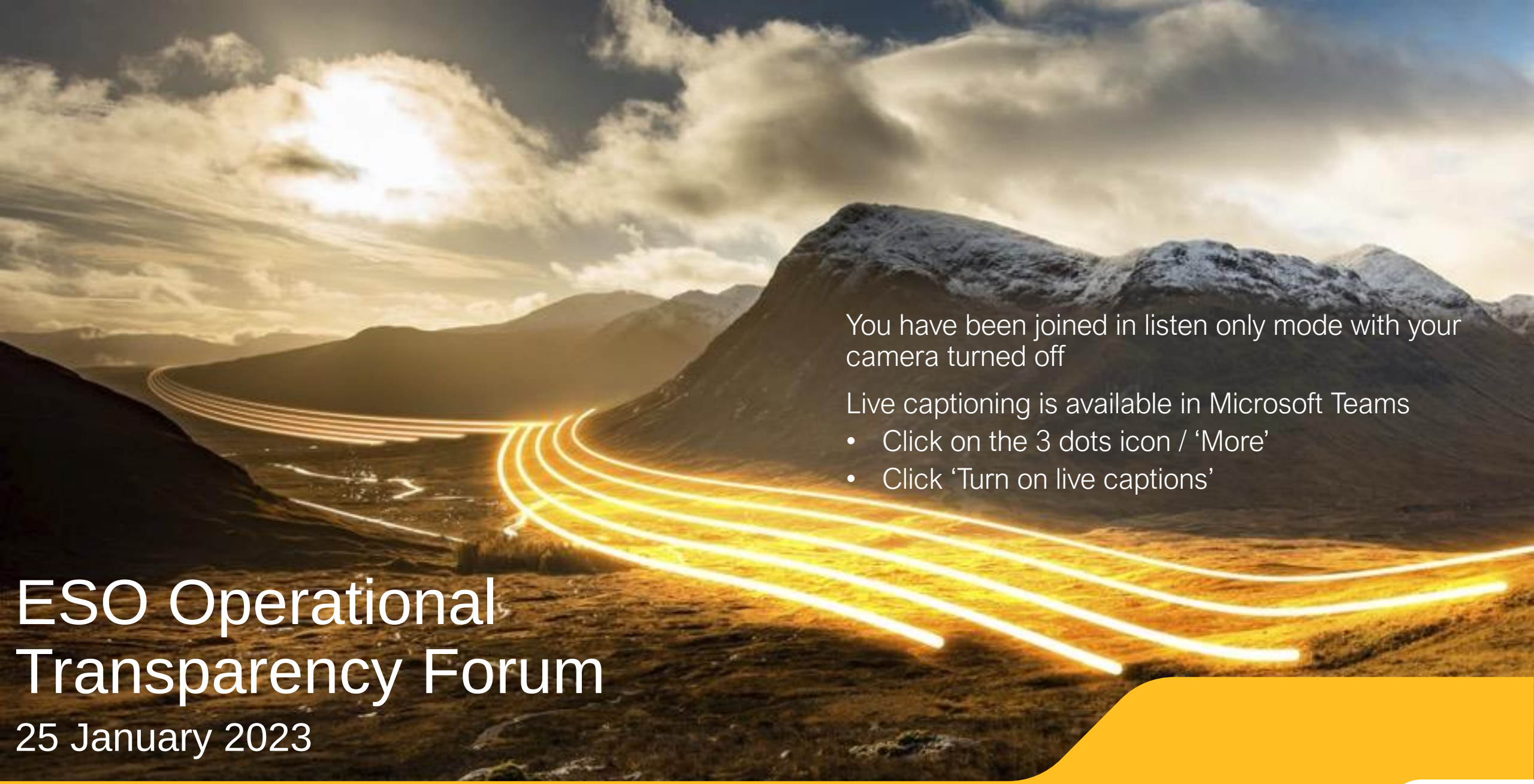


You have been joined in listen only mode with your camera turned off

Live captioning is available in Microsoft Teams

- Click on the 3 dots icon / ‘More’
- Click ‘Turn on live captions’

ESO Operational Transparency Forum

25 January 2023

ESO

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:

Advanced question can be asked here: https://forms.office.com/r/k0AEfKnai3

Stay up to date on our new webpage: https://www.nationalgrideso.com/OTF

Future deep dive / response topics & signposts

Today:

Operational Overview (Monday 23 January and Tuesday 24 January)

Coming soon:

December Balancing Costs Overview –01 February

Reserve Reform update

Response markets deep dive

System Inertia

Feedback welcomed on our proposed deep dive topics

Winter Contingency Units

Service instructions (Sunday 22 January to Tuesday 24 January 2023)

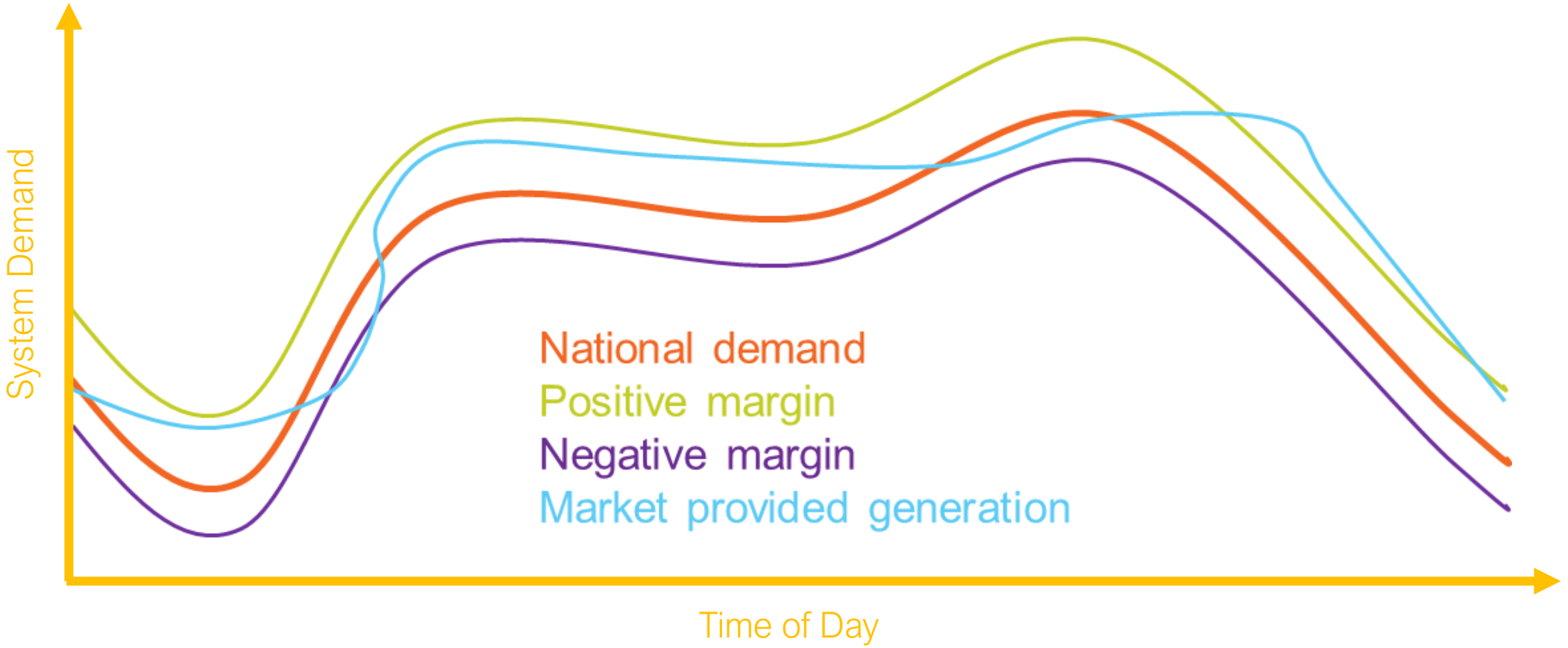
The following BM Start-Up instructions were issued over the period:

