You have been joined in listen only mode with your camera turned off

ESO Operational Transparency Forum

24 August 2022

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Introduction | Sli.do code #OTF

Please visit www.sli.do and enter the code #OTF to ask questions & provide us with post event feedback.

We will answer as many questions as possible at the end of the session. We may have to take away some questions and provide feedback from our expert colleagues in these areas during a future forum. **Ask your questions early in the session to give more opportunity to pull together the right people for responses.**

To tailor our forum and topics further we have asked for names (or organisations, or industry sector) against Sli.do questions. If you do not feel able to ask a question in this way please use the email: box.NC.Customer@nationalgrideso.com

These slides, event recordings and further information about the webinars can be found at the following location:
https://data.nationalgrideso.com/plans-reports-analysis/covid-19-preparedness-materials

Regular Topics

System Events (No system events this week)
Demand review
Costs for last week
Constraints
Questions from last week

Focus Areas:

Signpost for Enduring Auction Capability (EAC) Questionnaire

Inertia deep dive

Future deep dive/ response topics

Upcoming soon:
Carbon intensity deep dive – 31st August
ESO Trading on Interconnectors - 14th September

Items we have taken away and will come back to this forum on in the future
REMIT obligations on ESO

Feedback welcomed on our proposed deep dive topics

Enduring Auction Capability (EAC) Questionnaire

Having launched the full suite of response services and STOR on interim platforms, we are reviewing our current market arrangements and developing the enduring market design. We are eager to hear your feedback and insights on the enduring market design (including core auction functionalities, order structure, auction rules, etc.) of frequency response and reserve.

We would like to invite you to take our Enduring Auction Capability (EAC) Questionnaire by 5PM 9 September 2022.

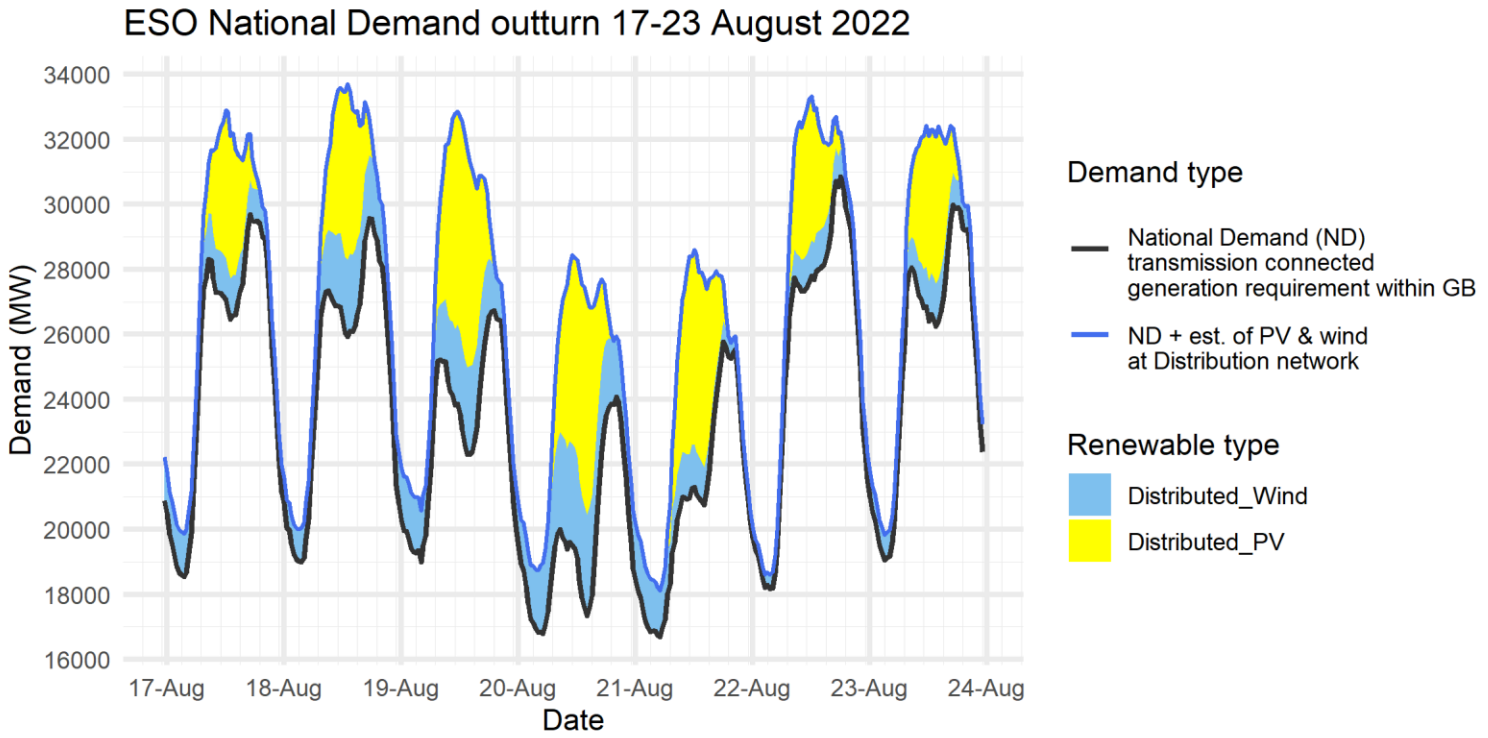
Demand Flexibility Service

Last week we hosted an industry webinar sharing our minded to proposals and will share the **recording** and **FAQs** on our website this week
https://www.nationalgrideso.com/industry-information/balancing-services/demand-flexibility

We will not be discussing the details of the Demand Flexibility Service in today's call and will take any questions on this topic away.

We will host out next webinar on **Monday 5 September** following the launch of the EBGL consultation of the service terms and welcome you to register your interest by emailing us at:
box.ESOConsumer@nationalgrideso.com

Demand | Last week demand out-turn



		FORECAST (Wed 17			OUTTURN		
Date	Forecasting Point	National Demand (GW)	Dist. wind (GW)	Dist. PV (GW)	National Demand (GW)	Dist. wind (GW)	Dist. PV (GW)
17 Aug	Afternoon Min	27.3	1.4	4.1	26.5	1.3	4.4
18 Aug	Overnight Min	19.6	1.0	0.0	19.0	1.0	0.0
18 Aug	Afternoon Min	25.3	2.4	4.5	25.9	2.4	5.4
19 Aug	Overnight Min	17.9	1.6	0.0	19.0	1.6	0.0
19 Aug	Afternoon Min	22.2	2.1	6.7	22.3	2.7	6.3
20 Aug	Overnight Min	16.7	1.7	0.0	16.8	2.2	0.0
20 Aug	Afternoon Min	17.4	3.1	5.8	17.3	3.1	6.7
21 Aug	Overnight Min	16.0	1.4	0.0	16.7	1.4	0.0
21 Aug	Afternoon Min	20.2	2.3	4.3	20.7	1.2	5.8
22 Aug	Overnight Min	16.1	2.0	0.0	18.2	0.4	0.0
22 Aug	Afternoon Min	24.5	2.4	4.6	27.7	1.1	4.1
23 Aug	Overnight Min	18.3	1.1	0.0	19.1	0.8	0.0
23 Aug	Afternoon Min	25.0	1.5	5.0	26.3	1.3	4.5

