Public

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- Click ‘Turn on live captions’

NESO Operational Transparency Forum

2 October 2024

NESO
National Energy System Operator

Slido code #OTF

National Energy System Operator (NESO)

As of 1 October 2024, the National Energy System Operator (NESO) has been launched, following the government agreeing to acquire the Electricity System Operator (ESO) from National Grid, transferring the ESO into public ownership.

As NESO, we'll be a new, independent organisation responsible for planning Britain's entire energy system, operating the electricity network and offering expert advice to the energy sector's decision makers.

More information about NESO can be found here including past webinar recordings.

Please subscribe to our new NESO mailing list here and select 'Operational Transparency Forum (OTF)' to continue receiving future OTF meeting invites and other communications.

NESO National Energy System Operator

Introduction | Sli.do code #OTF

To ask questions live & give us post event feedback go to Sli.do event code #OTF.

- **Ask your questions as early as possible** as our experts may need time to ensure a correct answer can be given live.
- **Please provide your name or organisation**. This is an operational forum for industry participants therefore questions from unidentified parties will not be answered live. If you have reasons to remain anonymous to the wider forum, please use the advance question or email options below.
- **The OTF is not the place to challenge the actions of individual parties** (other than the NESO), and we will not comment on these challenges. This type of concern can be reported to the Market Monitoring team at: marketreporting@nationalenergyso.com
- **Questions will be answered in the upvoted order whenever possible**. We will take questions from further down the list when: the answer is not ready; we need to take the question away or the topic is outside of the scope of the OTF.
- **Sli.do will remain open until 12:00**, even when the call closes earlier, to provide the maximum opportunity for you to ask questions. After that please use the advance questions or email options below.
- **All questions will be recorded and published.** Questions which are not answered on the day will be included, with answers, in the slide pack for the next OTF.
- **Ask questions in advance** (before 12:00 on Monday) at: https://forms.office.com/r/k0AEfKnai3
- **Ask questions anytime** whether for inclusion in the forum or individual response at: box.nc.customer@nationalenergyso.com

Stay up to date on our webpage: https://www.neso.energy/what-we-do/systems-operations/operational-transparency-forum (OTF Q&A is published with slide packs)

NESO National Energy System Operator

Future deep dive / focus topics

Slido code #OTF

Today

Space Weather

Future

Clean Power 2030 – 9 October

Winter Outlook – 16 October (report will be published on 8th October)

Clean Power 2030 – 6 November

Initial National Demand Outturn - TBC

If you have suggestions for future deep dives or focus topics, please send them to us at: box.nc.customer@nationalenergyso.com and we will consider including them in a future forum

Markets Forum - November 2024

Join us for our next Markets Forum event in London on **11th November.**

Secure your place at our next Markets Forum by signing up here -

If you can't join us on the day, you'll be able to watch a live stream of the day. Tickets are limited, so choose your preferred sign-up option.

If you have any questions please contact the team at-
Box.marketsengagement@nationalenergyso.com

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Future Event Summary

Event	Date & Time	Link
Markets Forum	11 November 2024 (10am)	

Public

NESO Space Weather Response Plan

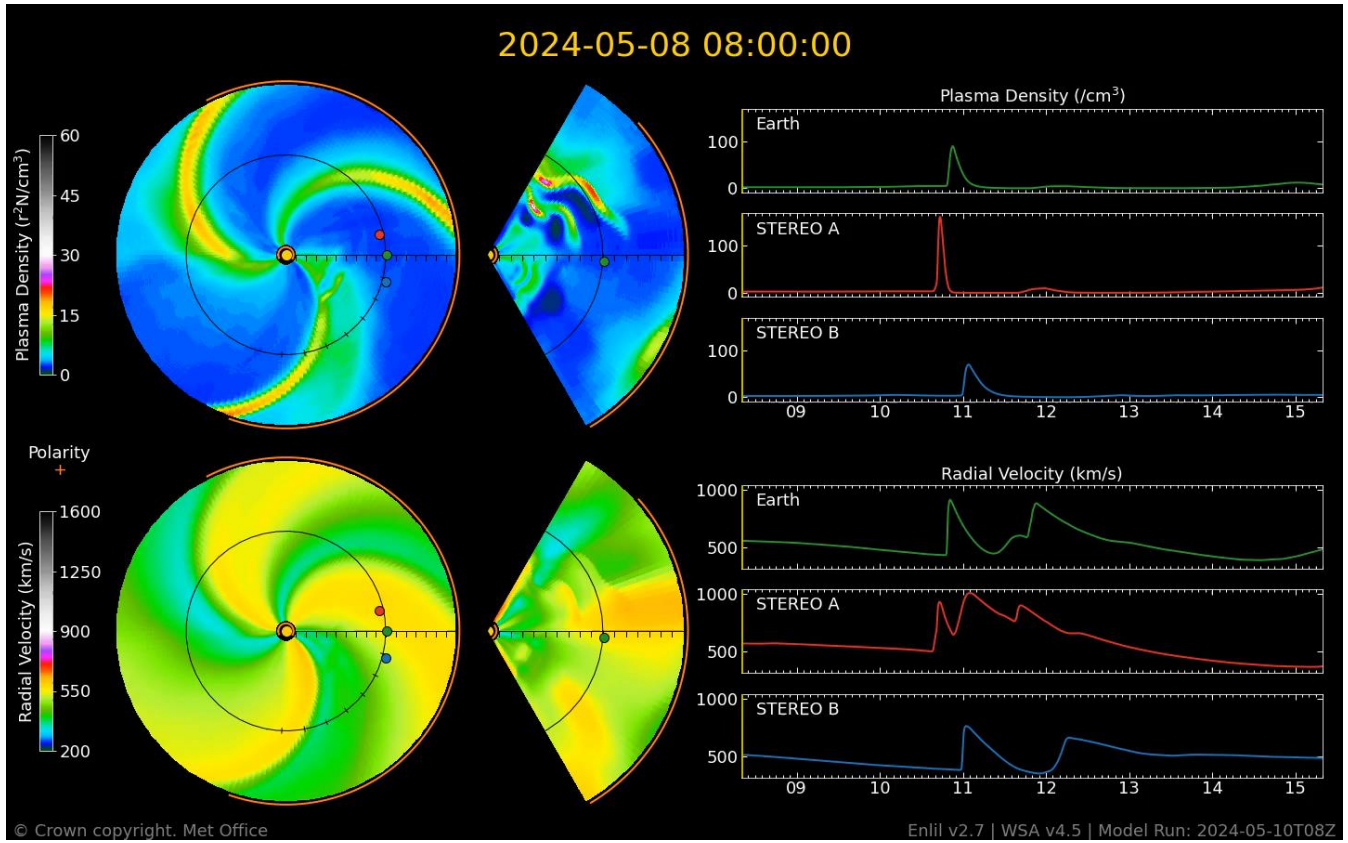
Mathew Hofton - National Planning Manager

October 2024

NESO
National Energy System Operator

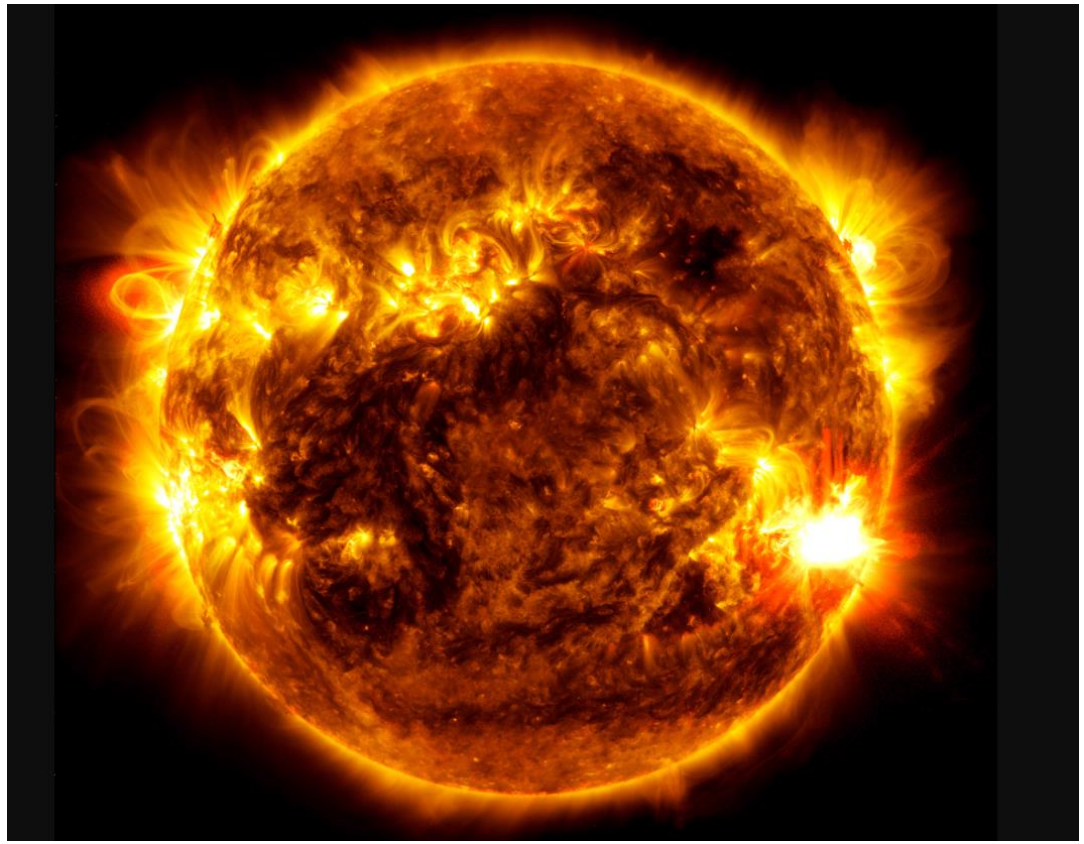
Space Weather

Solar wind model showing earth bound CMEs over 9th to 11th May 2024.



Credit: RAL Space

NASA image of a large solar flare at 7:44 am on May 11, 2024.