BMU ID	Instruction Issued	Instruction Cancelled	Notes
DRAXX-5	22/01/23 03:38 23/01/23 16:56	22/01/23 23:55 24/01/23 04:30	SONAR only SONAR & BMRS
DRAXX-6	22/01/23 03:39 23/01/23 16:32	22/01/23 23:55 24/01/23 04:04	SONAR only SONAR & BMRS
WBUPS-1	22/01/23 03:41 22/01/23 10:51	23/01/23 02:28	SONAR only SONAR only (re-issued due to unit MEL re-dec which caused inadvertent auto-cancellation)
WBUPS-2	23/01/23 17:01	24/01/23 02:37	SONAR & BMRS

For clarity, going forward we intend to issue a BMRS message for any actions relating to the winter contingency units.

Transparency | Why do we hold Operating Margin?

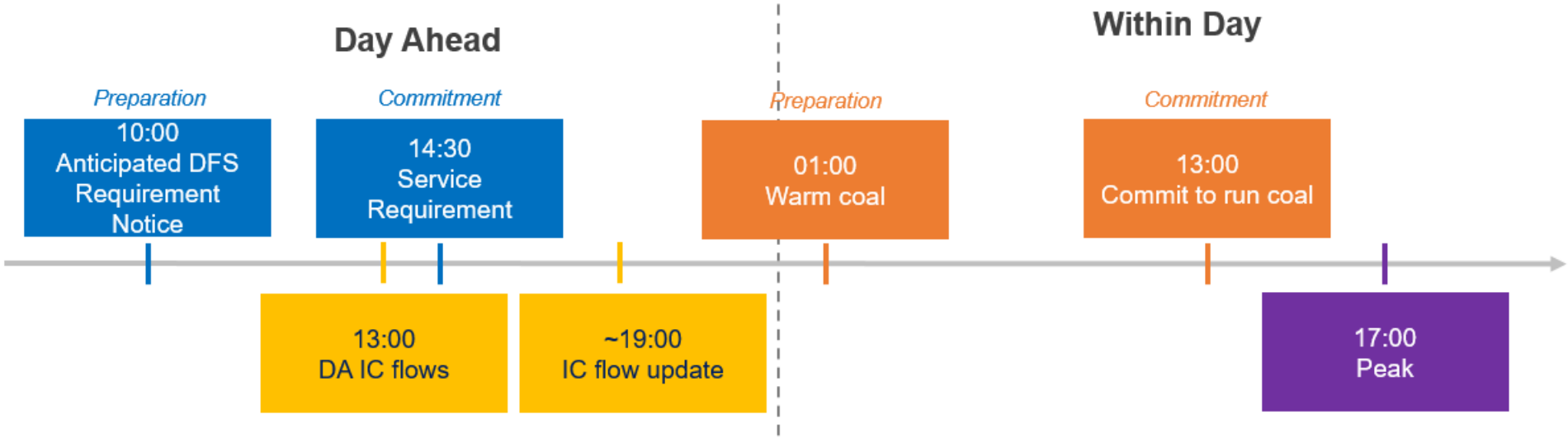
NGESO must ensure that there is sufficient Operating Margin held to meet system security requirements due to variety of factors, such as loss of generation, normal fluctuations in national demand and variance from forecast.



This reserve is required to account for the low likelihood series of events which could occur

Context and background

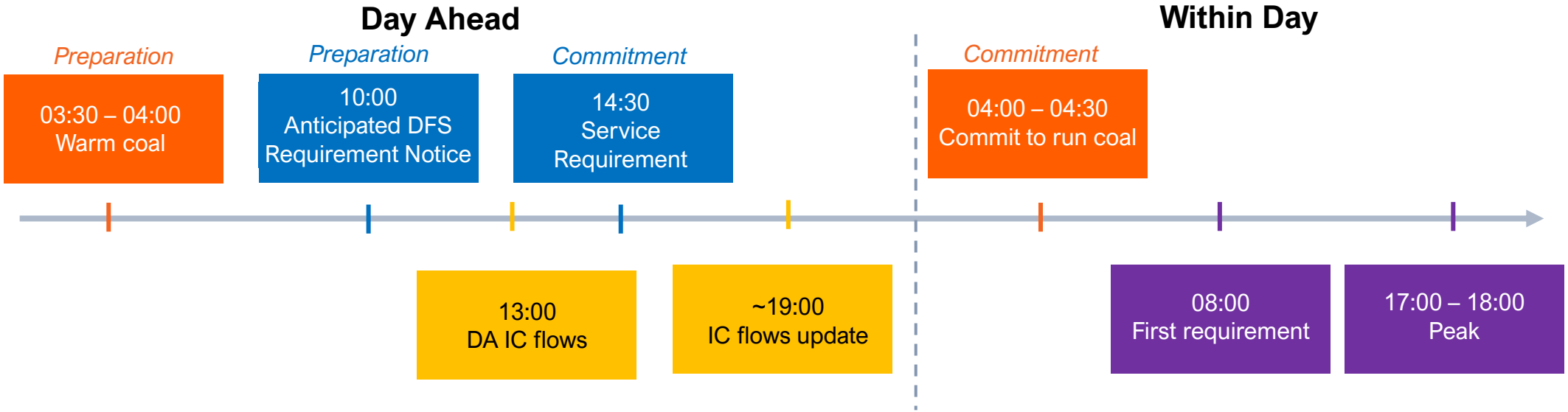
- Winter contingency contracts and the Demand Flexibility Service (DFS) have been implemented as **enhanced actions** for this Winter
- These services are intended for use when we anticipate we will exhaust our **every day actions**
- Each service has two key stages: *preparation* and *commitment*



For more information on our Order of actions Policy see https://www.nationalgrideso.com/document/268116/download