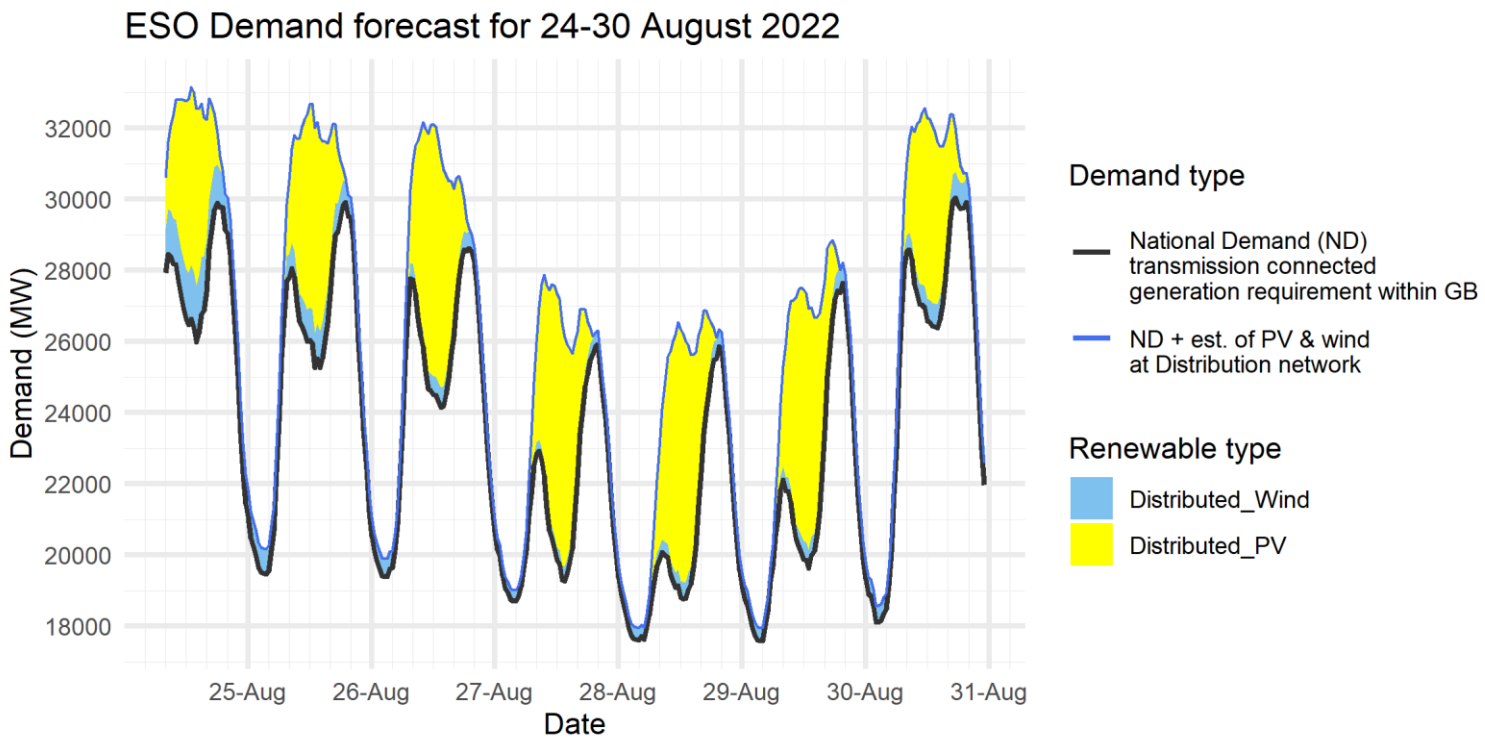
The black line (National Demand ND) is the measure of portion of total GB customer demand that is supplied by the transmission network.

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 ESO has no real time data.

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

Demand | Week Ahead



		FORECAST (Wed 24 Aug)		
Date	Forecasting Point	National Demand (GW)	Dist. wind (GW)	Dist. PV (GW)
24 Aug	Afternoon Min	26.0	1.6	5.0
25 Aug	Overnight Min	19.5	0.7	0.0
25 Aug	Afternoon Min	25.3	1.0	5.8
26 Aug	Overnight Min	19.4	0.5	0.0
26 Aug	Afternoon Min	24.2	0.6	6.5
27 Aug	Overnight Min	18.7	0.3	0.0
27 Aug	Afternoon Min	19.3	0.4	6.5
28 Aug	Overnight Min	17.6	0.3	0.0
28 Aug	Afternoon Min	18.8	0.5	7.0
29 Aug	Overnight Min	17.6	0.4	0.0
29 Aug	Afternoon Min	19.6	0.5	6.8
30 Aug	Overnight Min	18.1	0.5	0.0
30 Aug	Afternoon Min	26.4	0.7	4.6

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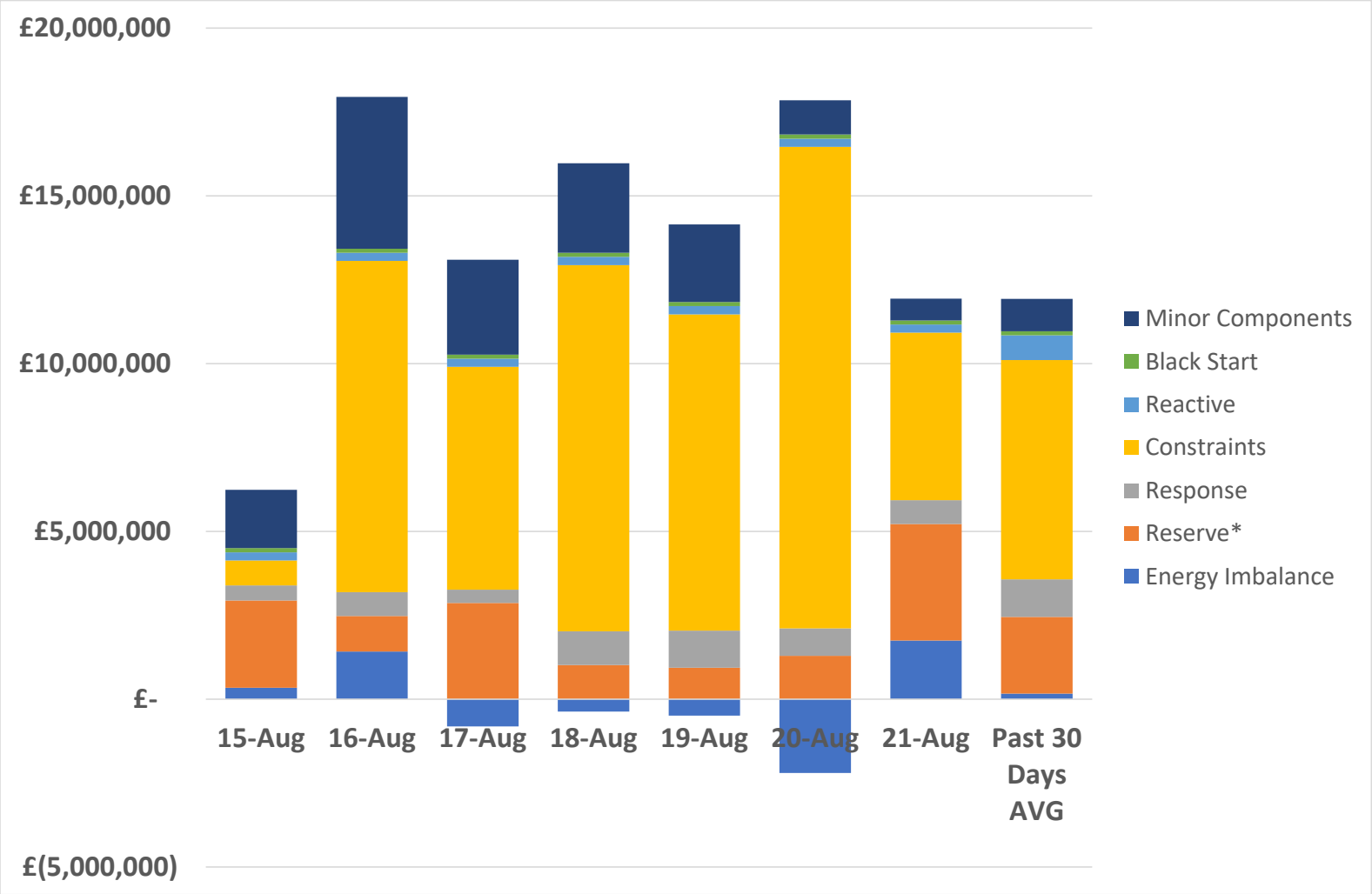
ESO Actions | Category costs breakdown for the last week