Credit: NASA/SDO

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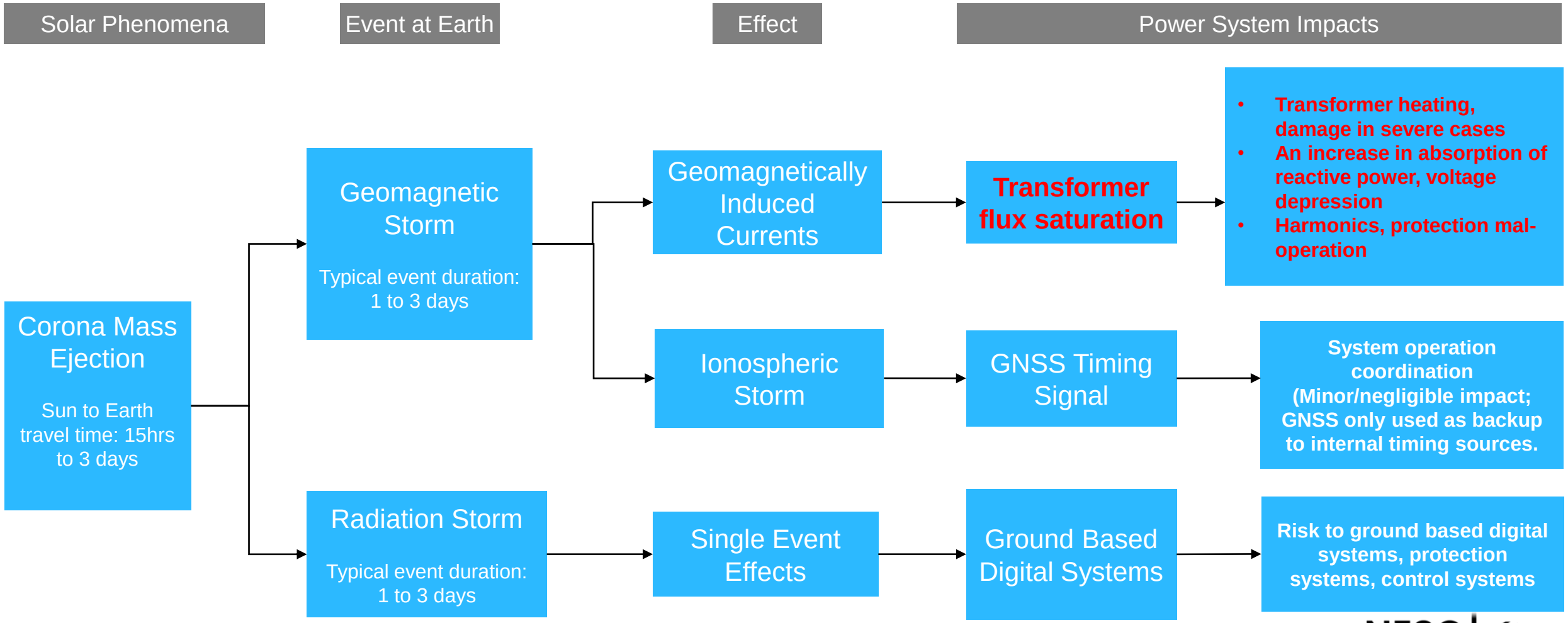
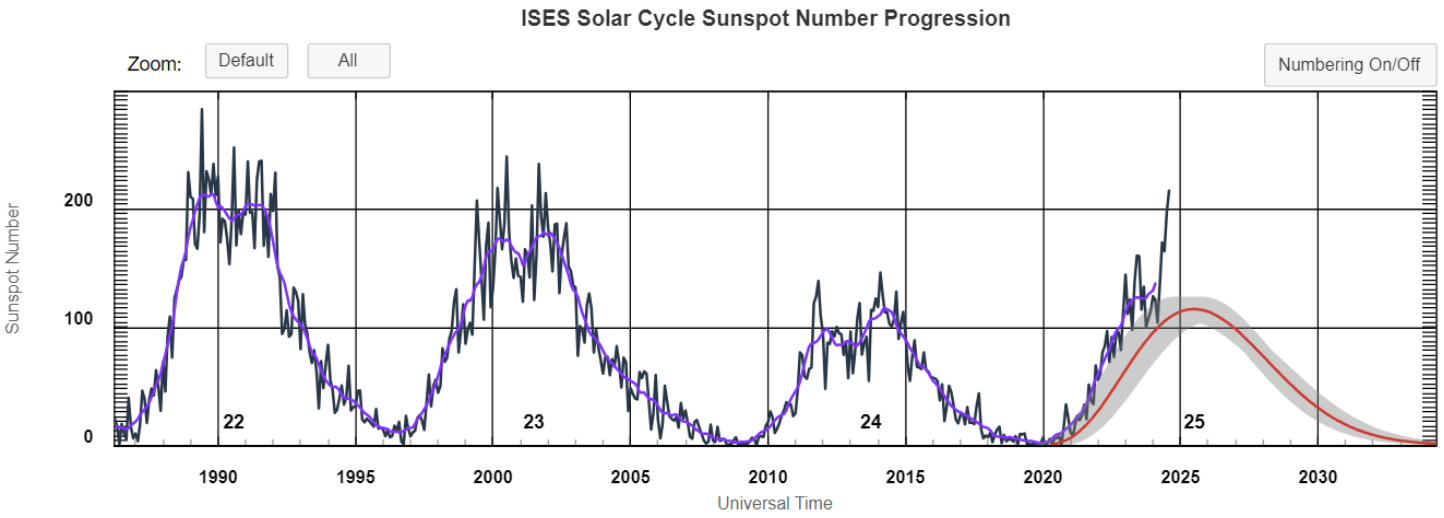
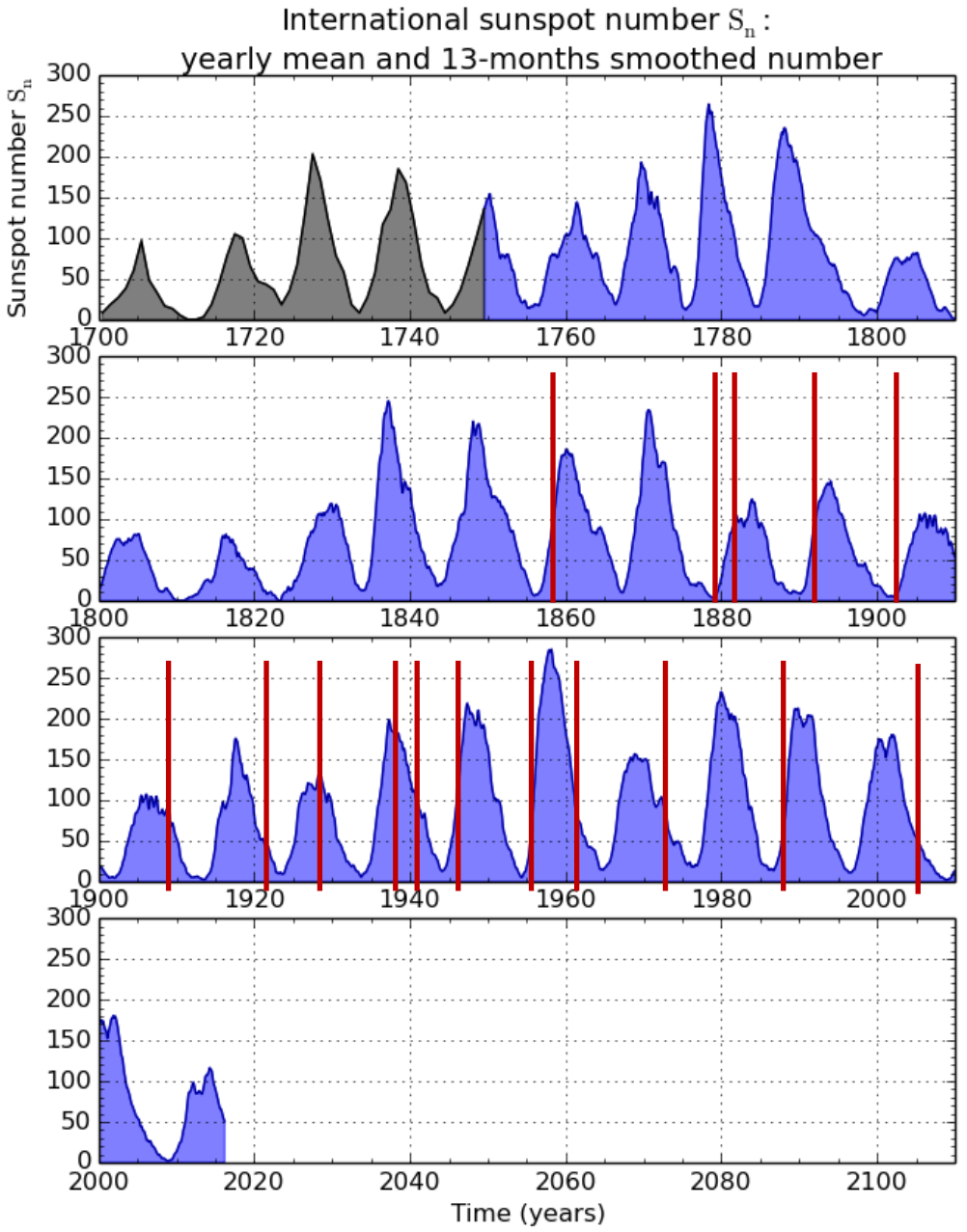
Space Weather – Power System Impacts



Solar Cycles





- There is an approximate 11 year solar cycle
- We move from solar minimum, with no sunspots (on almost all days) on the sun and very few CMEs to solar maximum with many sunspots and many CMEs
- There are many more ordinary sized flares and CMEs during solar maximum
- But largest events are scattered throughout the solar cycle and are not restricted to period of solar maximum.

SILSO graphics (http://sidc.be/silso) Royal Observatory of Belgium 2016 October 1

Reasonable Worst-Case Scenario

MOSWOC Geomagnetic storm scale

Scale	Description	Average Frequency
G5	Extreme	4 days per cycle
G4	Severe	60 days per cycle
G3	Strong	130 days per cycle
G2	Moderate	360 days per cycle
G1	Minor	900 days per cycle

Frequency	Description
1 in 100-year event	RWCS – Carrington like, very high reactive power demands, likelihood of damage to transformers
1 in 30-year event	Major storm, likelihood of voltage disturbance, transformer alarms
1 per cycle	Voltage disturbances
2 or 3 per cycle	Minor disturbance, small voltage fluctuations
4 or 5 per cycle	No effects on the system

Response Plan – Notifications

Event	MOSWOC → NESO (ENCC)	NESO (ENCC) → Industry (GO, TO, DNOs)	Time to event
Observation of very active sunspot region	Geomagnetic Storm **Watch**	Notification to **Prepare for Geomagnetic Activity**	T – 36h to T – 12h
Earth-bound CME observed and possibility of a G5 storm	Geomagnetic Storm **Warning**	Notification of **Possible Geomagnetic Effects**	<T – 1h
G5 storm measured at Earth	Geomagnetic Storm **Alert**	Notification of **Expected Geomagnetic Effects**	T – 0
Post-event (any of above)	**Cancellation** of applicable notification		NA

- Notifications go to Network TOs, DNOs, Generators (BMU trading point and/or control point), DESNZ and Ofgem.
- BMRS notification will also be raised

Response Plan – Mitigations

Space Weather alerts and warnings received from MOSWOC and BGS

Transformer damage

Assess availability of transformers and circuit outages that put the network at increased risk.

Cancel the start of planned outages.

Confirm the emergency return to service time of ongoing outages and recall circuits to increase resilience.