Navigating uncertainty

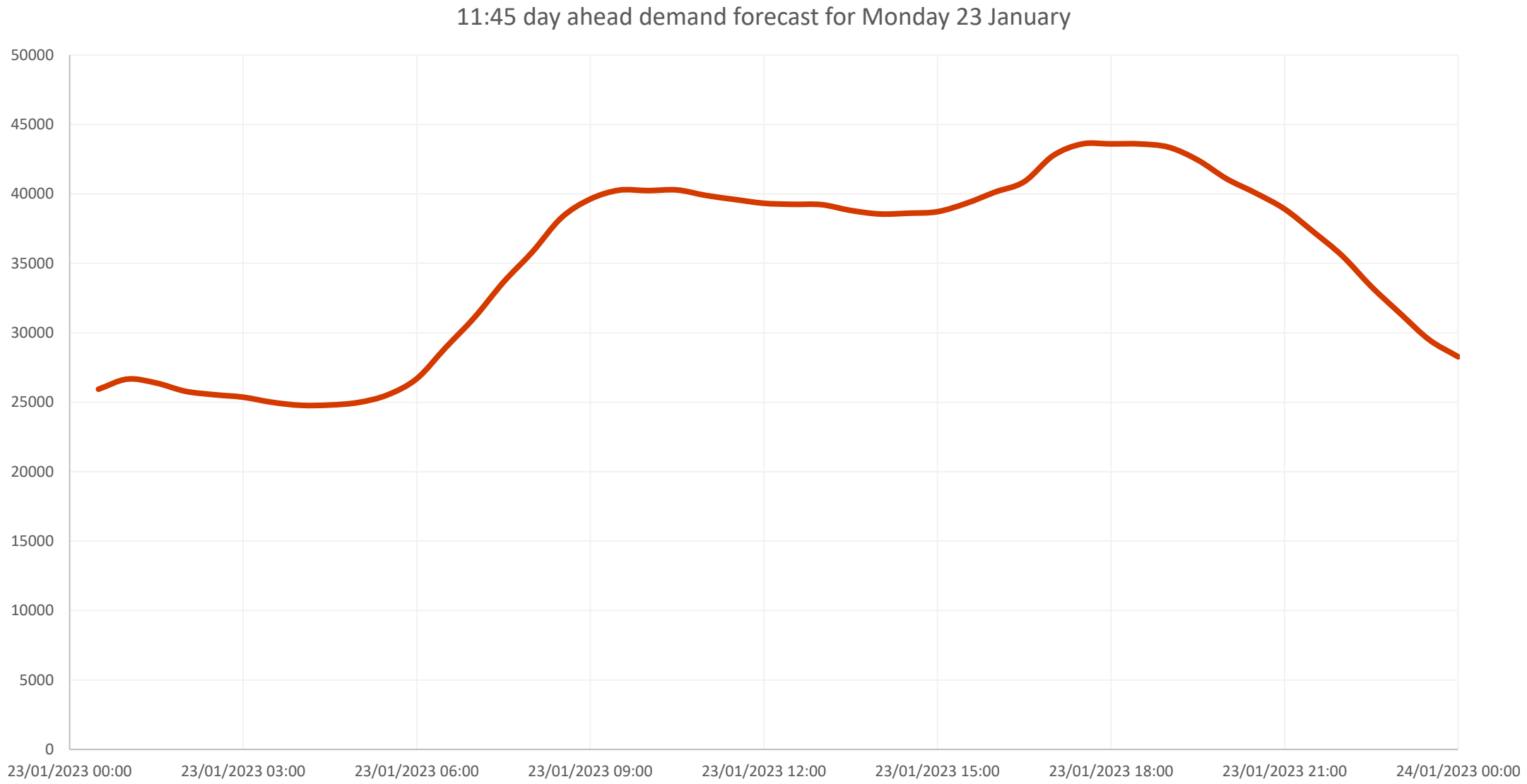
- When taking decisions at these lead times, as ESO we will always be navigating uncertainty with respect to the assumptions that impact our requirement calculations such as:
  - Available generation including access to constrained generation
  - Interconnector flows and status of other TSOs
  - Demand, including risk of triad avoidance and demand suppression
  - Wind forecast variability
  - Reserve requirements e.g. contingency reserve requirement erodes as you get closer to real time
- All decisions are made with the most up to date data available at the time alongside engineering judgment to minimise uncertainty
- **For Monday 23 January, coal warming timescales being 24hours instead of 12hours and the requirement sitting within the morning meant that the gap between the preparation and commitment stages was further widened.**



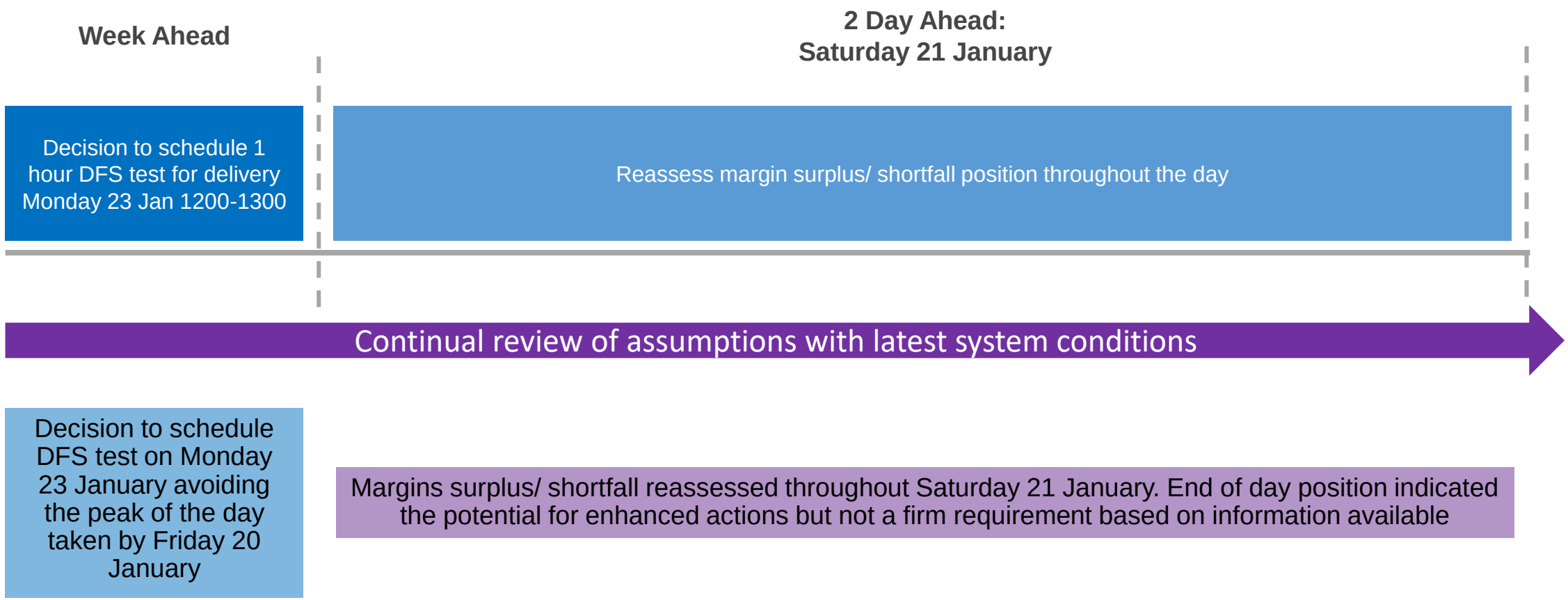
For more information on our Order of actions Policy see https://www.nationalgrideso.com/document/268116/download

Sli.do code #OTF

Timeline for the decisions taken moving into Monday 23 January



Week Ahead to Two Day Ahead Timescales



Sli.do code #OTF

Day Ahead – Sunday 22 January

Preparation

03:30 – 04:00
3x Winter Contingency Units warmed (earliest sync times 03:30-04:30 Monday)

Preparation

10:00
DFS Test process initiated

Commitment

13:30
Optimise network given prevailing conditions

Commitment

14:30
DFS Service requirement **issued** – DFS test requirement cancelled

10:30 - Interconnector assumptions updated following call with TSOs

13:30 - Interconnector profiles came through, which showed that DFS live requirement existed

Continual review of assumptions with latest system conditions

Overnight assessment showed a reliance on interconnector capacity which we weren't certain we could achieve. In addition generation availability was uncertain in the cold weather.

3x coal units warmed as a precautionary measure.

Requirements could be met through interconnector flows. Without further intelligence from neighbouring TSOs we decided to go ahead with the DFS test in the knowledge that we could proceed, cancel or convert to a live event later in the day

Optimising network released ~0.5GW constrained wind

Clear requirement for DFS with System Operating Plans for evening peak showing a shortfall in generation when compared with Operating Margin requirements.

We had greater confidence that morning peak was manageable with trades and BM action.