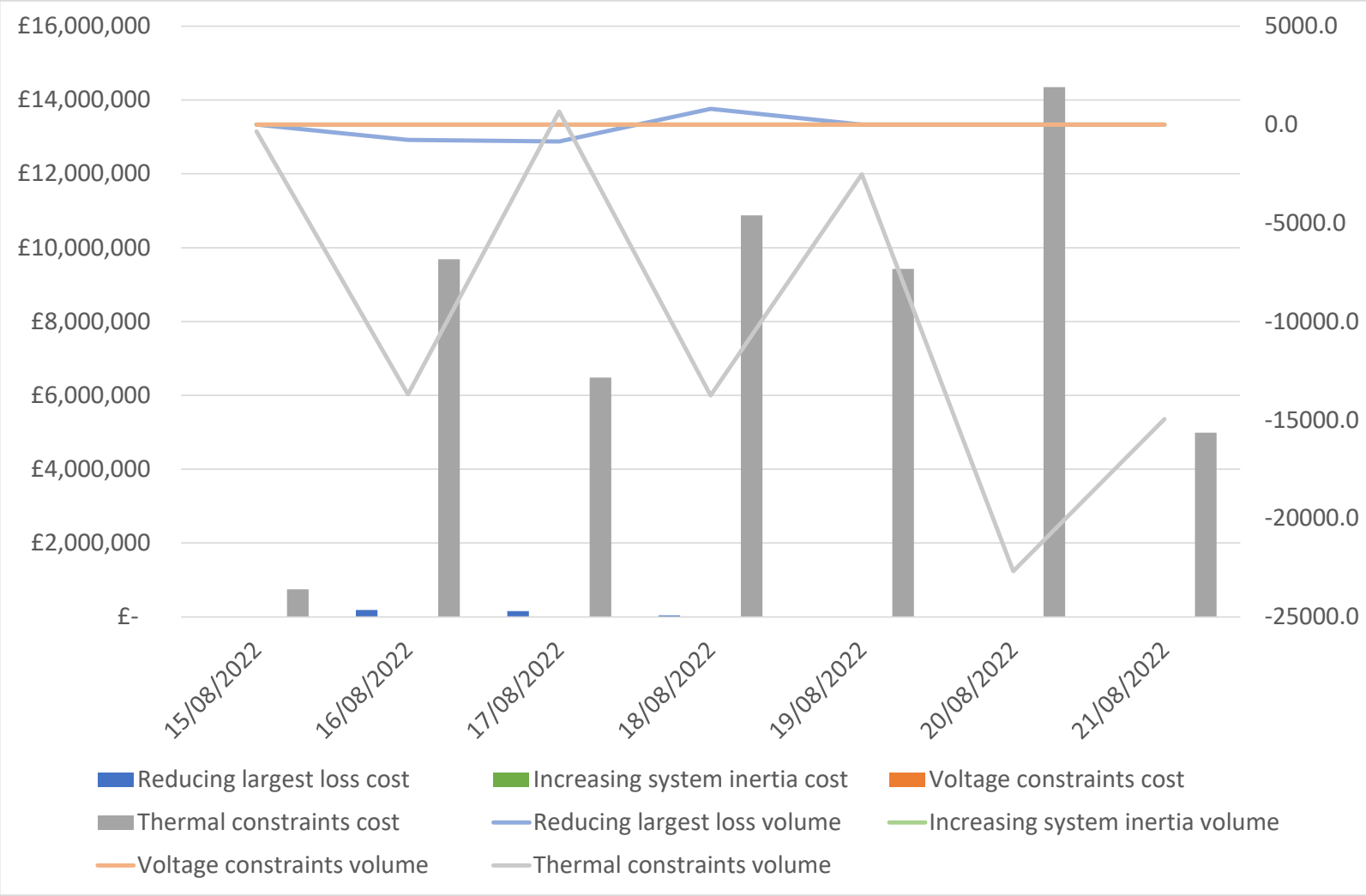
Date	Total (£m)
15/08/2022	6.2
16/08/2022	18.1
17/08/2022	12.3
18/08/2022	15.6
19/08/2022	13.7
20/08/2022	15.7
21/08/2022	11.9
Weekly Total	93.4

Constraint was the key cost component From Tuesday to Sunday.

*Reserve includes Operating Reserve, STOR, Fast Reserve, Negative Reserve, Other Reserve

Past 30 Days Average is displayed in the chart

ESO Actions | Constraint Cost Breakdown



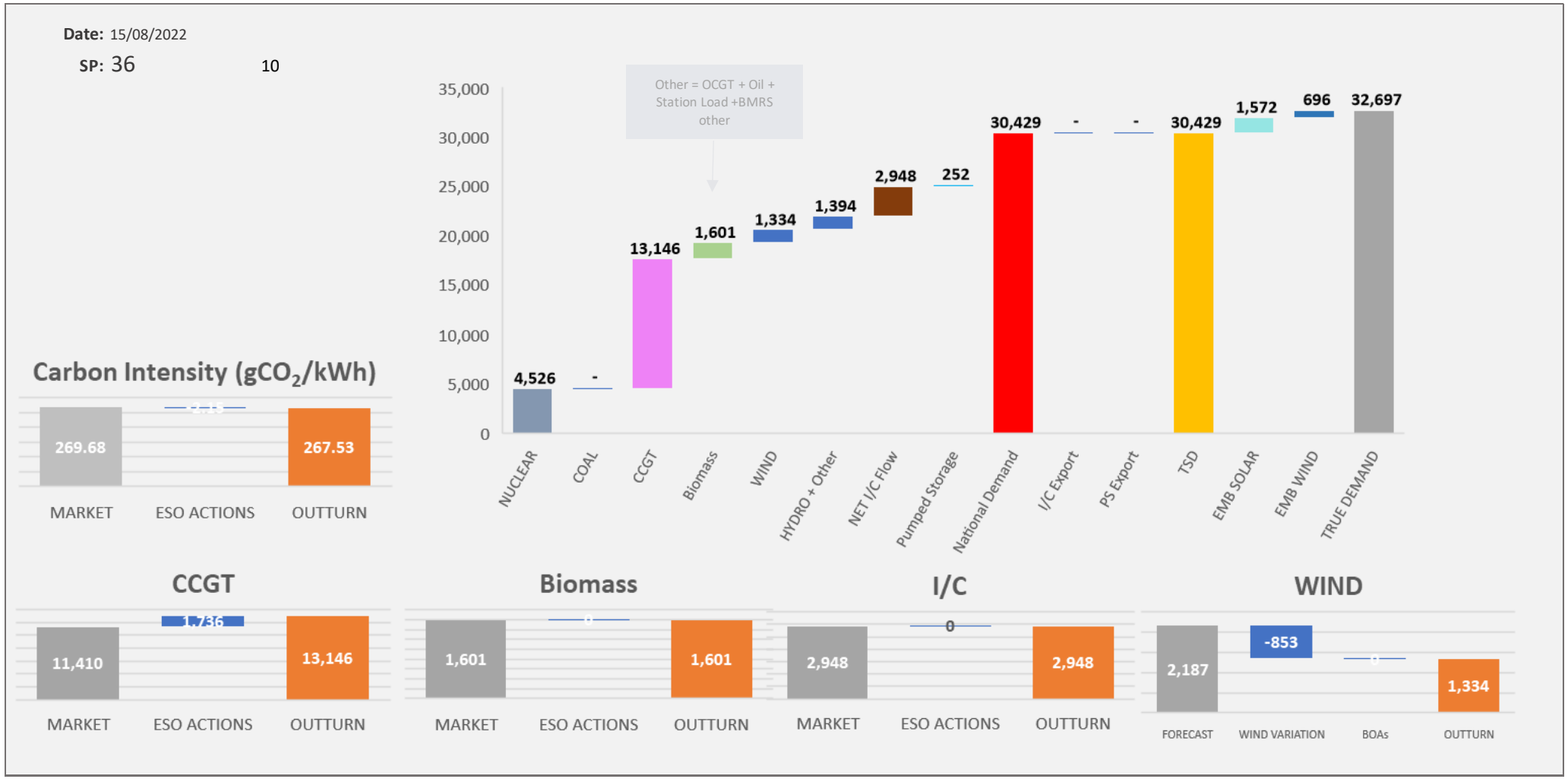
Thermal – network congestion
Actions required to manage Thermal Constraints throughout the week.

Voltage
No Intervention to manage the voltage levels.

Managing largest loss for RoCoF
Intervention required to manage largest loss on Monday, Tuesday and Wednesday

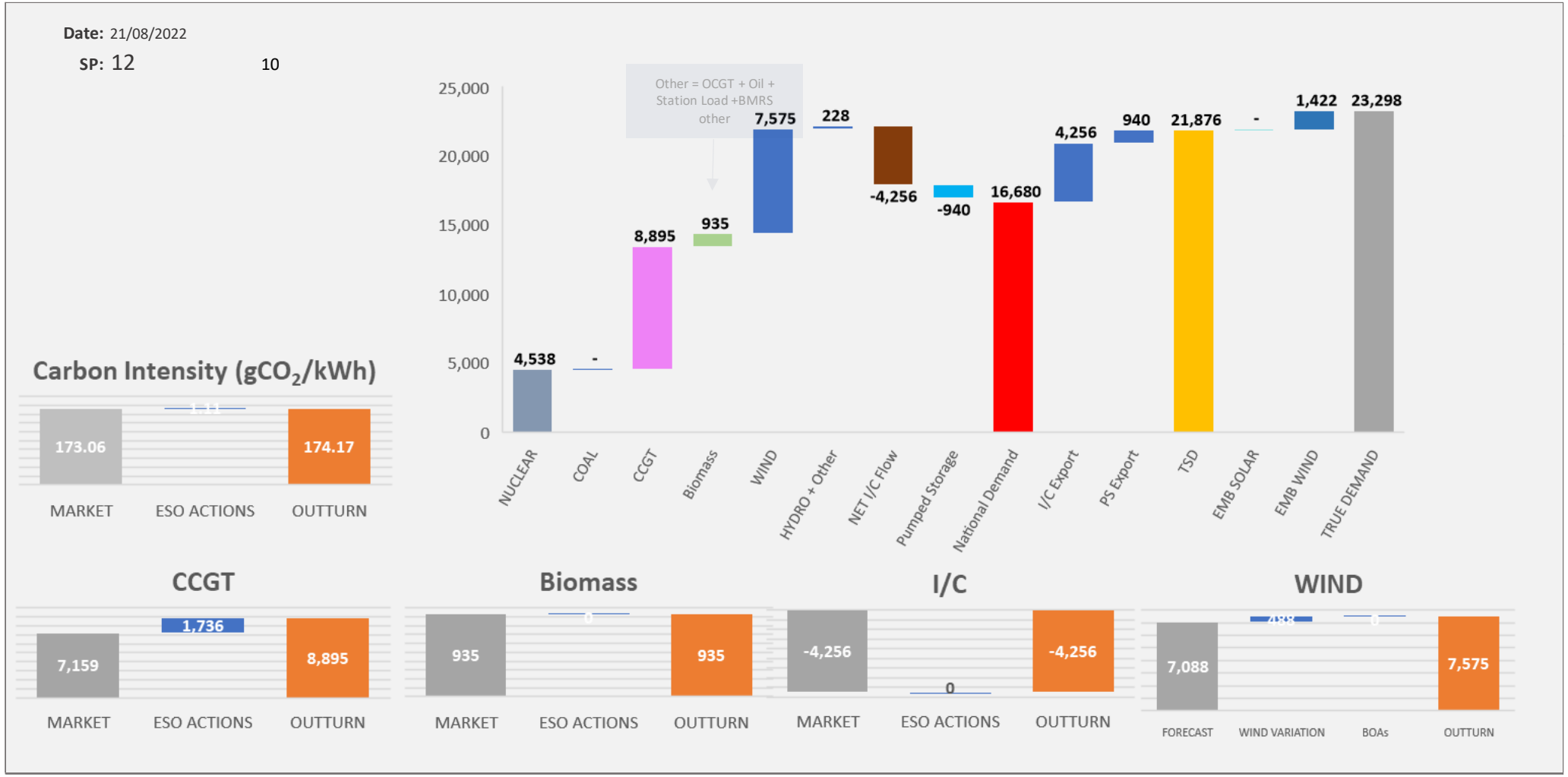
Increasing inertia
No Intervention required to manage Inertia