Reposition interconnectors to maximise flexibility.

Reactive absorption and voltage depression

Review regional network voltage requirements and prepare for increased reactive demand.

Contingency generation may be required to meet increase reactive demand.

Assess availability of reactive compensation equipment, recall assets from outage to increase resilience.

Harmonics, protection relay mal-operation

Previous investigations indicated that protection settings on assets meant that the expected levels of harmonic distortions would not lead to spurious trips.

Project SWIFTER

Space Weather Impact for Future Electricity System Resilience

The GB electricity system is undergoing a significant change, connecting low carbon technologies to meet net zero.

The SWIFTER project aims to:

- Review the system's resilience to a severe space weather events
- Investigate how resilience my change in the future
- Assess the effectiveness of a range of potential mitigations
- Review industry contingency and response plans

Department for Energy Security & Net Zero

NESO National Energy System Operator

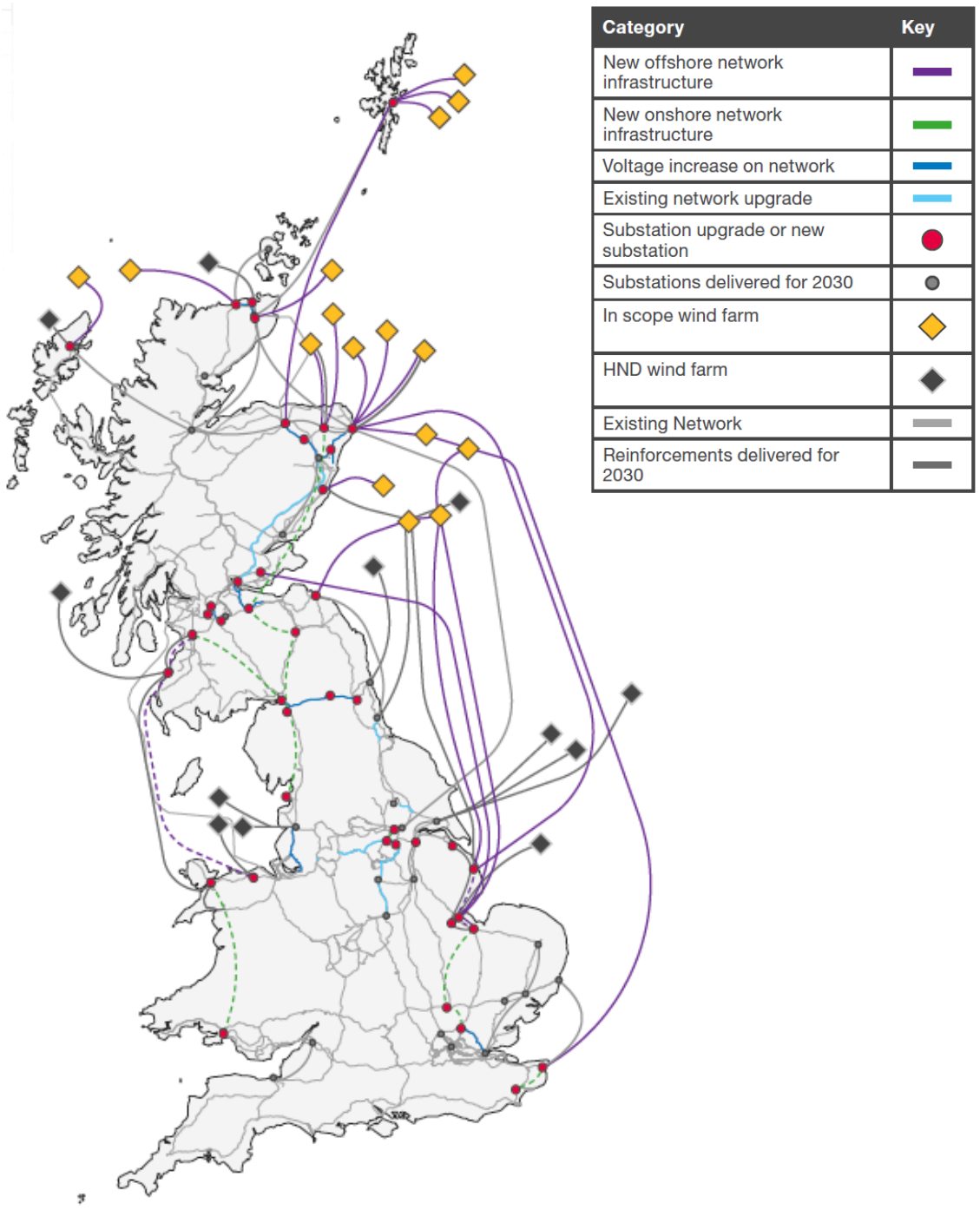
Met Office

BGS British Geological Survey

FRAZER-NASH CONSULTANCY A KBR COMPANY

Lancaster University

UNIVERSITY OF OXFORD



Public

May 2024 Geomagnetic Storm Review

Michael Harcus (R&EM Investigations Manager)

October 2024

NESO
National Energy System Operator

May 2024 Geomagnetic Storm Review

Slido code #OTF

Background

- A ‘low’ G5 geomagnetic storm occurred over the weekend of Friday 10 May – Sunday 12 May 2024.
- Whilst the storm was graded as a G5 (the highest tier), it did not reach the threshold outlined in NESO’s business plan for proactive or preventative measures to be taken.
- In collaboration with Industry, NESO has conducted a review to assess the Whole GB Energy System’s response, and to quantify what impact the event may have had on the Whole GB Energy System.

May 2024 Geomagnetic Storm Review

Slido code #OTF

Review Findings

- The key headline finding is that no participant identified any impact to system stability or operability. However, the event, and the corresponding impact, does not represent the “reasonable worst-case scenario” that defensive measures have been planned for, and is not an indication that all subsequent G5 events will be of the same severity or have the same level of impact.
- The review identified that the UK has a limited amount of Geomagnetic Induced Current (GIC) metering across GB.
- The review also highlights there could be value in standardising which alerts Industry participants subscribe to, and demonstrated there would be value in NESO proactively communicating to licensees during storm events, including to confirm no action is required.
- The review contrasts the UK’s current system and response with New Zealand’s preparation/response, from which there are numerous learning points.

Slido code #OTF

May 2024 Geomagnetic Storm Review

Next Steps

- The review recommends further work is undertaken to identify potential recommendations for improvements in managing future Space Weather events, including what a proportionate GIC metering capability looks like for GB.

- Thank you to respondents for supporting with this work.

Demand | Last week demand out-turn

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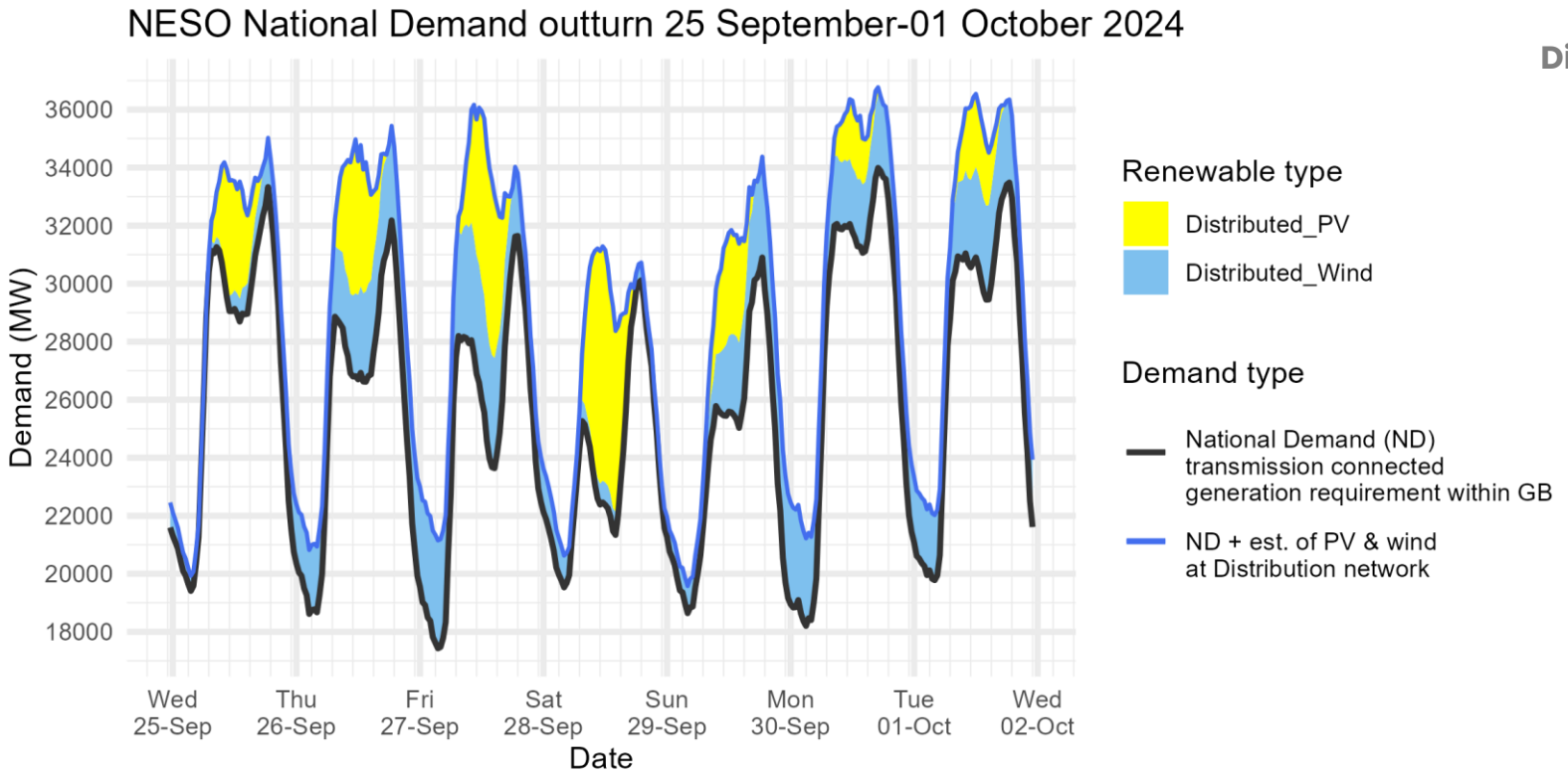


The black line (National Demand ND) is the measure of portion of total GB customer demand that is supplied by the transmission network.

ND values do not include export on interconnectors or pumping or station load

Blue line serves as a proxy for total GB customer demand. It includes demand supplied by the distributed wind and solar sources, but it does not include demand supplied by non-weather driven sources at the distributed network for which NESO has no real time data.