Day Ahead – Sunday 22 January

Commitment

16:30
DFS acceptances sent

Commitment

23:55
DRAXX-5 Winter Contingency unit dropped

Commitment

23:55
DRAXX-6 Winter Contingency unit dropped

19:00 – Updated interconnector flows

Continual review of assumptions with latest system conditions

Clear requirement for DFS for evening peak with Winter Contingency Coal still warming.
All DFS bids accepted.

Morning peak viewed to be manageable with trades & BM action and no DFS requirement.

As the Winter Contingency contracts were partially warmed, conversations between units and control room meant that we could stand down the warming and still access the capacity for the evening peak if required.

Within Day – Monday 23 January

Commitment

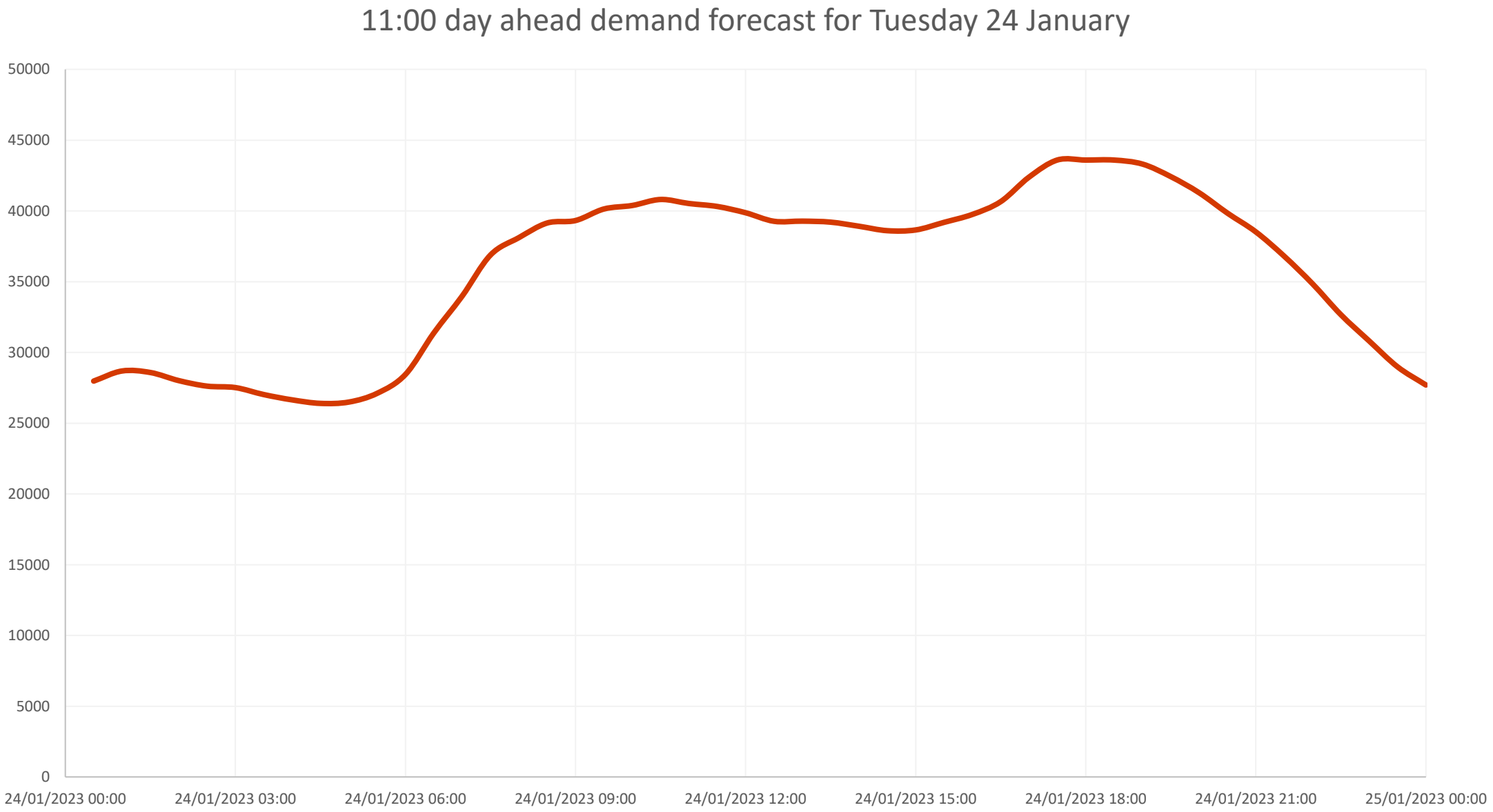
02:28
WBUPS-1 Winter Contingency unit dropped

17:00 – 18:00
DFS delivery period

Delayed system outage which would have restricted generation.
Contingency Reserve requirement reduced on approach to real-time.
Trades carried out on BritNed & NEMO.
No trades possible on interconnectors with France.
BOAs issued to instruct generation in the BM.
Anticipated triad avoidance for evening peak.

Continual review of assumptions with latest system conditions

Timeline for the decision taken moving into Tuesday 24 January



Day Ahead – Monday 23 January

Preparation

10:00
DFS Anticipated Requirement Notice issued

Commitment

14:30
DFS Service requirement **issued** – DFS test requirement cancelled

10:30 - Interconnector assumptions updated following call with TSOs

13:30 - Interconnector profiles came through, which showed that DFS live requirement existed

Continual review of assumptions with latest system conditions

At this point the uncertainty on interconnector flows and generation availability is very high. Anticipated requirement notice issued with expectation that enough information would be available by 14:30 to send service requirement

Clear requirement for DFS with System Operating Plans for evening peak showing a shortfall in generation when compared with Operating Margin requirements.

We had greater confidence that morning peak was manageable with trades and BM action.

Day Ahead – Monday 23 January

Commitment

16:30
DFS acceptances sent

Preparation

16:30-17:00
3x Winter Contingency Units warmed (earliest sync times 03:30-04:30 Tuesday)

19:00 – Updated interconnector flows

Continual review of assumptions with latest system conditions

Clear requirement for DFS for evening peak. All DFS bids accepted.

Morning peak viewed to be manageable with trades & BM action and no DFS requirement.

Uncertainty over possible interconnector flows and limitations to trading volumes.

3x coal units warmed as a preparatory measure to de-risk the interconnector capacity concern