ESO Actions | Monday 15 August – Peak Demand – SP spend ~£38k



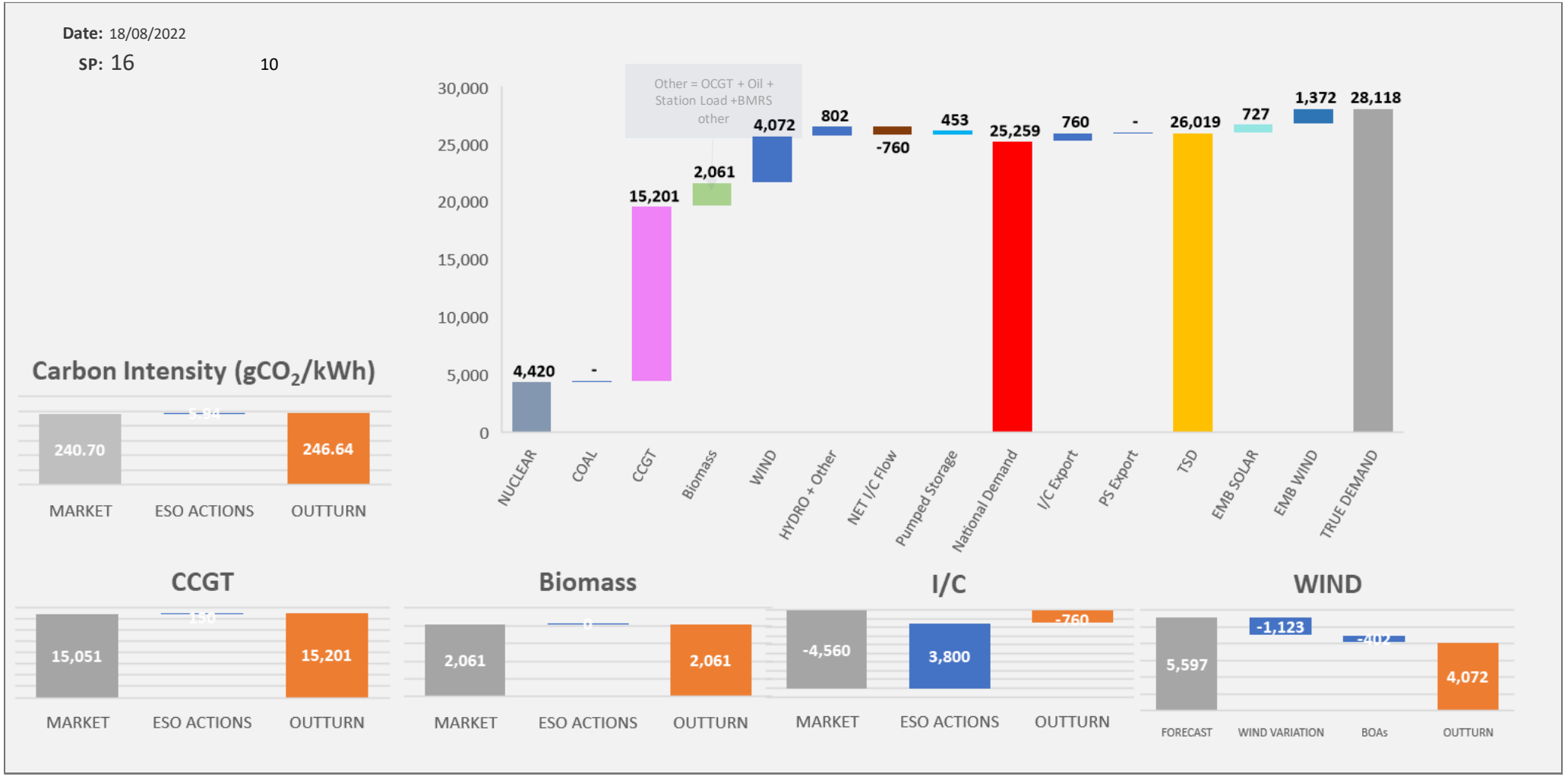
Carbon Intensity data on data portal: https://data.nationalgrideso.com/carbon-intensity1/carbon-intensity-of-balancing-actions

ESO Actions | Sunday 21 August – Minimum Demand – SP Spend ~£235k



Carbon Intensity data on data portal: https://data.nationalgrideso.com/carbon-intensity1/carbon-intensity-of-balancing-actions

ESO Actions | Thursday 16 August – Highest SP Spend ~£800k



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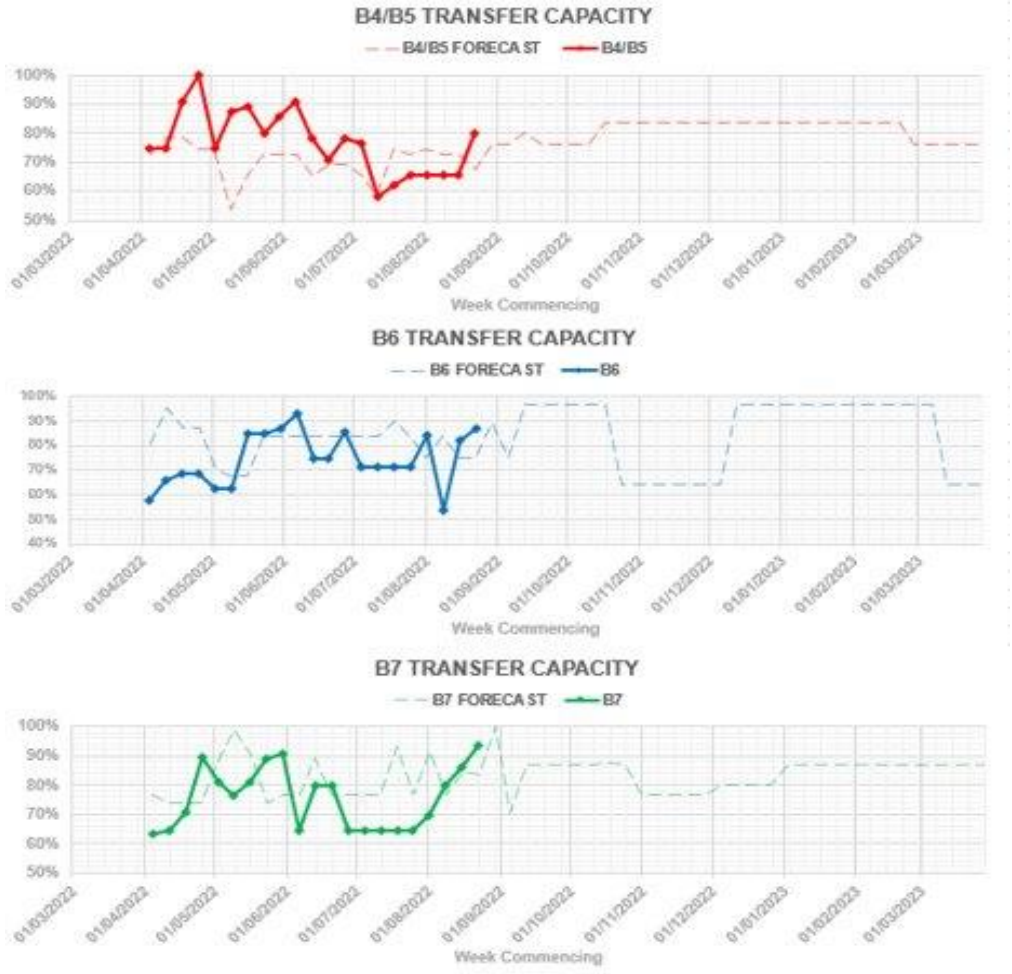
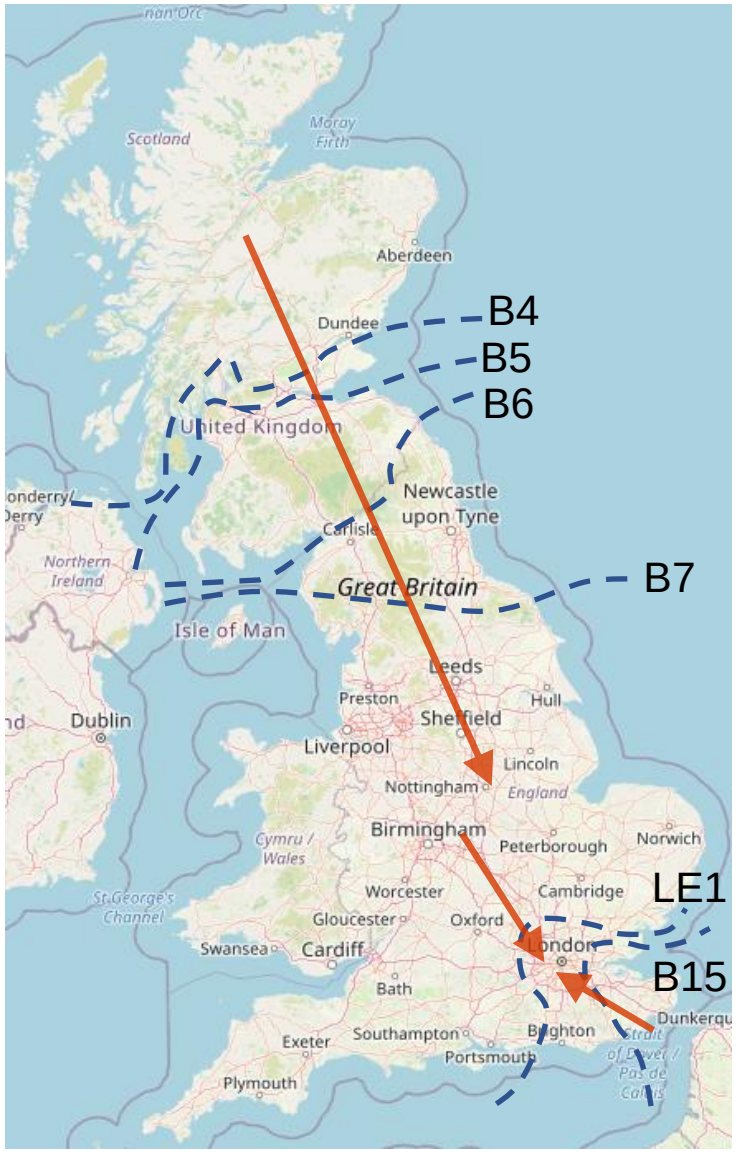
Transparency | Network Congestion