Historic out-turn data can be found on the NESO Data Portal in the following data sets: Historic Demand Data & Demand Data Update

Distributed generation

Peak values by day

Date	OUTTURN Daily Max Dist. PV (GW)	OUTTURN Daily Max Dist. Wind (GW)
25 Sep 2024	4.0	2.0
26 Sep 2024	5.3	3.3
27 Sep 2024	6.1	4.1
28 Sep 2024	8.1	1.6
29 Sep 2024	3.6	3.8
30 Sep 2024	2.3	3.6
01 Oct 2024	2.6	3.3

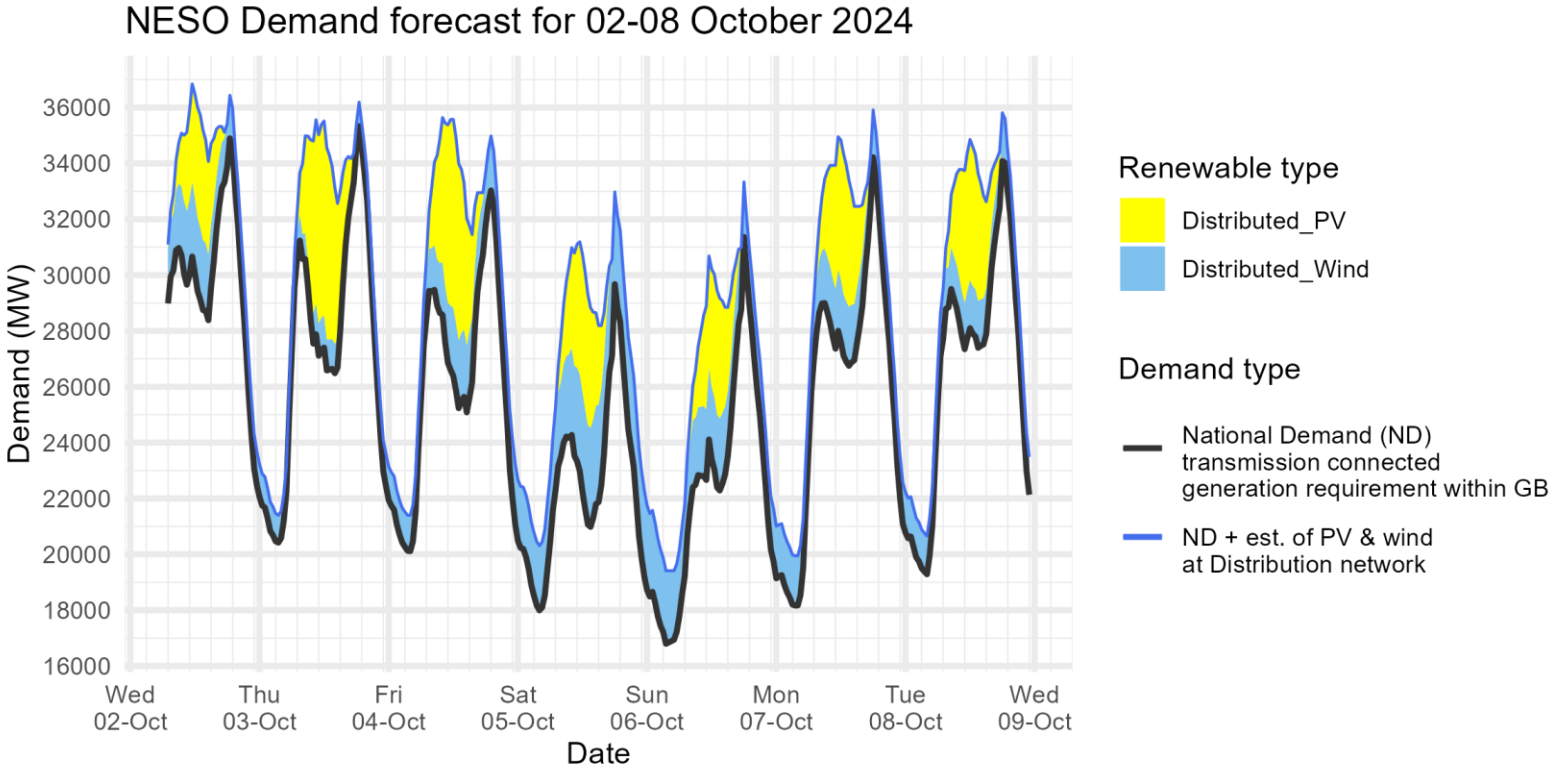
National Demand

Peaks and troughs

Date	Forecasting Point	FORECAST (Wed 25 Sep) National Demand (GW)	FORECAST (Wed 25 Sep) Dist. wind (GW)	OUTTURN National Demand (GW)	OUTTURN Dist. wind (GW)
25 Sep 2024	Evening Peak	33.4	1.4	33.3	1.7
26 Sep 2024	Overnight Min	18.1	2.2	18.6	2.2
26 Sep 2024	Evening Peak	32.0	2.2	32.2	3.3
27 Sep 2024	Overnight Min	17.6	2.9	17.4	3.7
27 Sep 2024	Evening Peak	30.8	2.2	31.6	2.2
28 Sep 2024	Overnight Min	18.4	1.4	19.5	1.1
28 Sep 2024	Evening Peak	29.6	1.2	30.0	0.6
29 Sep 2024	Overnight Min	17.9	1.1	18.6	0.9
29 Sep 2024	Evening Peak	29.1	2.7	30.9	3.5
30 Sep 2024	Overnight Min	16.4	3.4	18.2	3.0
30 Sep 2024	Evening Peak	31.7	3.1	34.0	2.5
01 Oct 2024	Overnight Min	17.7	2.8	19.8	2.2
01 Oct 2024	Evening Peak	32.2	2.3	33.5	2.9

Demand | Week Ahead

Slido code #OTF



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National Demand

Peaks and troughs

		FORECAST (Wed 02 Oct)	
Date	Forecasting Point	National Demand (GW)	Dist. wind (GW)
02 Oct 2024	Evening Peak	34.9	1.5
03 Oct 2024	Overnight Min	20.4	1.0
03 Oct 2024	Evening Peak	35.3	0.9
04 Oct 2024	Overnight Min	20.1	1.3
04 Oct 2024	Evening Peak	32.5	1.9
05 Oct 2024	Overnight Min	18.0	2.3
05 Oct 2024	Evening Peak	29.7	3.3
06 Oct 2024	Overnight Min	16.8	2.6
06 Oct 2024	Evening Peak	31.4	2.0
07 Oct 2024	Overnight Min	18.2	1.8
07 Oct 2024	Evening Peak	34.2	1.7
08 Oct 2024	Overnight Min	19.3	1.4
08 Oct 2024	Evening Peak	34.1	1.4

NESO National Energy System Operator

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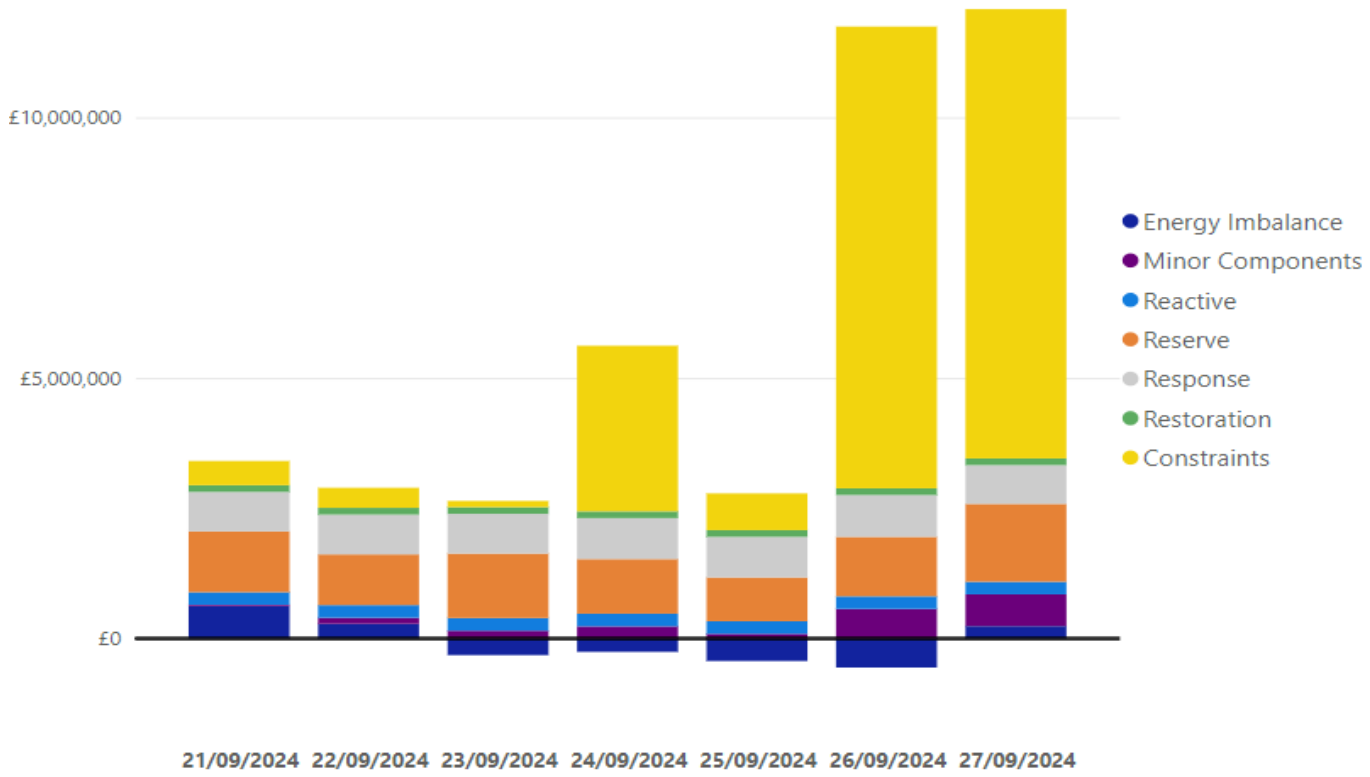
NESO Actions | Category Cost Breakdown