Within Day – Tuesday 24 January

Commitment

02:37
WBUPS-2 Winter Contingency unit dropped

Commitment

04:30
DRAXX-5 Winter Contingency unit dropped

Commitment

04:04
DRAXX-6 Winter Contingency unit dropped

Commitment

09:26
Recalled outage constraining wind

16:30 – 18:00
DFS delivery period

Continual review of assumptions with latest system conditions

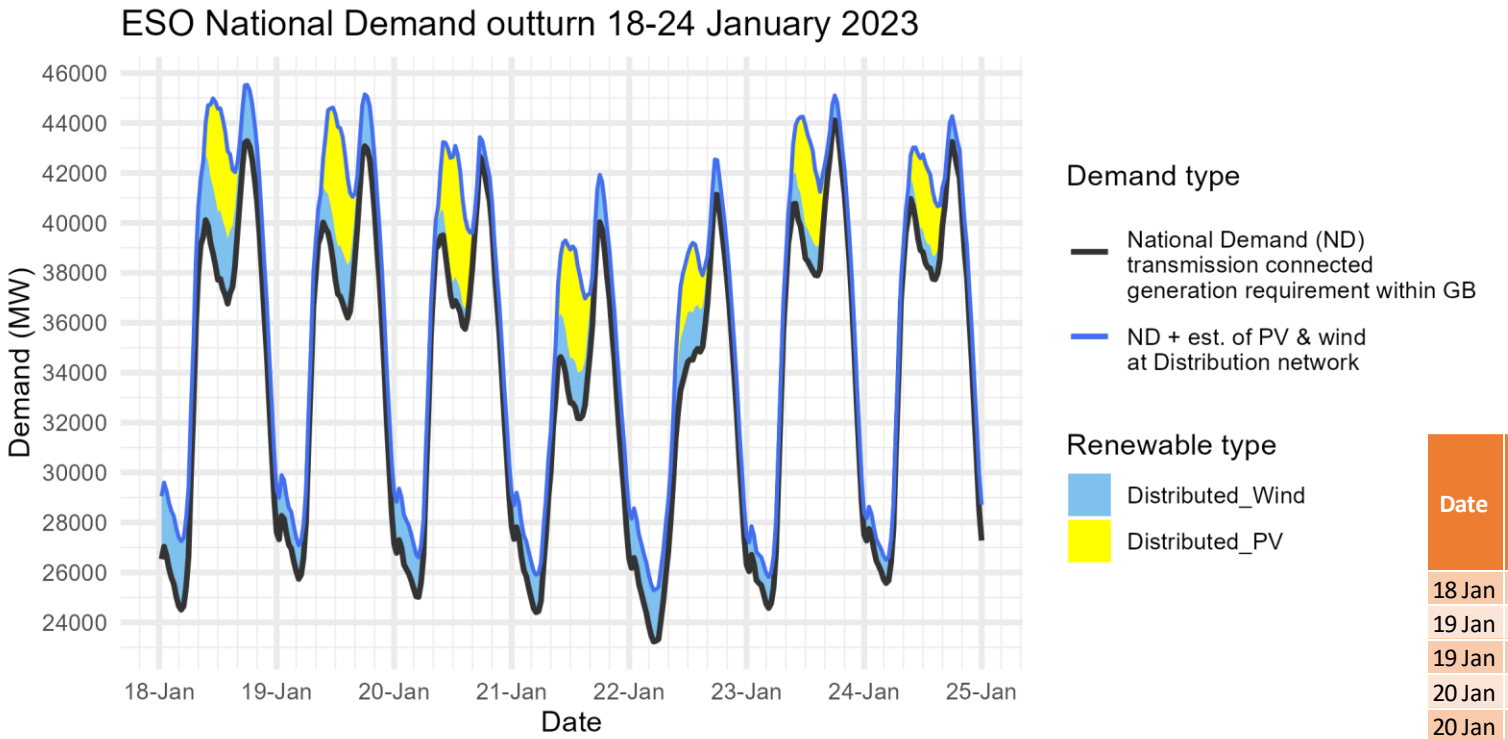
With contingency requirement dropping on approach to real-time, increased certainty the Winter Contingency Units were no longer required as a contingency option.

Conversations between units and control room meant that we could stand down the warming and still access the capacity for the evening peak if required.

Optimising network released ~0.5GW constrained wind

Contingency Reserve requirement reduced on approach to real-time.
Trades carried out on BritNed.
No trades possible on NEMO or interconnectors with France.
BOAs issued to instruct generation in the BM.
Anticipated triad avoidance for evening peak.

Demand | Last week demand out-turn



		FORECAST (Wed 18 Jan)		OUTTURN			
Date	Forecasting Point	National Demand (GW)	Dist. wind (GW)	National Demand (GW)	Triad Avoidance est. (GW)	N. Demand adjusted for TA (GW)	Dist. wind (GW)
18 Jan	Evening Peak	43.6	2.5	43.3	0.6	43.9	2.3
19 Jan	Overnight Min	25.2	1.7	25.7	n/a	n/a	1.3
19 Jan	Evening Peak	44.5	1.5	43.1	0.3	43.4	2.1
20 Jan	Overnight Min	26.4	1.0	25.0	n/a	n/a	1.6
20 Jan	Evening Peak	43.8	0.6	42.7	0.3	43.0	0.8
21 Jan	Overnight Min	25.1	1.3	24.4	n/a	n/a	1.5
21 Jan	Evening Peak	38.9	1.8	40.0	0.0	40.0	1.9
22 Jan	Overnight Min	23.5	1.6	23.2	n/a	n/a	2.1
22 Jan	Evening Peak	39.8	1.3	41.1	0.0	41.1	1.4
23 Jan	Overnight Min	24.2	1.1	24.6	n/a	n/a	1.2
23 Jan	Evening Peak	43.5	0.9	44.1	0.2	44.3	1.0
24 Jan	Overnight Min	25.1	0.7	25.6	n/a	n/a	0.9
24 Jan	Evening Peak	43.4	0.7	43.2	0.5	43.7	1.0

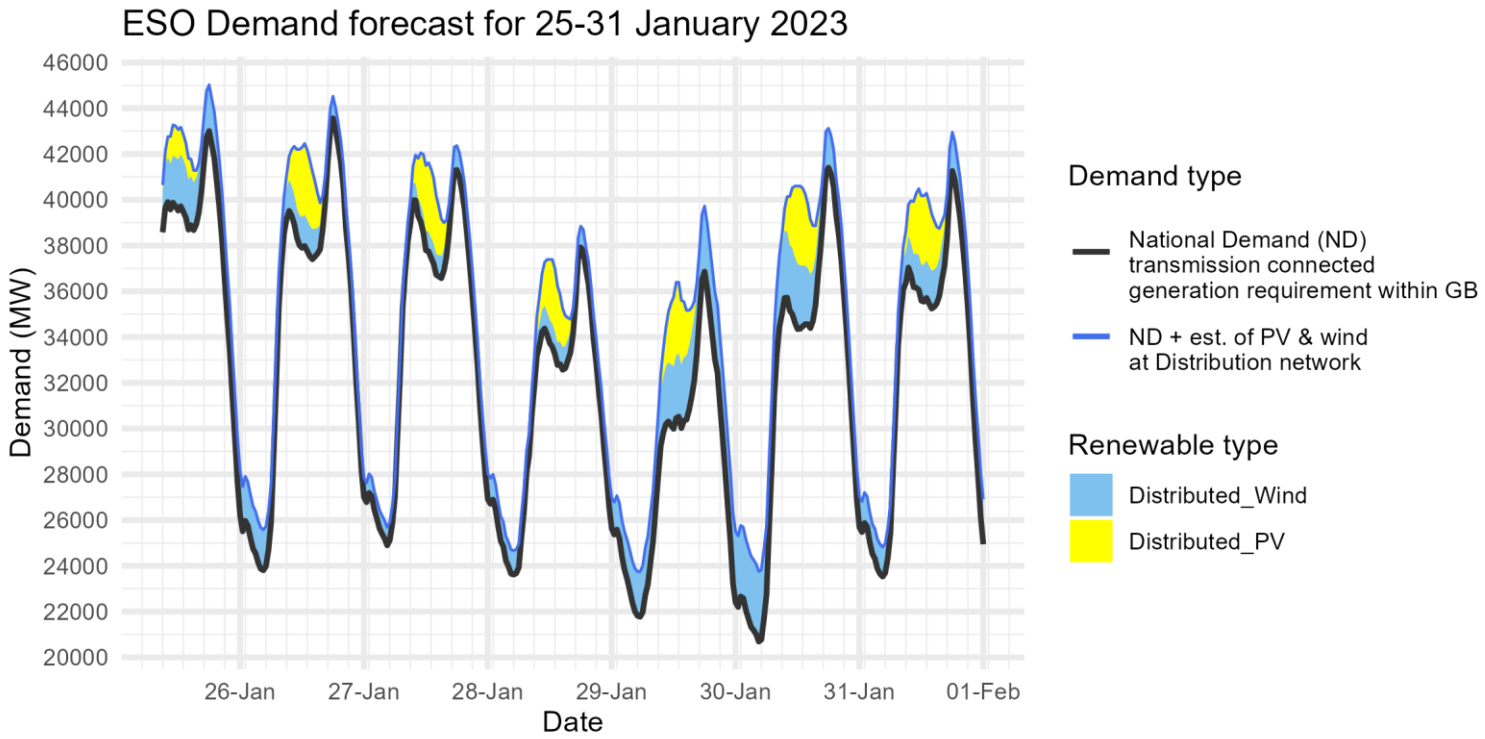
The black line (National Demand ND) is the measure of portion of total GB customer demand that is supplied by the transmission network.