Boundary	Max. Capacity (MW)
B4/B5	2250
B6	4850
B7	7950
LE1	7200
B15	4500



Day ahead flows and limits, and the 24 month constraint limit forecast are published on the ESO Data Portal:
https://data.nationalgrideso.com/data-groups/constraint-management

Transparency | Network Congestion

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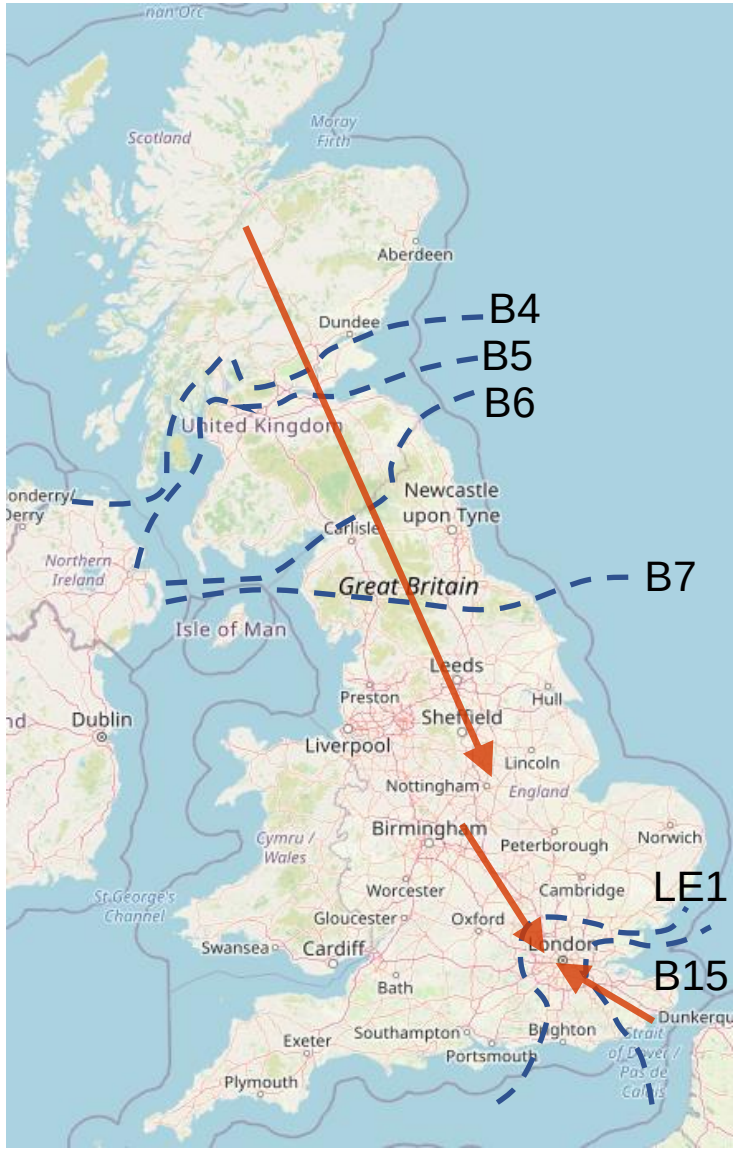