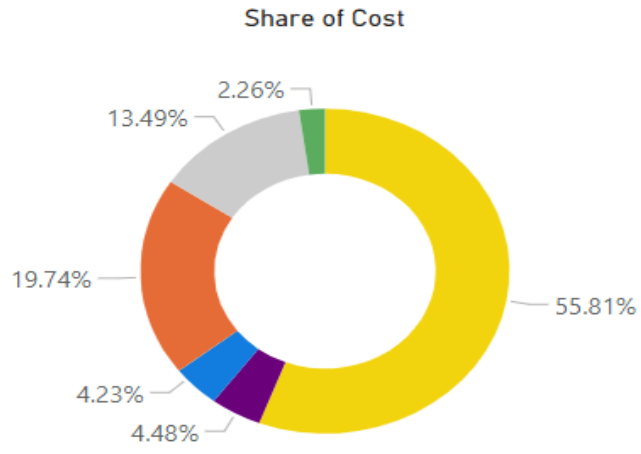


£39.61M
Weekly Total

£39.37M
Previous Week Total

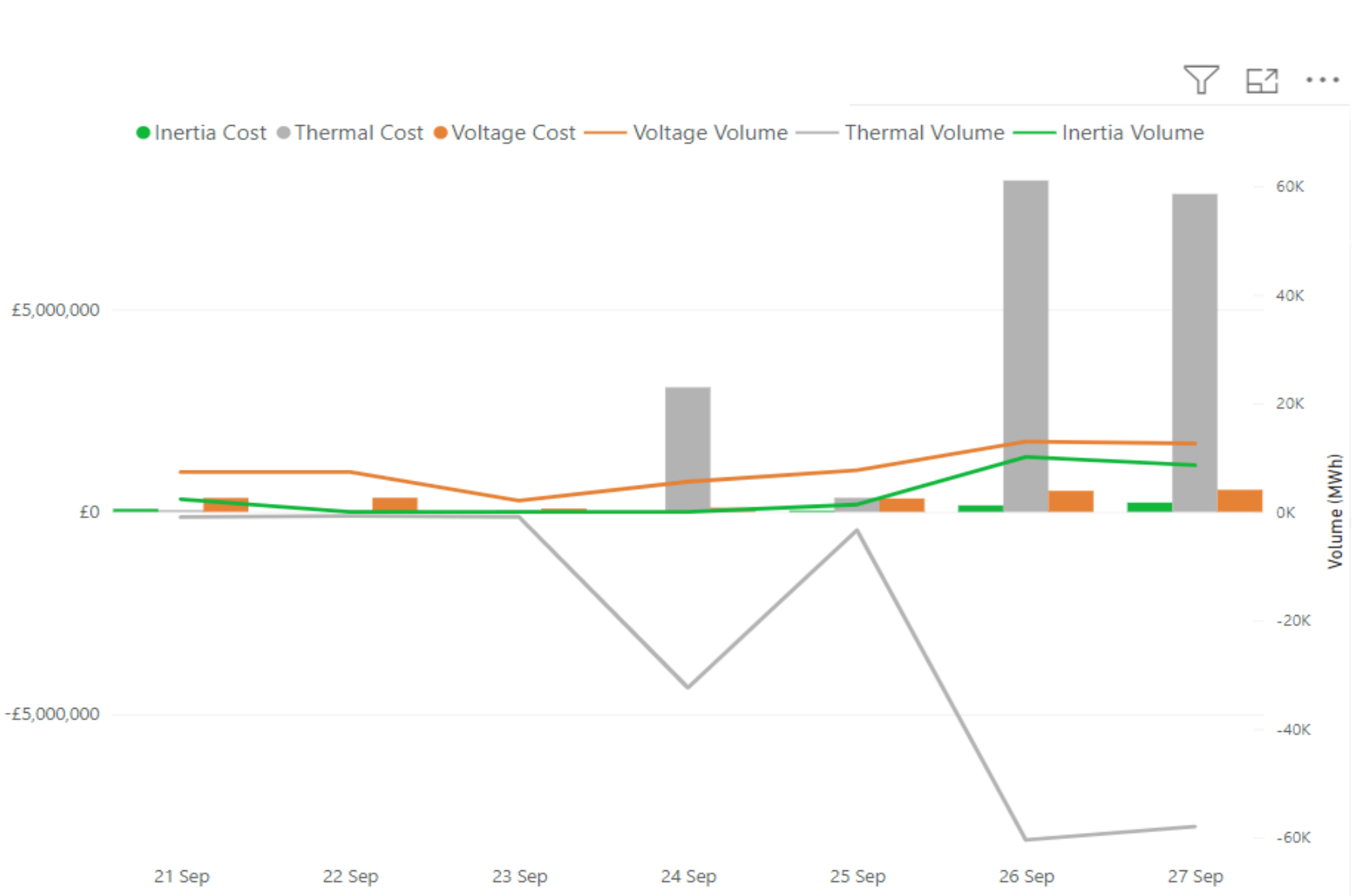
£6.33M
Past 30 Days Average

Date	Total (£)
21/09/2024	£3,407,112
22/09/2024	£2,893,015
23/09/2024	£2,322,031
24/09/2024	£5,363,607
25/09/2024	£2,353,332
26/09/2024	£11,187,166
27/09/2024	£12,079,424
Total	**£39,605,688**



Slido code #OTF

NESO Actions | Constraint Cost Breakdown



Date

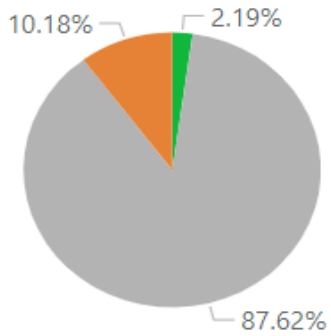
21/09/2024 27/09/2024

£2.3M
Sum of Voltage Cost

£489.9K
Sum of Inertia Cost

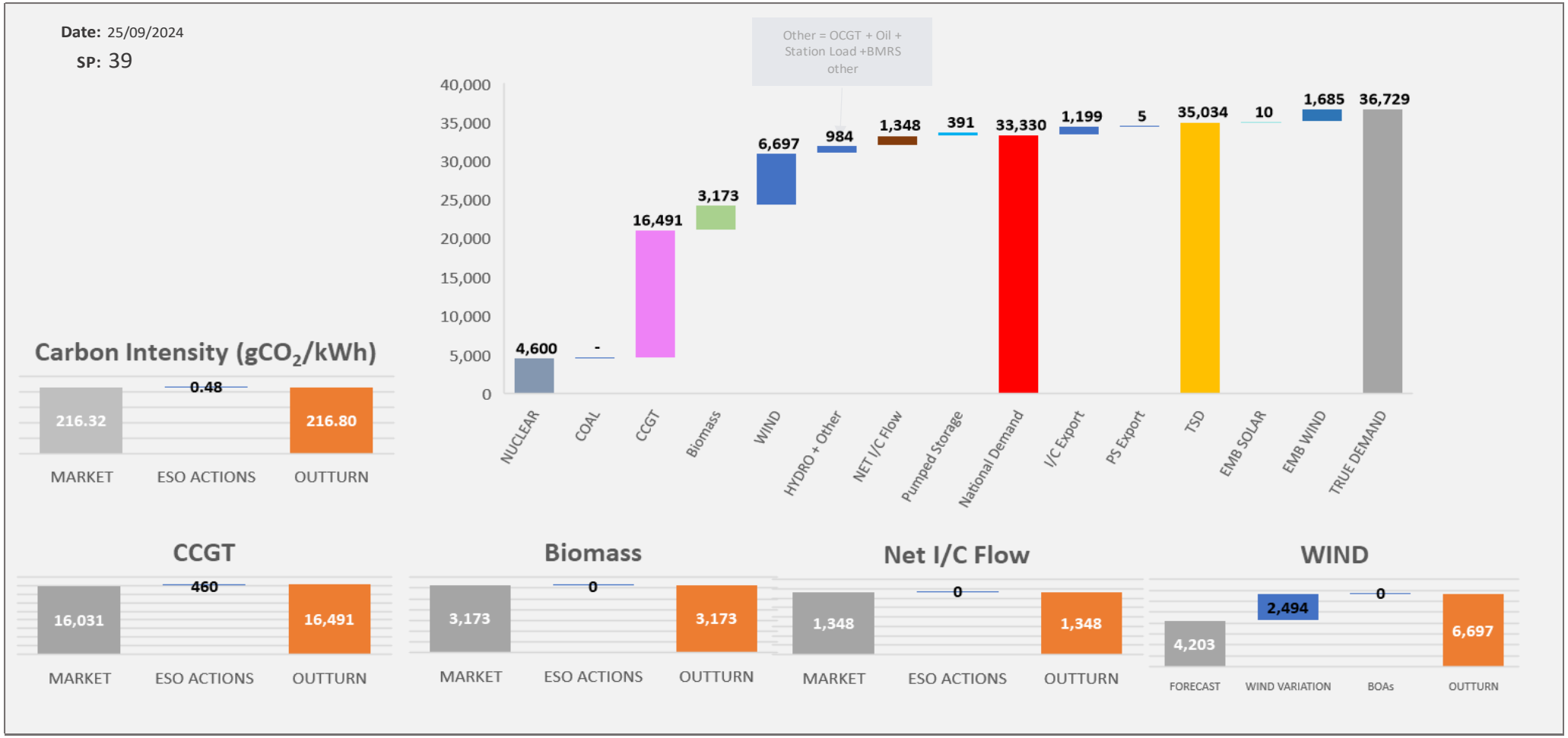
£19.6M
Sum of Thermal Cost

Share of cost



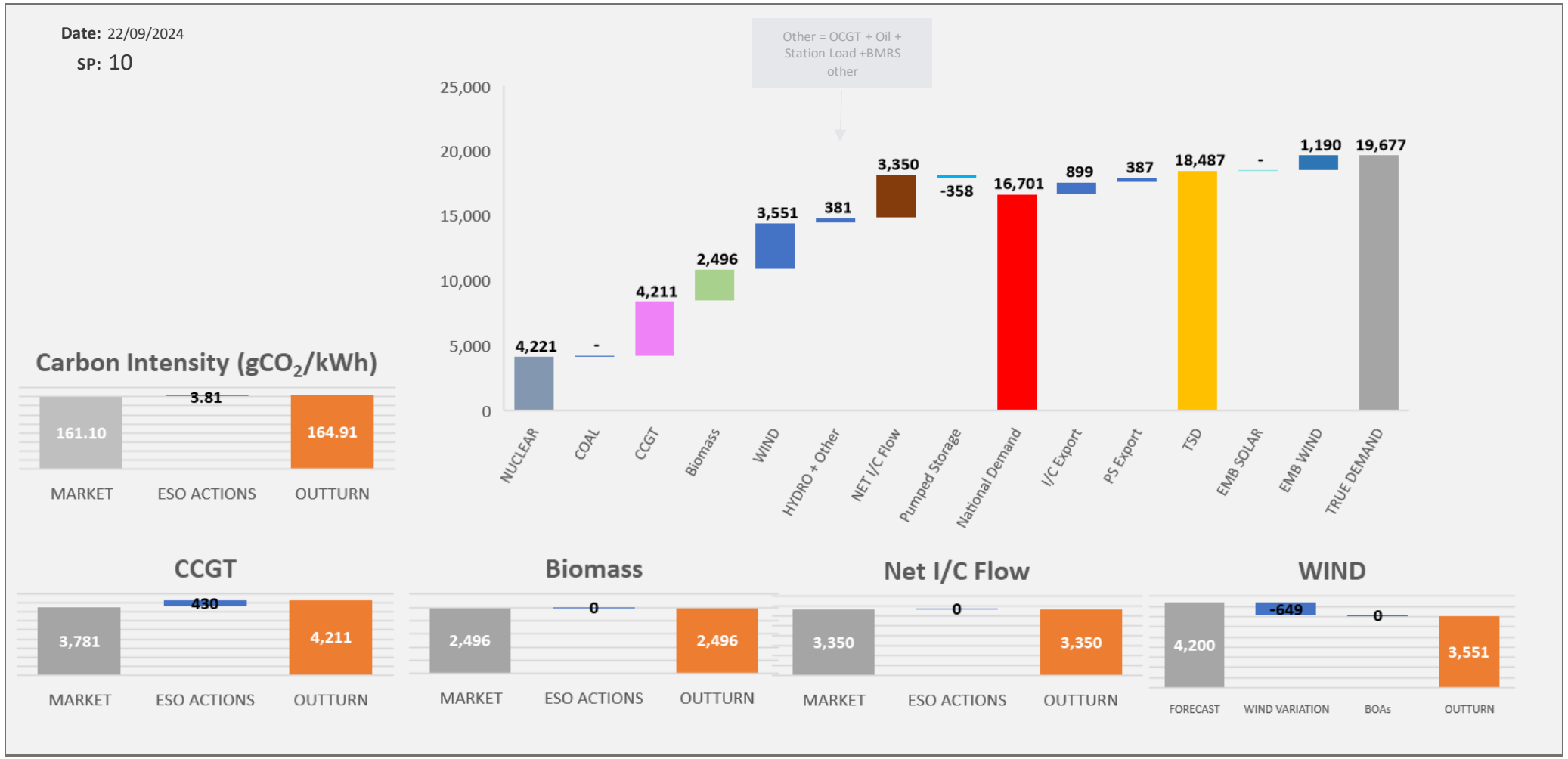
NESO Actions | Peak Demand – SP spend ~ £19k
Wednesday 25th September