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



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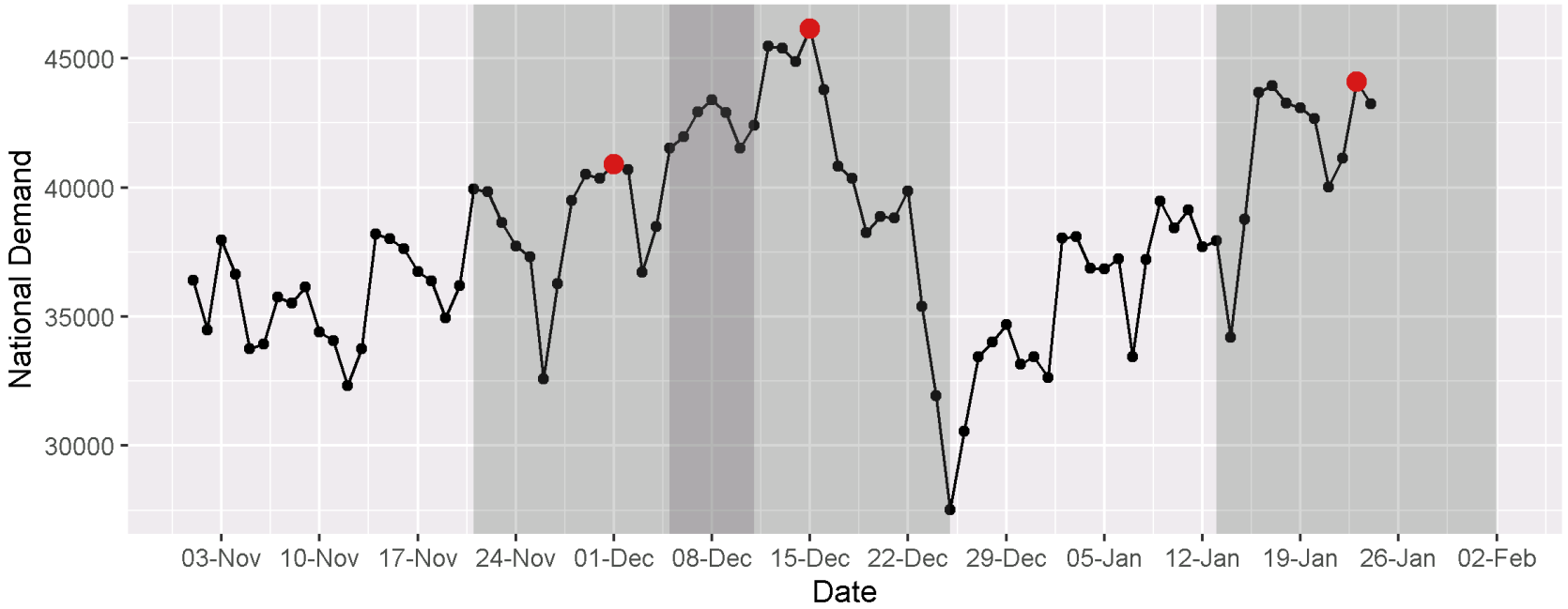
Historic out-turn data can be found on the ESO Data Portal in the following data sets: Historic Demand Data & Demand Data Update

		FORECAST (Wed 25 Jan)	
Date	Forecasting Point	National Demand (GW)	Dist. wind (GW)
25 Jan 2023	Evening Peak	43.0	2.0
26 Jan 2023	Overnight Min	23.8	1.8
26 Jan 2023	Evening Peak	43.6	1.0
27 Jan 2023	Overnight Min	24.9	0.8
27 Jan 2023	Evening Peak	41.3	1.1
28 Jan 2023	Overnight Min	23.6	1.0
28 Jan 2023	Evening Peak	37.9	0.9
29 Jan 2023	Overnight Min	21.8	2.0
29 Jan 2023	Evening Peak	36.9	2.9
30 Jan 2023	Overnight Min	20.7	3.1
30 Jan 2023	Evening Peak	41.4	1.7
31 Jan 2023	Overnight Min	23.5	1.3
31 Jan 2023	Evening Peak	41.3	1.7

Triad avoidance: indicative triad data based on operational metering



ESO operational metering			
Date	Time of peak (HH ending)	National Demand (MW)	Estimated triad avoidance (HH corresponding with the time of the peak) (MW)
15/12/2022	1730	46147	0
23/01/2023	1800	44109	200
01/12/2022	1800	40909	200

ESO does not include station load.

Indicative triad demand on Elexon's BMRS website quotes "GB Demand" which is based on the Transmission System Demand definition (it adds 500MW of station load onto the National Demand). Also, it shows time as half hour **beginning**.

Triad avoidance: Calculation method

Q: How does NGESO predict triad avoidance volumes?

As a reminder, Triads are the 3 highest demand settlement periods between 1 Nov and End Feb, separated by at least 10 days.
These can only be precisely determined at the end of the Triad season, and until that point all Triads are indicative only.
Further explanation of Triads can be found in the OTF slide deck and recording from 2 Dec 2020 here.

Triad avoidance volumes are estimated based on a few key numbers:

- Unrestricted demand forecast (ie. without any Triad avoidance)
- Current indicative Triads
- Maximum amount of Triad avoidance available
- A small 'cushion' to allow for forecast errors

The maximum avoidance and cushion are dynamically calculated based on data from earlier in the current Triad season.
At the start of the Triad season when this is not available, these numbers are based on previous season data.

On days when a Triad is forecast, the amount of Triad avoidance is then predicted by calculating:
"How much demand reduction would be required to avoid that settlement period from becoming one of the 3 indicative Triads"
The calculation will differ slightly based on whether we are within 10 days of a current indicative Triad.