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System Inertia Deep Dive

Paddy McNabb
Anna Blackwell

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Declining inertia

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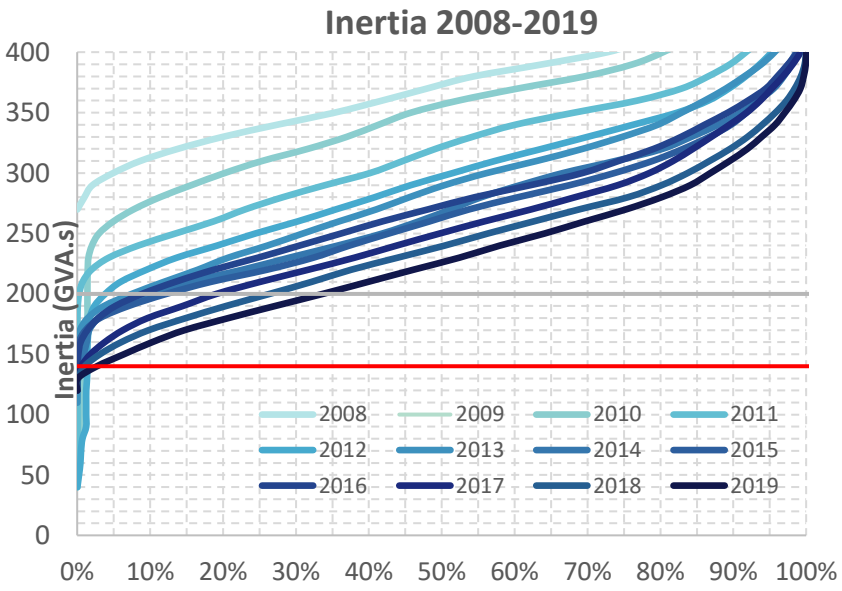
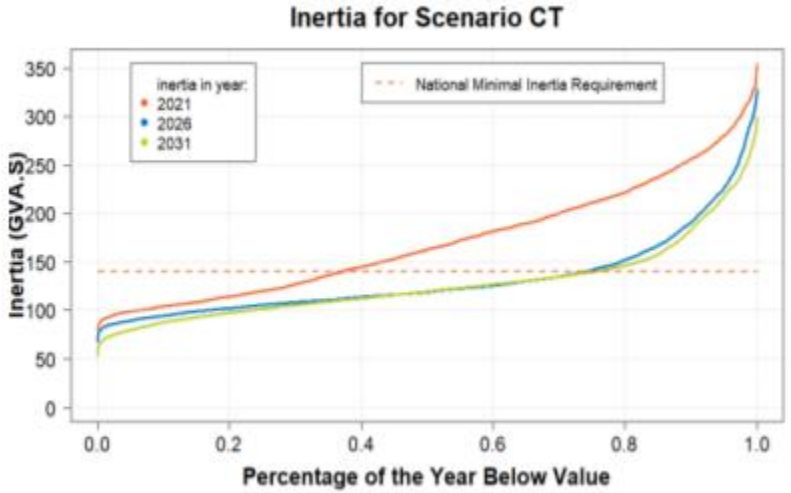
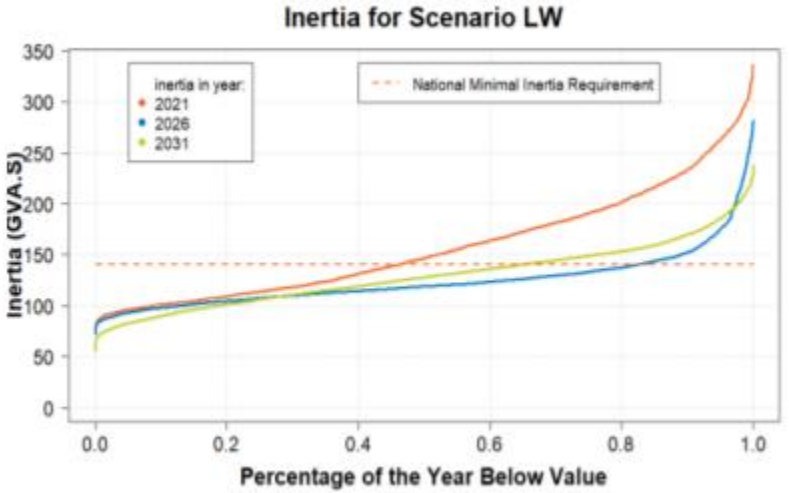
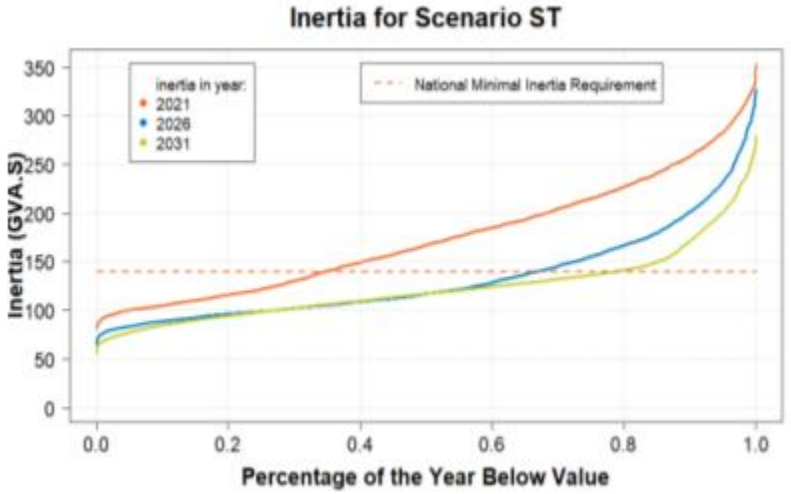
- The rate at which frequency changes following a loss of generation or demand depends on the total system inertia.
- The declining trend of the inertia is across all scenarios.

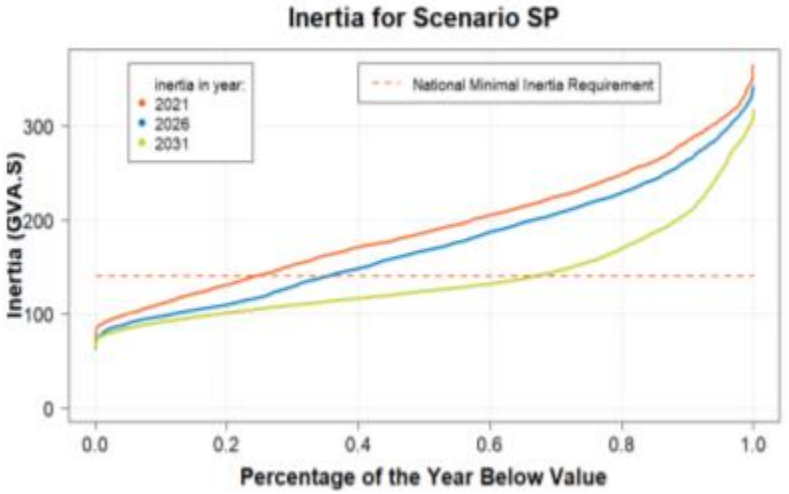


Annual distribution of inertia for four future energy scenarios









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Zero carbon by 2025

Loss of Mains change programme

Changing embedded generation settings to reduce unnecessary tripping – nearly 6,000 sites changed to date, around 10.7GW of capacity.

Reducing RoCoF 0.125Hz risk

Stability Pathfinders

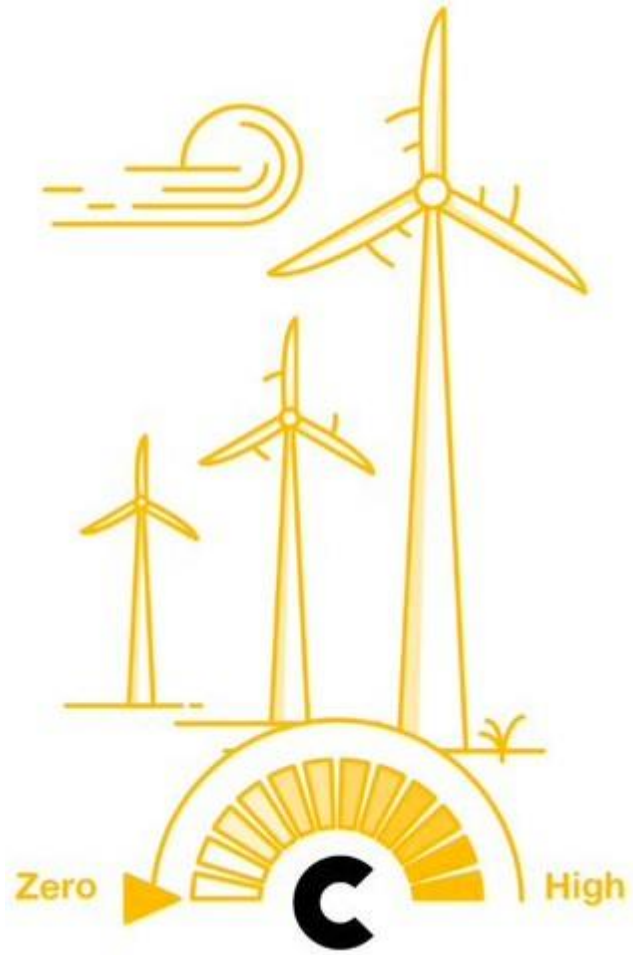
Providing inertia and short circuit capacity without generating megawatts

- 12.5GVA.s connected in GB under phase 1 (7.5 GVAs currently)
- Phase 2 contracted in Scotland (6.7 GVAs)
- Phase 3 ongoing

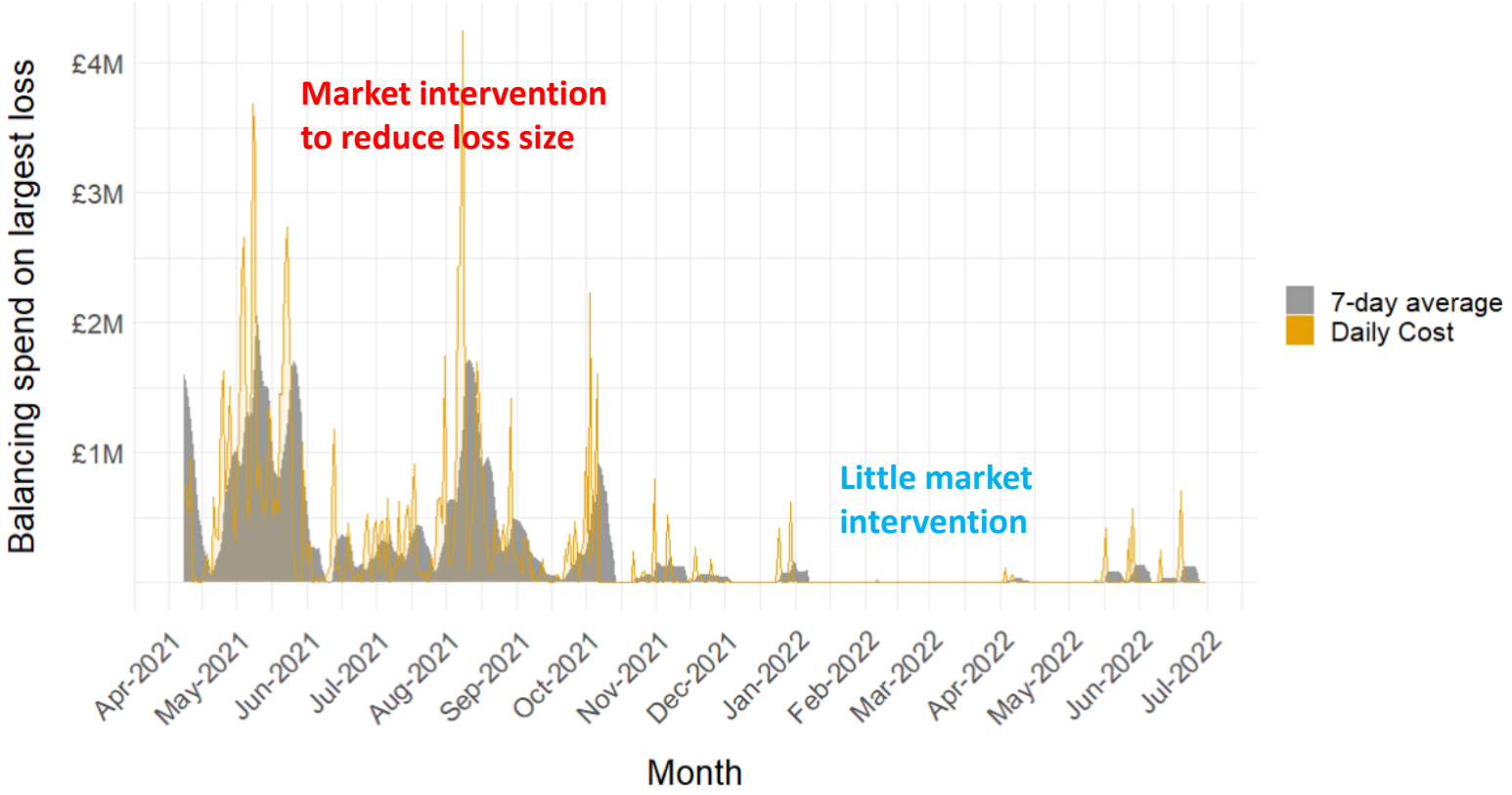
Frequency management – Reserve and Response Roadmap