Slido code #OTF



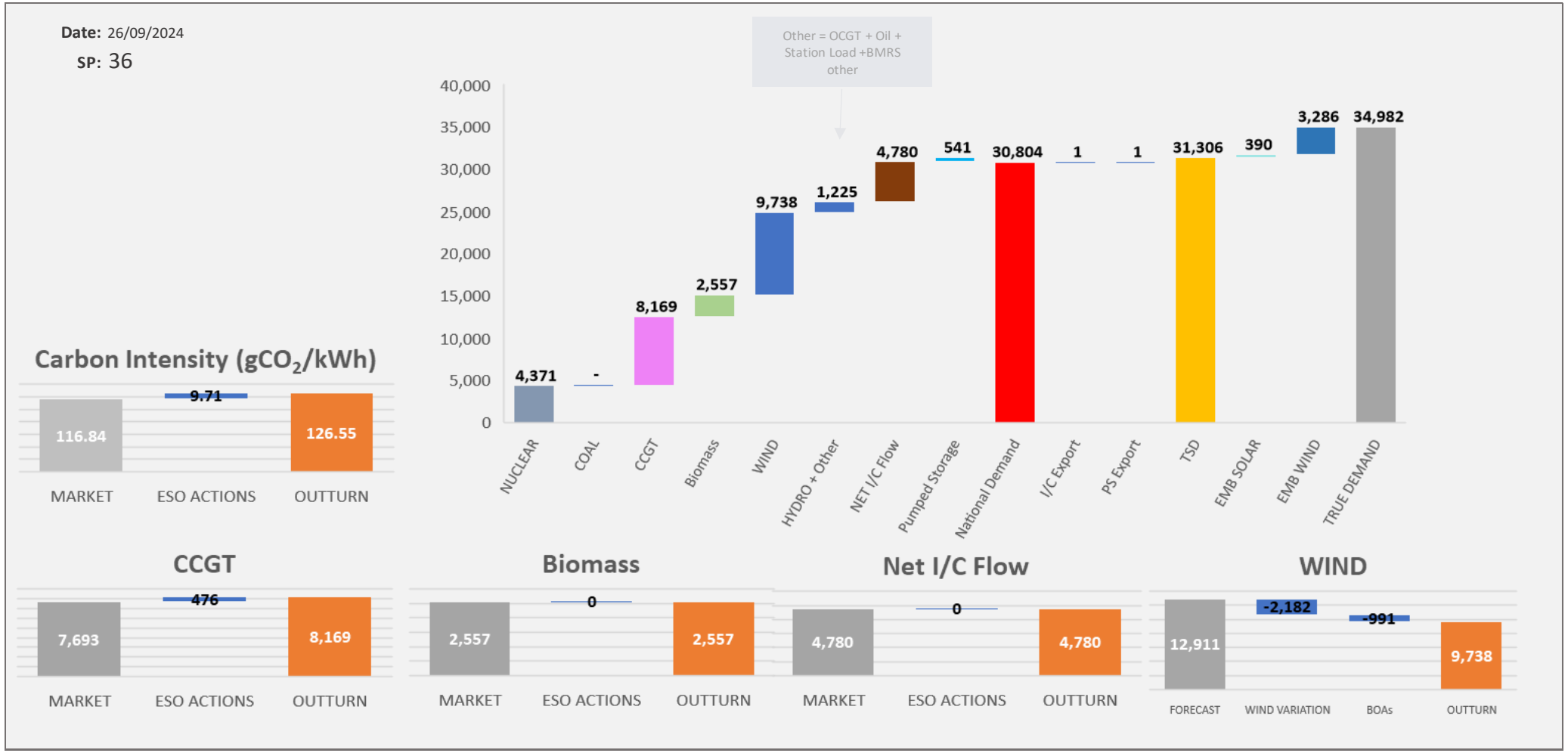
NESO Actions | Minimum Demand – SP spend ~ £34k Sunday 22nd September

Slido code #OTF



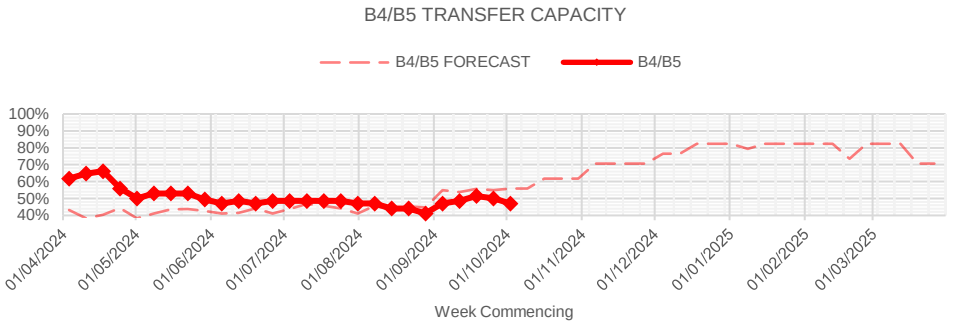
NESO Actions | – Highest SP spend ~ £293k Thursday 26th September

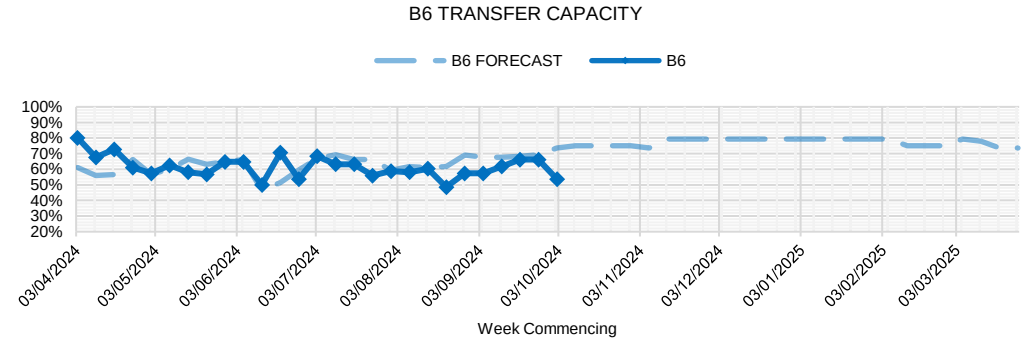
Slido code #OTF

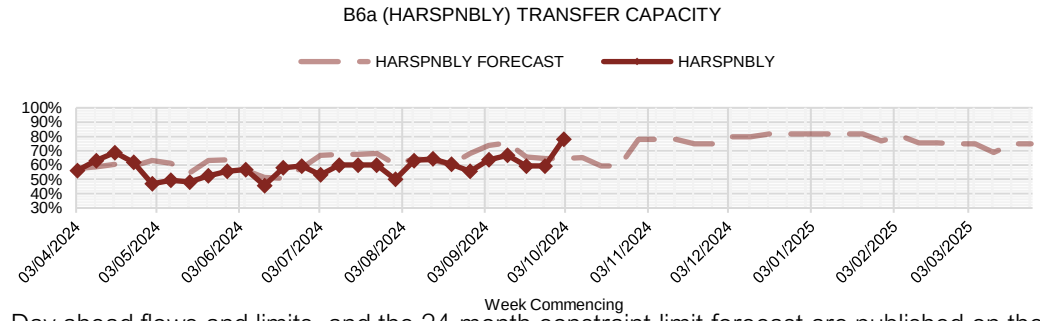


Transparency | Network Congestion

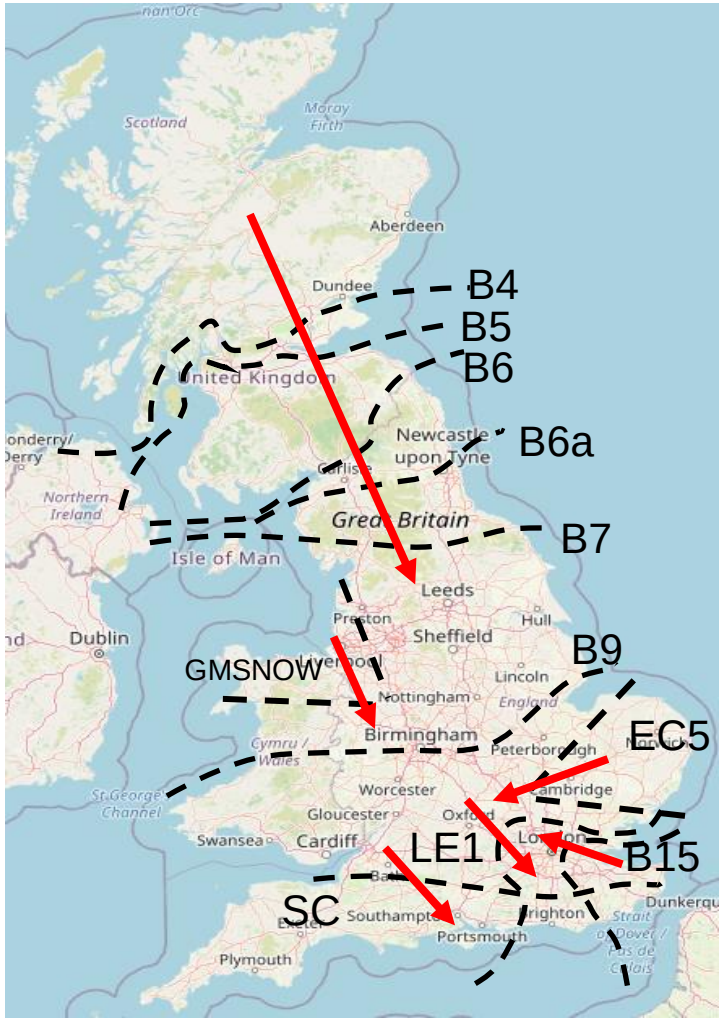
Slido code #OTF







Boundary	Max. Capacity (MW)	Current Capacity (%)
B4/B5	3400	47%
B6 (SCOTEX)	6800	54%
HARSPNBLY	8000	78%
B7 (SSHARN)	8325	84%
GMSNOW	4700	83%
EC5	5000	100%
LE1 (SEIMP)	8500	35%
B15 (ESTEX)	7500	75%
SC1	7300	100%