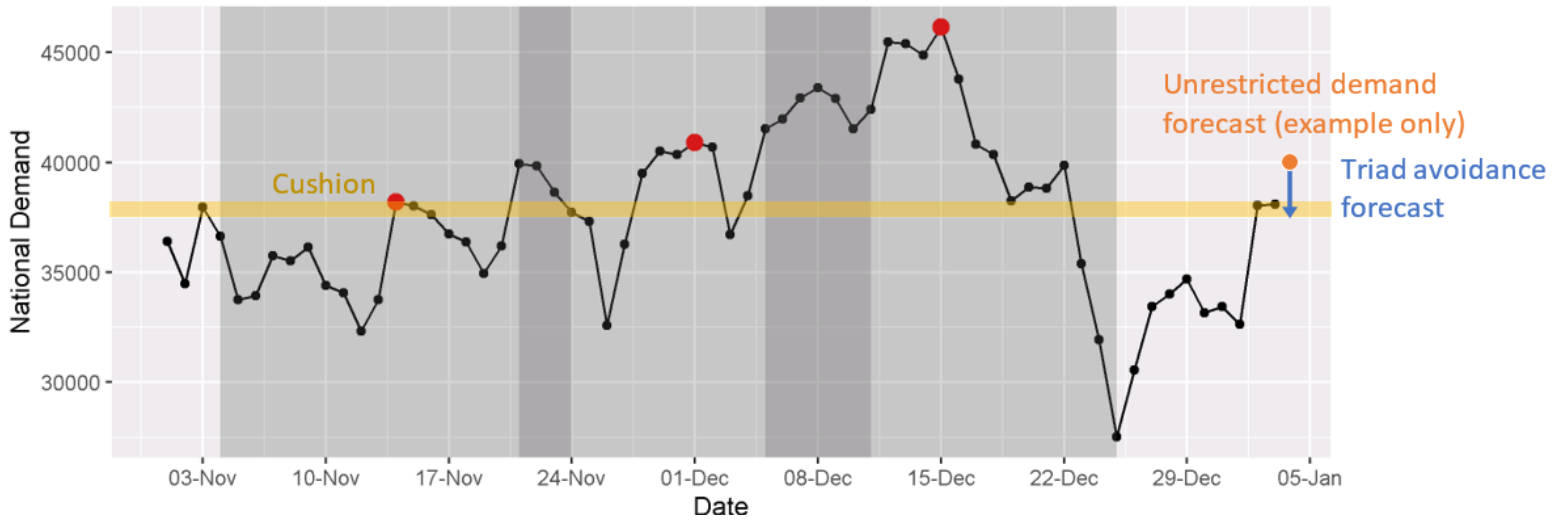
- If so, to avoid being a Triad, demand must be reduced below that of the most recent Triad
- If not, demand must be reduced lower than all 3 of the currently indicated Triads

In both cases this difference is calculated, the cushion amount is added, and this value is capped at the maximum available.

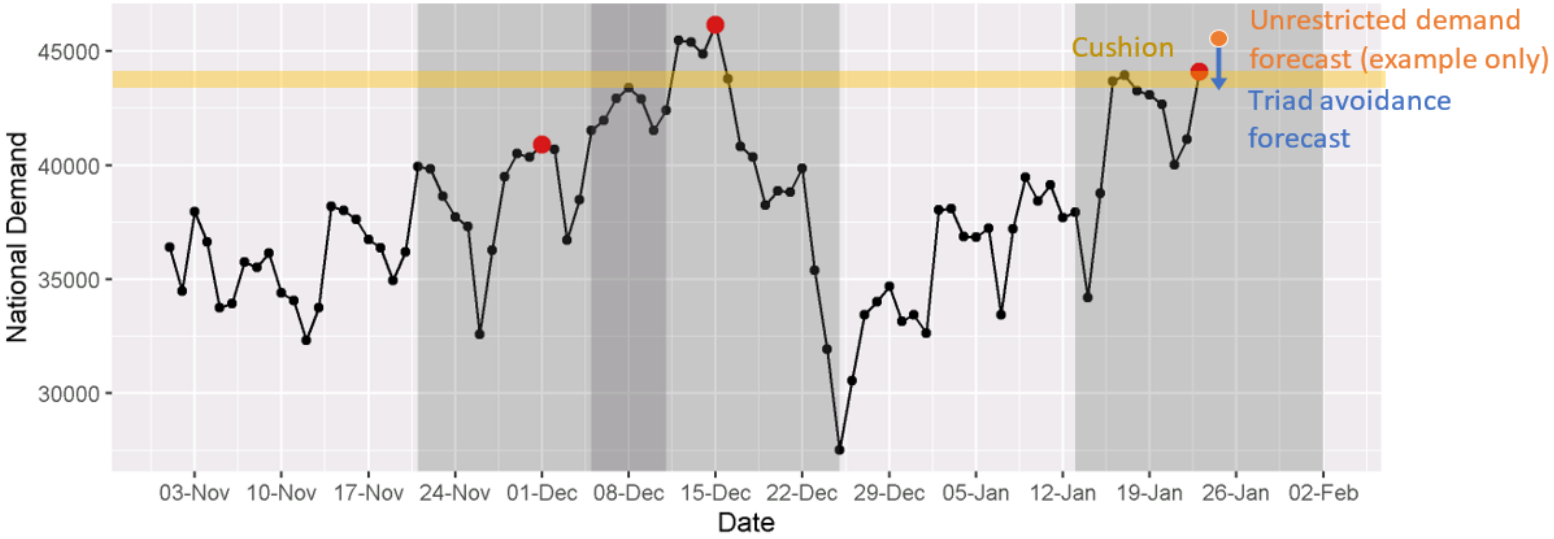
Note: this slide is in response to a question asked at the OTF last week.

Triad avoidance: Calculation method

Triad avoidance – not in exclusion period



Triad avoidance – within exclusion period



Operational margins: week ahead

How to interpret this information

This slide sets out our view of operational margins for the next week. We are providing this information to help market participants identify when tighter periods are more likely to occur such that they can plan to respond accordingly.

The table provides our current view on the operational surplus based on expected levels of generation, wind and peak demand. This is based on information available to National Grid ESO as of 25 January and is subject to change. It represents a view of what the market is currently intending to provide before we take any actions. The interconnector flows are equal to those in the Base case presented in the Winter Outlook.

The indicative surplus is a measure of how tight we expect margins to be and the likelihood of the ESO needing to use its operational tools.

For higher surplus values, margins are expected to be adequate and there is a low likelihood of the ESO needing to use its tools. In such cases, we may even experience exports to Europe on the interconnectors over the peak depending on market prices.

For lower (and potentially negative) surplus values, then this indicates operational margins could be tight and that there is a higher likelihood of the ESO needing to use its tools, such as issuing margins notices. We expect there to be sufficient supply available to respond to these signals to meet demand.

Margins are adequate for the next week. This is based on our current assessment and is subject to change.

