an update on current products and services. The update also included how we are going to approach Whole Energy, and calls to action from industry to engage in our flexibility market strategy consultation. Following the morning session, we hosted a panel discussion with industry panel members. To conclude, there was an optional networking session for industry to ask us further questions on a one-to-one basis and meet with other colleagues.

Post event feedback has been positive with 82% of those attending stating the event met their expectations. We also received suggestions we will seek to implement for future in person forums. For more detail and to watch any of the sessions from this, and previous event, please visit Markets Forum Events.

Flexibility Markets Strategy – call for Input

On 20 May, we launched a call for input on our proposed Flexibility Markets Strategy. Recognising the important role flexibility will play in helping to operate a decarbonised electricity network in the most cost-effective way, we've asked our stakeholders to help design the strategy we want to follow. This strategy is intended to enable flexibility at all levels, by outlining the actions needed, identifying the barriers to be removed and providing the overall strategic direction of being more competitive, coordinated and coherent. Having launched the call for input with a short, recorded presentation as well as a full pack with questions for stakeholders, we followed up with a Q&A session to allow stakeholders to ask for any clarifications about the draft strategy. Stakeholders have until the end of June to respond.

For more information, and to find out how to contribute, please see our website: Flexibility Markets Strategy – Call for input.

Role 3
(System insight, planning and network development)

ESO

Metrics and RREs: Please note there are no metrics or monthly RREs for Role 3

Notable events during May 2024

All two-step connection offers issued by the end of May

This week, we marked a huge milestone on our journey to improve the connections process. All of the two steps and BAU (business-as-usual) offers have now been issued. The two-step offer process was developed as part of our five-point plan to accelerate connections and enable more generation to connect to the electricity network.

Together we have issued just under 700 connection offers in three months. Whilst working through this process, we have built stronger working relationships with our TO delivery partners at NGET, showing just how important collaboration with our stakeholders is. As well as our five-point plan, we are also working on a programme of longer-term reform as part of our Connections Reform Project. We fully recognise the challenges our connections customers are experiencing, and will continue to work with our customers and our other key stakeholders to address the challenges with existing connections processes.

Virtual teach-in about the new Connections Reform TMO4+ proposals

In April, we published our updated recommendation on the Connections Reform TMO4+ model, originally introduced as TMO4 in December 2023. TMO4 was originally created for all new applications, however due to the size of the current queue it was decided to include the process with an approach to the whole queue, as well as new applicants. This amendment to TMO4 was renamed as TMO4+ with the aim to streamline grid connections and reduce the connection queue, allowing those who are first ready to connect.

The TMO4+ model now includes extending the new approach to projects already in the queue. By prioritizing first-ready projects rather than first-served, we aim to significantly reduce the size of the queue and offer earlier connection dates to viable projects.

Understanding this process is crucial for the industry, so we have been hosting a series of teach-in sessions throughout April and May, which will continue throughout the year. In our latest webinar more than 250 people joined our session, where we discussed our progress to date, next steps, our rationale for TMO4+ and what we what it to achieve, a run through of what the process would look like, and plenty of time for Q&A. These sessions provide an opportunity for industry members to ask questions and gain confidence in the TMO4+ proposal.

Our next webinars on TMO4+ will be held in July. Details of upcoming events can be found on our website and in our monthly newsletter, where you can sign up here."