Day ahead flows and limits, and the 24-month constraint limit forecast are published on the ESO Data Portal: [Constraints Management]

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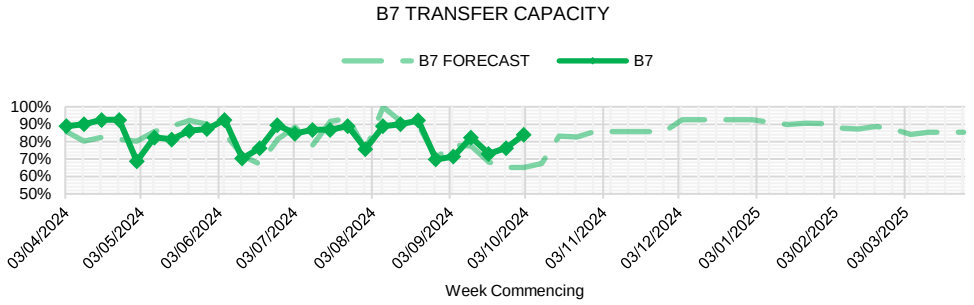

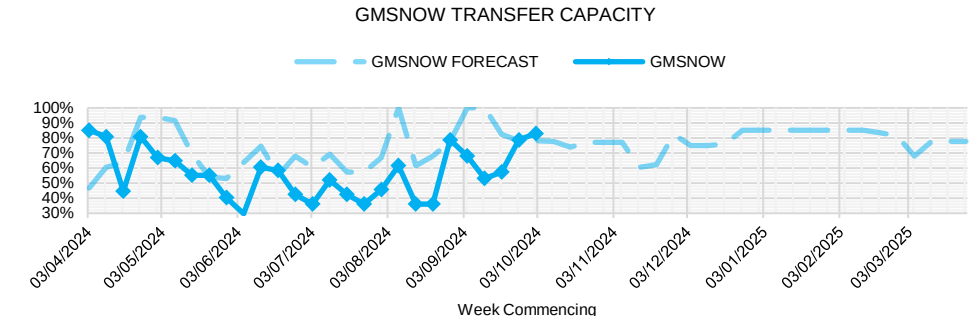

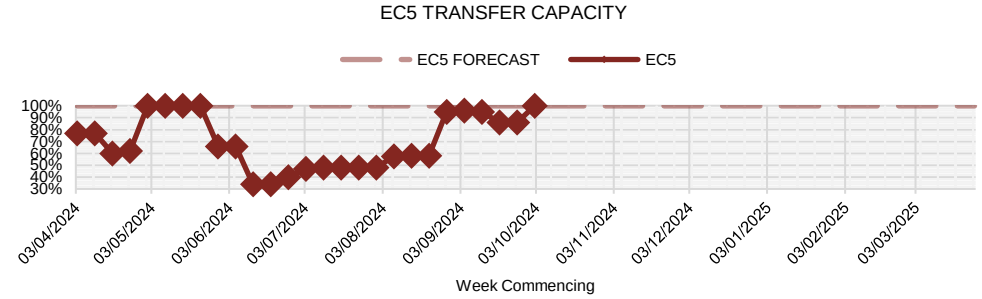

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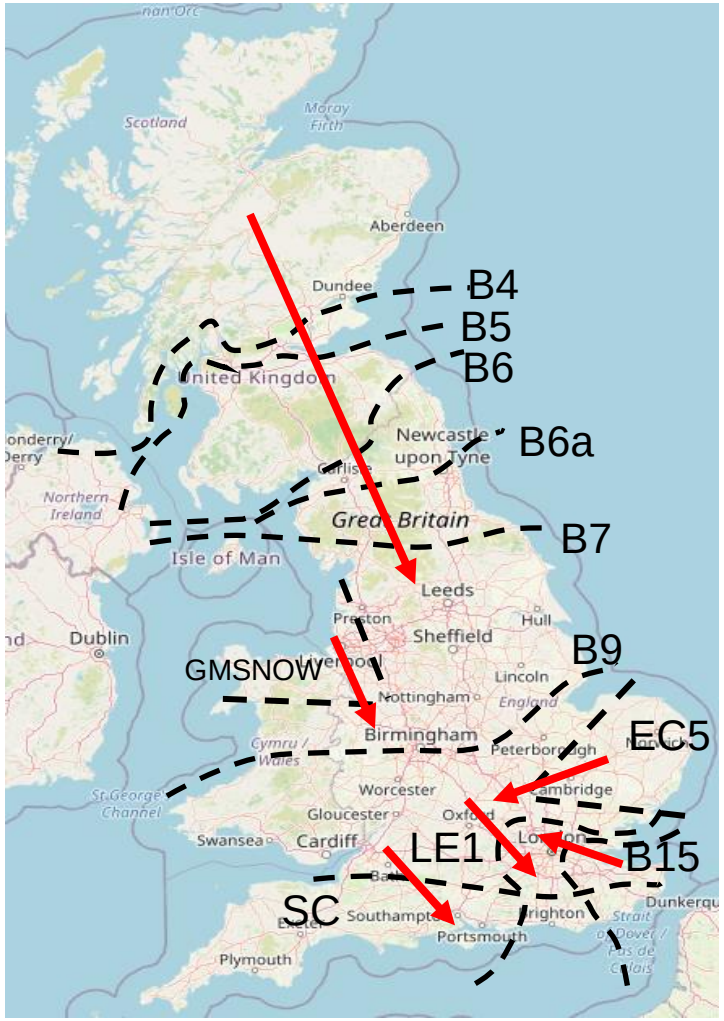

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Transparency | Network Congestion

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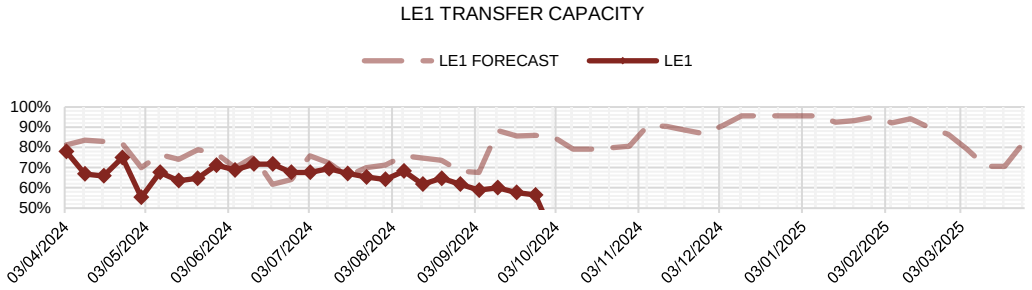

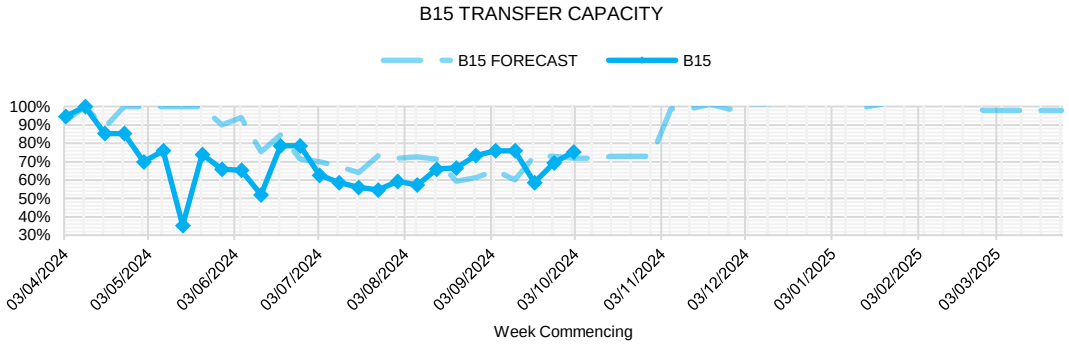

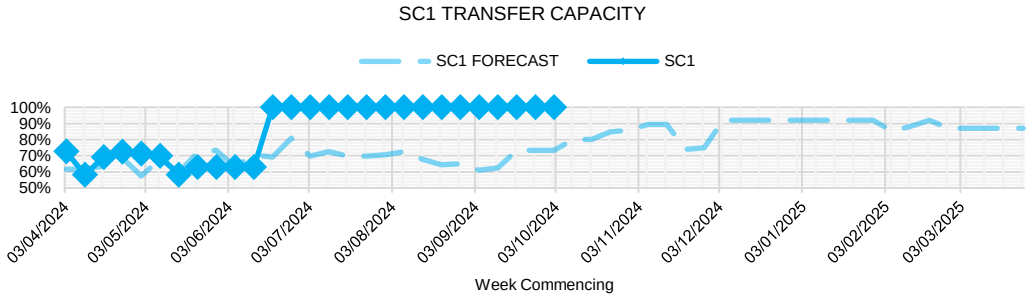

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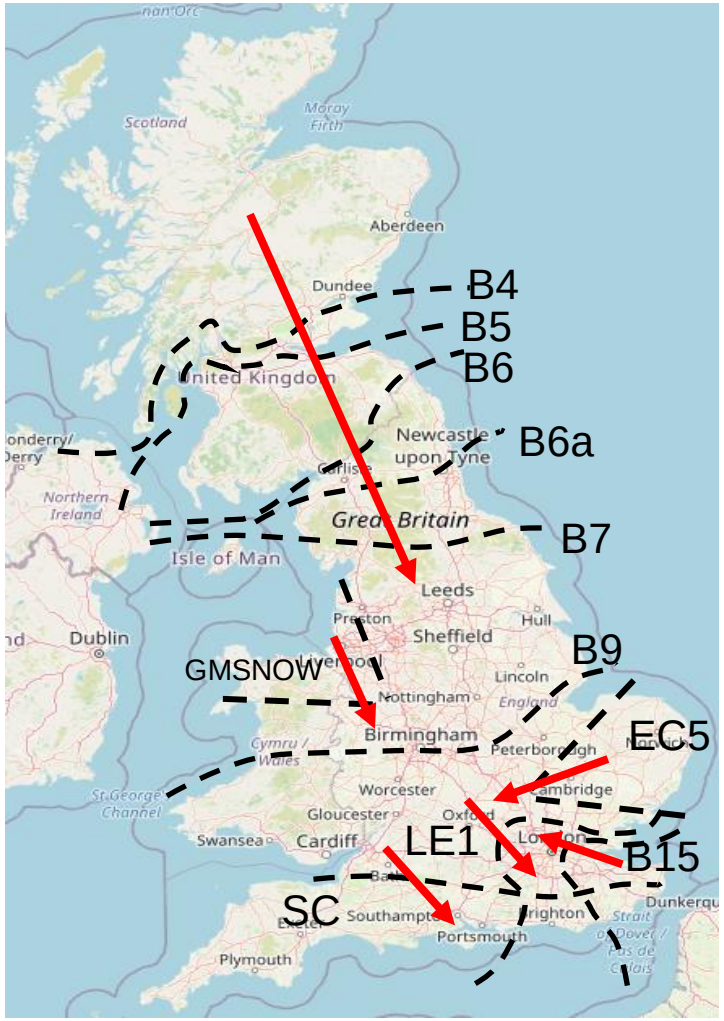