New, fast and flexible ways to keep frequency stable, including

- Dynamic Containment – sub-second response to catch deviations
- Dynamic Regulation & Dynamic Moderation – correct frequency deviations



Frequency Risk and Control Report (FRCR)



Progress to date

SQSS Mod GSR027 introduced the **FRCR** to establish a clear and transparent process to assess reliability vs. cost of managing frequency in the GB power system

The Accelerated Loss of Mains Change Programme (**ALoMCP**) has delivered a large rediction in risk from inadvertent operation of RoCoF and Vector Shift relays

Dynamic Containment (**DC**) has grown to > 1GW and provides fast-acting response to enable to ESO to secure larger losses

Outcome was FRCR 2021 policy and resulting reduction in market interventions to manage loss risks

FRCR 2023 – Minimum Inertia Policy

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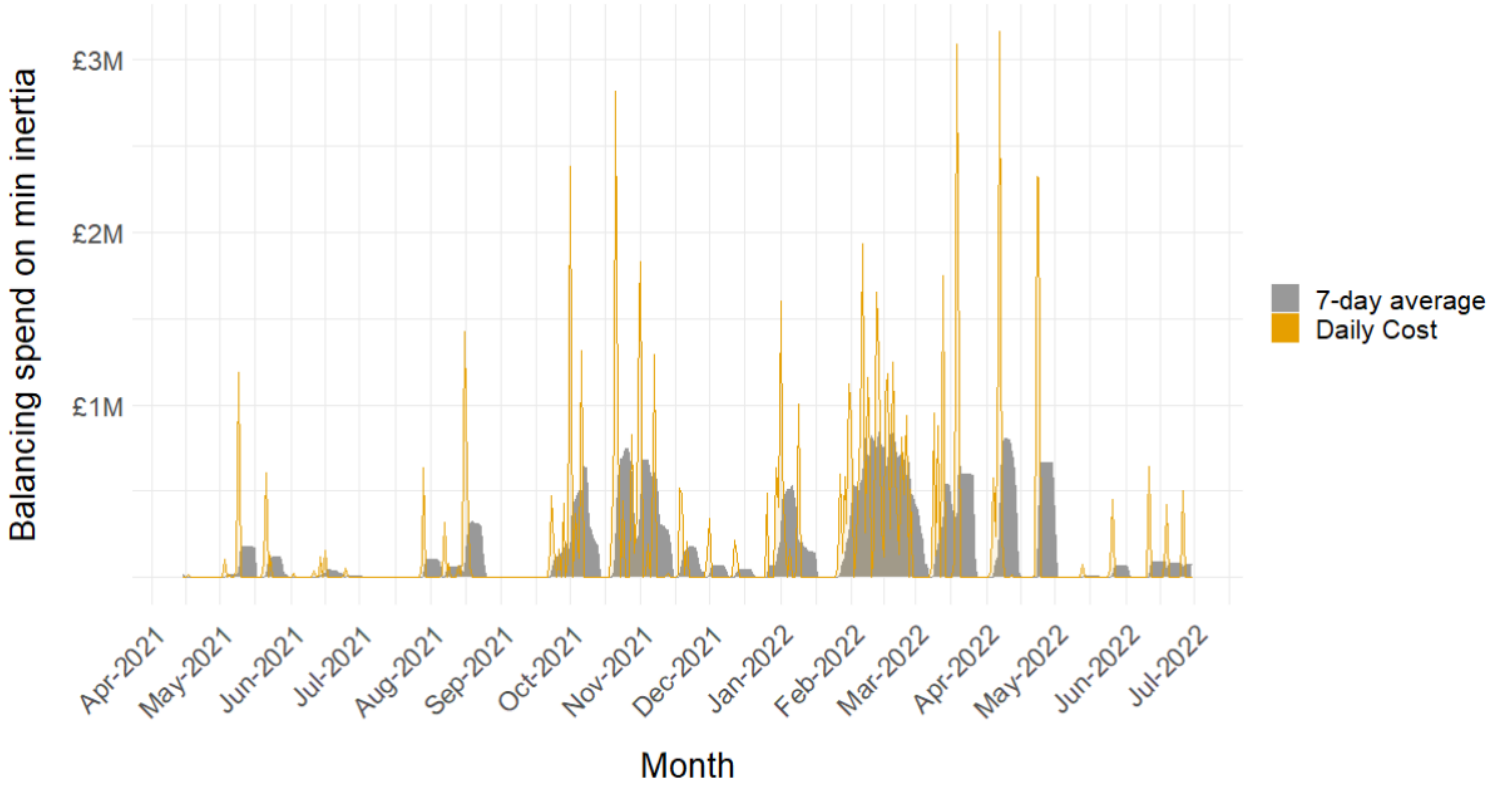
FRCR 2023 aims to reduce minimum inertia policy limits to <140GVA.s



Meeting min. inertia policy

Minimum inertia policy is currently set at 140GVA.s. To meet the requirement in certain conditions synchronous plant needs to be connected to the system with a corresponding reduction in non-synchronous plant to ensure generation matches demand

This typically occurs through the BM where units receive and offer price to generate and non-synchronous units receive a bid price to reduce output

Costs and volume of actions have been increasing year on year due to an increase in the number of low inertia periods and higher wholesale costs with approx. £100m spent in the last year to manage inertia

Inertia – where it comes from

Bulk Generation & Plant
Steam/Hydro/Gas generation
Flywheels

Load
Rotating machines
Other passive/active behaviour

Inverter-Based Resources
Solar/Wind Generation
HVDC Links
Energy Storage

Rotating Inertia
Easy to know

Effective Inertia
Includes "hidden" contributors

Then / Now
High inertia
Easy to estimate

Now / Future
Low inertia
Harder to estimate

Historically estimated Effective Inertia, measurement is now becoming **critical** to operation

RTL GridMetrix Inertia Measurement

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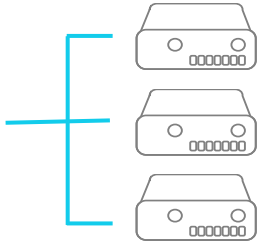
Modulator

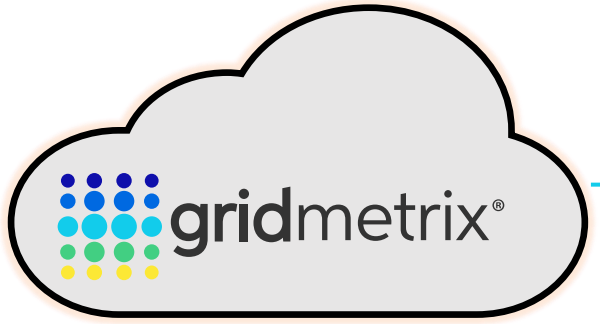
Send small signals through the Grid and extrapolate meaning gives unique insight

eXtensible Measurement Units (XMU)



Wide area monitoring, improved measurement and visibility

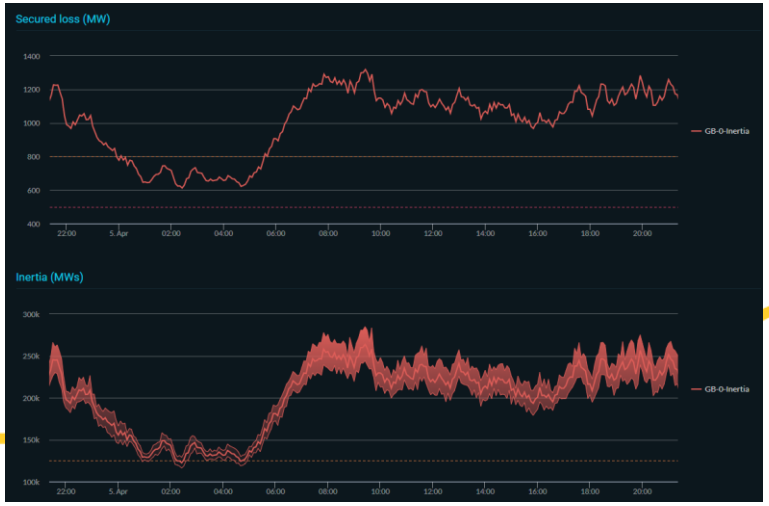
Grid Metrix Cloud



Software/infrastructure as a service:

- Analytics to translate measurements into valuable datapoints for Grid operation improvements
- Cloud platform allows for scalability and additional applications to be built from same infrastructure

Customer's control centre



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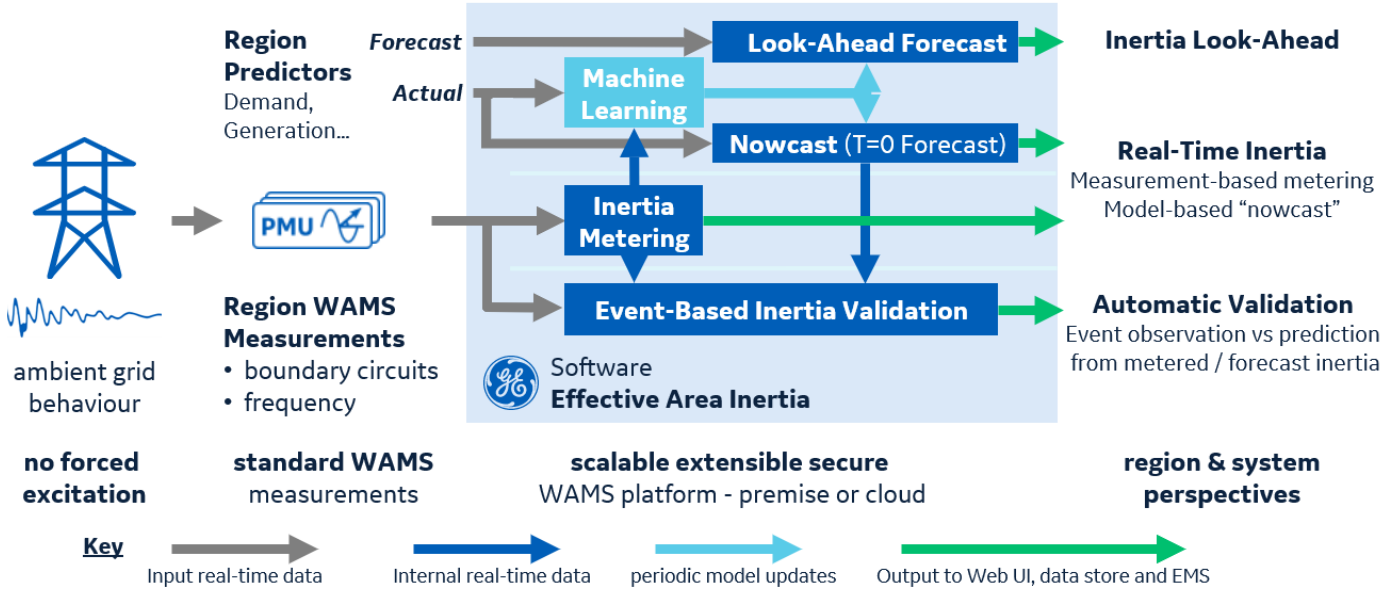
Inertia Measurement Data

- Data analysis being undertaken with National Physical Laboratory
- Initial indications show good correlation with existing NGESO estimation calculation method
  - Reviewing discrepancies
  - Calibrating measurements against large loss of load events
- Tools visible to Control engineers but not currently used for decision making
- Aim to incorporate into control room processes later this year based on data analysis work

GE Digital Effective Inertia Forecasting & Metering



Themes from Winter Contingency Contract questions

Pricing of the contracts and effects on cash out

Our intention is to minimise effects of the contracts on imbalance prices. We heard your feedback on this area last week and welcome constructive contributions on how this is best achieved. This is an area we are continuing to work on and are working with Elexon.

Q: If coal plant is instructed on due a shortfall of energy, why is this a flagged action? Surely this volume needs to flow into the cash out calculation?

A: The winter contingency contract costs are being fully recovered though BSUoS and will not be taken alongside other commercial options. The approach of system flagging any action is part of our intention to minimise the impact of these actions on cash out and BM costs.

Q: SBR contracts were priced into cashout at VoLL and this was supported by Ofgem and the market in general. Why is the ESO taking a different approach to these contingency contracts?

A: The cost of the winter contingency contracts is being recovered through BSUoS and so pricing as £0 removes any unnecessary cash flows.

Themes from Winter Contingency Contract questions

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Q: The Environmental Protection (England) (Coal Fired Power Stations) Direction 2022 refers to coal-fired power stations operating when required by the ESO under the Electricity Supply Emergency Code. Is that intended to refer to the winter contingency contracts and what is the relevance of ESEC?

A: ESEC covers the provision for a long-term generation shortfall requiring restrictions on consumption of electricity. This code is owned by BEIS and is separate to the winter contingency contracts.

Q: What is the penalty and testing regime for the contingency contracts?

A: This is a contractual element that will not be shared at this forum

Clarification: There are performance measures within the signed contracts based on availability of the plant. We will not go into detail on these measures as the specific terms in the bilateral contracts are confidential.

Questions outstanding from previous weeks

Q: If a system stress event is active on both gas and power, how do the electricity system operator and gas control centre communicate? Which stress event takes priority? It is likely that there would be insufficient gas for gas generation to meet the generation requirement.

A: NGESO and NGG are able to share information during an emergency situation to allow both parties to understand interplays between the gas and electricity systems and inform actions to mitigate detrimental impacts arising from these interactions.

Q: On 11/08, interconnector requirements have been called on all interconnector cables, but on H20 only 2GW has been done out of 4.8GW. Why did you not close all the volume?

A: This was shared in the slides during the OTF. We continue to optimise our requirements and our alternative cost forecasts for trading until the trades are completed. ratings with the Transmission Owners on circuits to increase the power flow across constraint boundaries.

Q: Why the increase in the latest BSUoS forecast? Can explanatory notes please be published with the forecast?

A: The forecast for August 2022 increased when published in July compared to that published in June because of an increase in the wholesale electricity prices in the forward markets. We try to provide a forecast commentary in the pdf.

Questions outstanding from previous weeks

Q: There are two sources of reporting for NG's interconnector trades: (a) the Interconnector requirement and auction summary data, and (b) the Upcoming Trades page. These two sources are often reporting different values for the interconnector trades. Why the difference? Which is the correct source?

A: The upcoming trades are the individual trades that have been agreed per counterparty, per hour. The requirements and auction summary page is the output of the auction carried out to agree the trades and is an aggregated version of this data. This data is all provisional and subject to correction during our usual trade confirmation process with counterparties. The upcoming trades page is updated every 10mins so any changes as part of the trade confirmation are reflected there. If there are differences the upcoming trades will be the primary source of data.

Q: What level of demand reduction/demand destruction are you forecasting for the winter ahead from commercial industrial consumers as a price response?

A: ESO forecasts electricity demand at the national level. We can not attribute portion of demand into sectors or particular customers group.

At the national level we are currently anticipating slight drop in the demand due to economic factors.

Questions outstanding from previous weeks

Q: Why is your costs for 11th Aug. lower in slide 25 (£19m) compared to £24m in the Trading Costs slide 17? Where is the discrepancy and how are the extra £5m costs treated if not a mistake?

A: Trading costs are the actual trade costs paid to counterparties. The costs presented weekly are the total costs incurred on the system that day taking into consideration all the actions on the system. Some actions taken on the system will have an cost to ESO and some will involve a payment to ESO. This is why the numbers do not and are not meant to match.

Q: When will the Local Constraint Market go live? Is there a specific start date?

A: We are looking to appoint and work with a platform provider to deliver the LCM service very shortly, and at which point we should be able to share more accurate timescales. However, we anticipate deliver being in early Q1 2023.

Questions outstanding we are still working on

Q: The Irish ICs over July (Moyle basically all July, East-West 10th July) generated to a nomination profile completely away from their PNs. This is a semi-regular occurrence since ISEM. After several years why are PNs still not submitted correctly for Irish ICs?

Q: Is constraint cost going to increase year on year? Looking at few months trends in Summer, Winter? Any views? When constraint management plans from ESO will kick-in to reduce the constraint?

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Audience Q&A Session

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

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@nationalgrideso.com

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