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NESO National Energy System Operator

Previously Asked Questions

Slido code #OTF

Q: What's the latest on the FRCR2024 strategy to run the system down at 120GVA inertia - has Ofgem signed it off yet? Also regarding the 100MW of extra DC the ESO said they would buy to add more system stability has this started yet to secure against Vector Shift events?

A: Please note this minimum inertia policy of 120 GVA.s. is in place since July 2024 as part of FRCR 2023. FRCR2024 recommends maintaining this policy of running the system at minimum inertia of 120 GVA.s. FRCR 2024 policy was submitted to Ofgem on 12 July for approval and we are waiting for Ofgem's decision before we implement the up to 100MW additional DC-Low procurement. The additional DC-Low will improve system security by largely securing additional event category which is BMU + VS. Please also note not procuring additional DC will not deteriorate current system security, as all BMU-only risks have been secured.

Q: How should batteries protect volume that has cleared in DC/DM/DR, especially when bidding in BM. There is discrepancy between official documentation and guidance. Are batteries required to protect DFR volume with MIL/MEL or price this volume strategically to receive full power BOA's whilst in DFR.

A: It is set out in this guidance. We have worked to bring together BM submissions guidance with the response guidance for consistency. Generally, this is through the use of MELs/MILs, but prices are used in some exceptional situations.

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Previously Asked Questions

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Q: Please can you provide some insight into the below scenario which occurred March 4th 2024. We received this message:

“A request for Emergency Assistance has been agreed on a GB connected Interconnector. The requesting party was NGESO. GB net flow will decrease by 716 MW between 12:50 04/03/2024 to 14:05 04/03/2024. Issued by Simon Williams at 12:45 on 04/03/2024.”

This action led to the system shortening by 716MW in SP27. Cashout has remained unchanged on Elexon Insights and those down-regulation actions never fed through post-event. Please can we have some clarity that if Emergency Assistance is used again in the future, we should expect the same outcome (no post-event trades being published)?

A: We are investigating the trade mentioned as there was a misalignment with our internal processes.

For future reference, if a trade has been confirmed between both parties then it will affect cashout on Elexon Insights post-event.

Previously Asked Questions

Slido code #OTF

Q: Could you please start sharing the available capacity across all boundaries in the future, as currently toy share only across the main boundaries.

A: We are currently considering what additional information on constraints that we will look to share in the future, including available generation capacity

Advance Questions

Slido code #OTF

Q: Could you please start sharing the available network capacity across all boundaries in the future meetings as you currently only share the capacity across main boundaries?

Answered in previous slide.

Q: After the ElecLink trip from approx. 1GW flow last week (Wed 25th Sep) we saw an offsetting FPN submitted against the IED-ELEC1 BMU to net the aggregate FPN flow to 0MW.
Is an offsetting FPN submission in the event of trips on ICs a required action by NGESEO for an Interconnector Error Administrator?

A: This is one method market participants can use to manage any imbalance resulting from a trip or a fault. It is not a requirement from the ESO or the Interconnector Error Administrator.

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Outstanding Questions

Slido code #OTF

Q: Following on from Shivam's question, can you also please explain why non BM FR was called at prices up to £2949.51 when there were flexible units available in the BM, and the control room were taking bids on other flexible units?

Q: Yesterday the cashout price was set (a few times) by reversal actions on batteries. SP22 the cashout price was £68 with a NIV of -620 Mwh and vast majority of bid stack was negative. This seriously affects our ability to trade and market confidence. Please could you comment and suggest solution?

Q: Please explain how with similar demand and 4GW more wind, yesterday's negative wind bids were all system tagged in the same regions, but today there have been energy neg priced bids since 0800hrs? You'd expect more constrained system to have more 'extreme' price dynamics vs less constrained system.

Q: Re. the SSO (Sub-sync oscillations) risk can the ESO say what actions they are taking to mitigate the risk and how much has it cost in the last year since detected in May.23 in Scotland. Thanks

Reminder about answering questions at the NESO OTF

Slido code #OTF

- **Questions from unidentified parties will not be answered live**. If you have reasons to remain anonymous to the wider forum, please use the advance question or email options. Details in the appendix to the pack.
- **The OTF is not the place to challenge the actions of individual parties** (other than the NESO), and we will not comment on these challenges. This type of concern can be reported to the Market Monitoring team at: marketreporting@nationalenergyso.com
- **Questions will be answered in the upvoted order whenever possible**. We will take questions from further down the list when: the answer is not ready; we need to take the question away or the topic is outside of the scope of the OTF.
- **Slido will remain open until 12:00**, even when the call closes earlier, to provide the maximum opportunity for you to ask questions.
- **All questions will be recorded and published** All questions asked through Sli.do will be recorded and published, with answers, in the Operational Transparency Forum Q&A on the webpage: https://www.neso.energy/what-we-do/systems-operations/operational-transparency-forum
- **Takeaway questions** – these questions will be included in the pack for the next OTF, we may ask you to contact us by email in order to clarify or confirm details for the question.
- **Out of scope questions** will be forwarded to the appropriate NESO expert or team for a direct response. We may ask you to contact us by email to ensure we have the correct contact details for the response. These questions will not be managed through the OTF, and we are unable to forward questions without correct contact details. Information about the OTF purpose and scope can be found in the appendix of this slide pack

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slido

Audience Q&A was removed

ⓘ Start presenting to display the audience questions on this slide.

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Feedback

Please remember to use the feedback poll in Sli.do after the event.

We welcome feedback to understand what we are doing well and how we can improve the event for the future.

If you have any questions after the event, please contact the following email address: box.nc.customer@nationalenergyso.com

Appendix

Participation in the Operational Transparency Forum

Thank you to everyone who participates in the OTF, whether you join weekly, monthly, on specific occasions or follow up with the webinar recordings and published slides. We hear from participant feedback and our NESO colleagues that all of us value the opportunity to share information, ask questions and share the answers.

One of the reasons this format works so well is the professional courtesy we see demonstrated every week.

However, in recent weeks there have been some Slido questions and comments in the Q&A session directed at specific market participants suggesting their actions are not appropriate. This is concerning because:

- The statements are being made in a public forum without the opportunity to reply
- The negative comments may impact these businesses directly, or indirectly e.g.: through social media, etc.
- The individuals asking questions could not be traced using the details provided in Slido
- **The OTF is not the place to challenge the actions of individual parties** (other than the NESO), and we will not comment on these challenges. This type of concern can be reported to the Market Monitoring team at: marketreporting@nationalenergyso.com

Remember, if you have reasons to remain anonymous to the wider forum or have concerns your question may not be one to ask in public, you can use the advance questions or email options.

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Purpose and scope of the NESO Operational Transparency Forum

Slido code #OTF

Purpose

The Operational Transparency Forum runs once a week to provide updated information on and insight into the operational challenges faced by the control room in the recent past (1-2 weeks) and short-term future (1-2 weeks). The OTF will also signpost other NESO events, provide deep dives into focus topics, and allow industry to ask questions.

Scope

Aligns with purpose, see examples below:

In Scope of OTF

Material presented i.e.: regular content, deep dives, focus topics
NESO operational approach & challenges
NESO published data

Out of Scope of OTF

Data owned and/or published by other parties
e.g.: BMRS is published by Elexon
Processes including consultations operated by other parties e.g.: Elexon, Ofgem, DESNZ
Data owned by other parties
Details of NESO Control Room actions & decision making
Activities & operations of particular market participants
NESO policy & strategic decision making
Formal consultations e.g.: Code Changes, Business Planning, Market development

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Managing questions at the NESO Operational Transparency Forum

Slido code #OTF

- OTF participants can ask questions in the following ways:
  - Live via Slido code #OTF
  - In advance (before 12:00 on Monday) at https://forms.office.com/r/k0AEfKnai3
  - At any time to box.nc.customer@nationalenergyso.com

- **All questions asked through Sli.do** will be recorded and published, with answers, in the Operational Transparency Forum Q&A on the webpage: Operational Transparency Forum | NESO
- **Advance questions** will be included, with answers, in the slide pack for the next OTF and published in the OTF Q&A as above.
- **Email questions** which specifically request inclusion in the OTF will be treated as Advance questions, otherwise we will only reply direct to the sender.
- **Takeaway questions** – we may ask you to contact us by email in order to clarify or confirm details for the question.
- **Out of scope questions** will be forwarded to the appropriate NESO expert or team for a direct response. We may ask you to contact us by email to ensure we have the correct contact details for the response. These questions will not be managed through the OTF, and we are unable to forward questions without correct contact details. Information about the OTF purpose and scope can be found in the appendix of this slide pack.

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NESO Information Request Statement

The Energy Act 2023 and the power to request information.

Section 172 of The Energy Act 2023 provides NESO, as the Independent System Operator and Planner, with the power to require information, from anyone carrying out a relevant activity, to allow it to carry out any of its functions. This power will come into effect once NESO is operational.

In advance of this we are consulting on what the Information Request Statement will contain and what an Information Request issued by NESO may look like.

The Information Request Statement and Notice.

The Statement will be available on our website and will contain sections on why a request has been issued, the process of responding to a request, what happens if a recipient does not provide the information and how we will manage any data provided. A draft template of an Information Request Notice is also shared on our website.

The Consultation

We are running a consultation from **May 3rd to May 31st** which can be found at https://www.neso.energy/about/operational-information/information-request-statement-consultation and would welcome feedback from across industry to make sure we develop a statement which is clear and accessible.

Following the consultation period Ofgem will determine if the draft Statement is approved or if any changes are necessary.