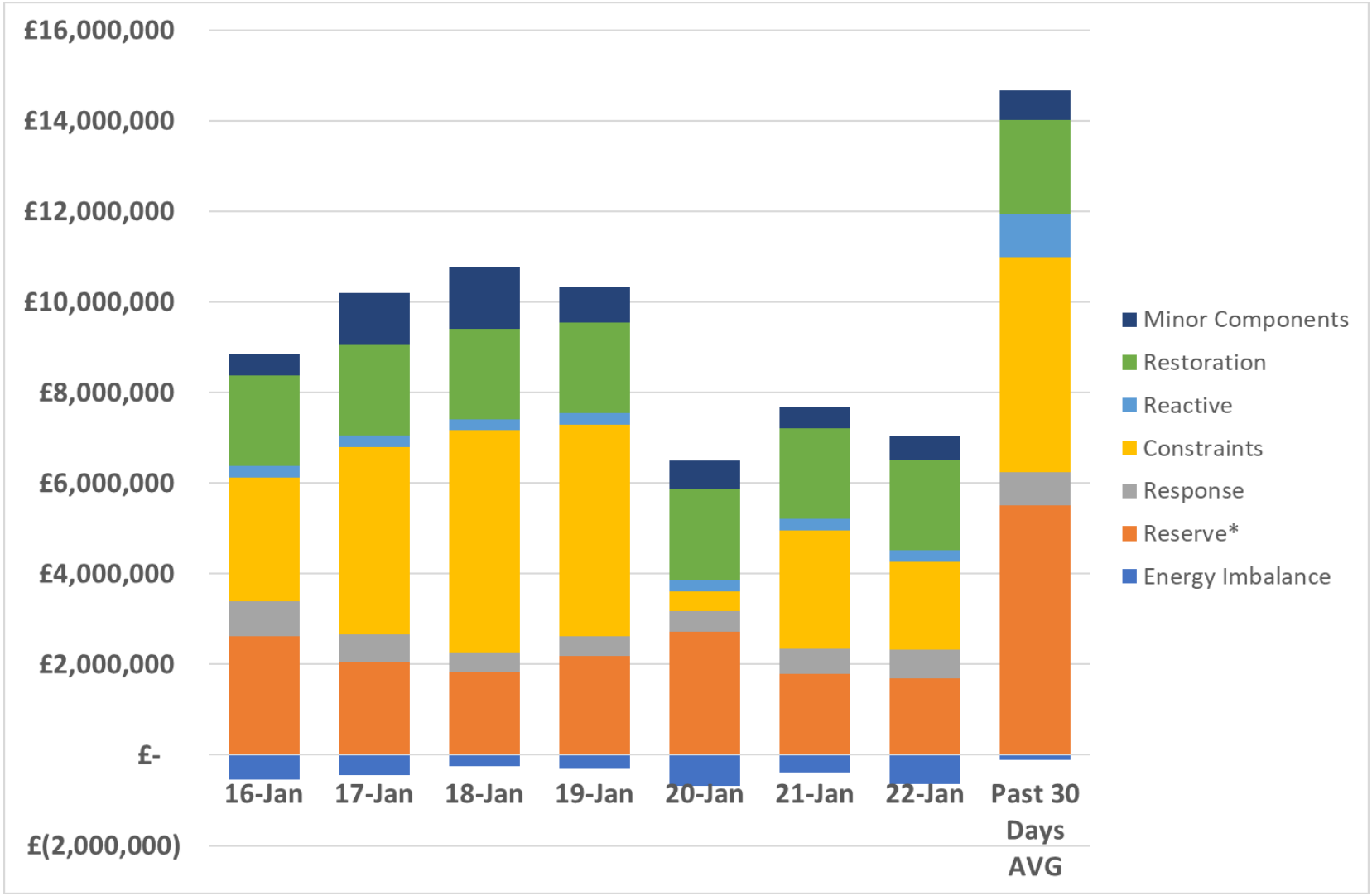
Day	Date	Notified Generation (MW)	Wind (MW)	IC Flows* (MW)	Peak demand (MW)	Indicative surplus (MW)
Thu	26/01/2023	42201	6470	4020	44290	3760
Fri	27/01/2023	41838	4620	4020	41270	4620
Sat	28/01/2023	41436	3430	4400	37860	6810
Sun	29/01/2023	42081	15300	4400	36480	18320
Mon	30/01/2023	41694	8990	4400	41420	9000
Tue	31/01/2023	42310	8060	4400	40850	9220
Wed	01/02/2023	42643	10600	4400	41110	11690

*Interconnector flow in line with the Winter Outlook Report Base Case but will ultimately flow to market price

Margins do not include NGESO enhanced or emergency actions (Outlined here: download (nationalgrideso.com))

Adequate when Indicative Surplus >= 1000 MW

ESO Actions | Category costs breakdown for the last week



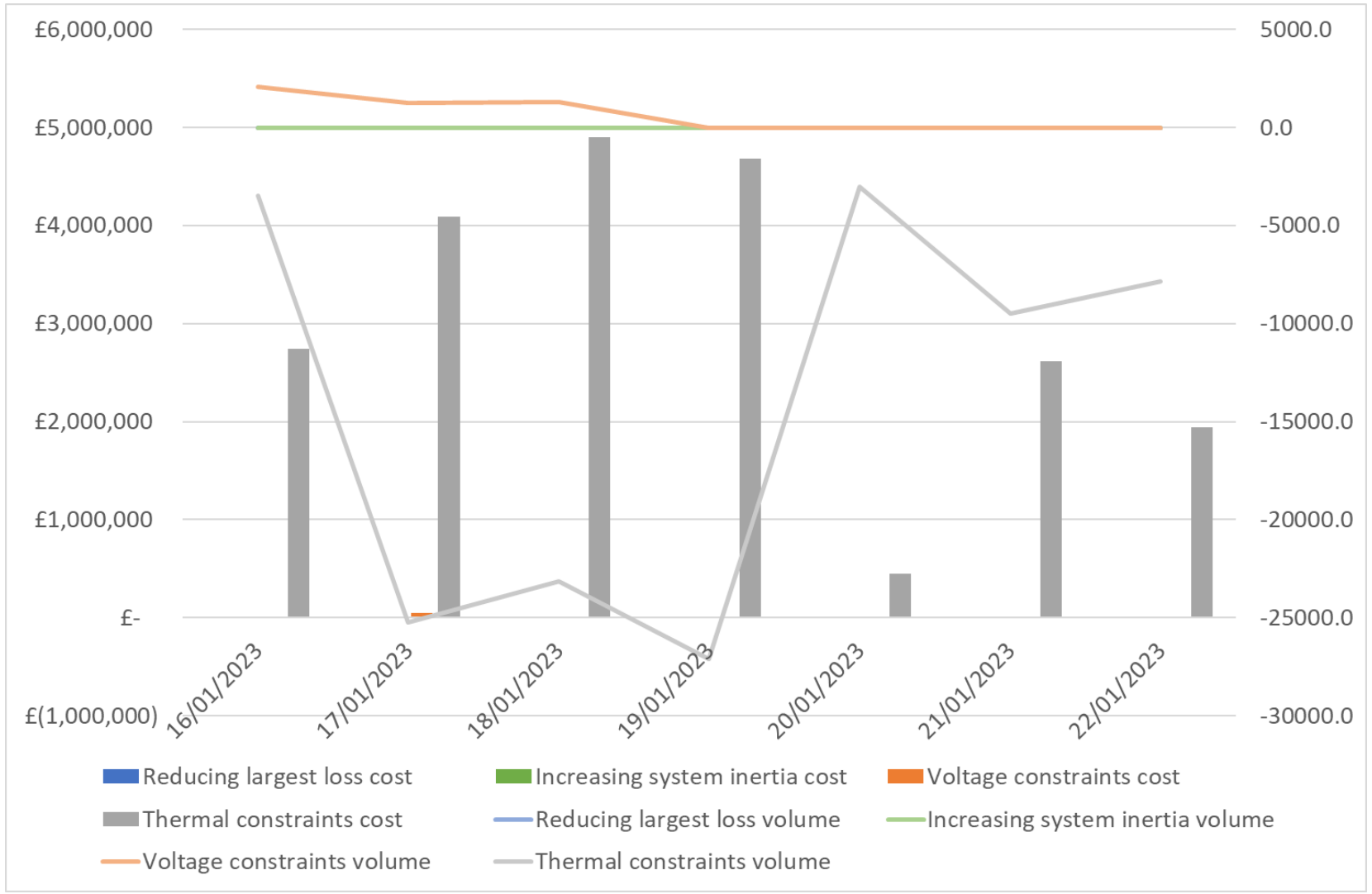
Date	Total (£m)
16/01/2023	8.3
17/01/2023	9.8
18/01/2023	10.5
19/01/2023	10.0
20/01/2023	5.8
21/01/2023	7.3
22/01/2023	6.4
Weekly Total	58.1

Reserve and Constraints costs were the key cost component throughout the week.

Please note that all the categories are presented and explained in the MBSS.

Data issue: Please note that due to a data issue on a few days over the last few months, the Minor Components line in Non-Constraint Costs is capturing some costs on those days which should be attributed to different categories. It has been identified that a significant portion of these costs should be allocated to the Operating Reserve Category. Although the categorisation of costs is not correct, we are confident that the total costs are correct in all months. We continue to investigate and will advise when we have a resolution.

ESO Actions | Constraint Cost Breakdown



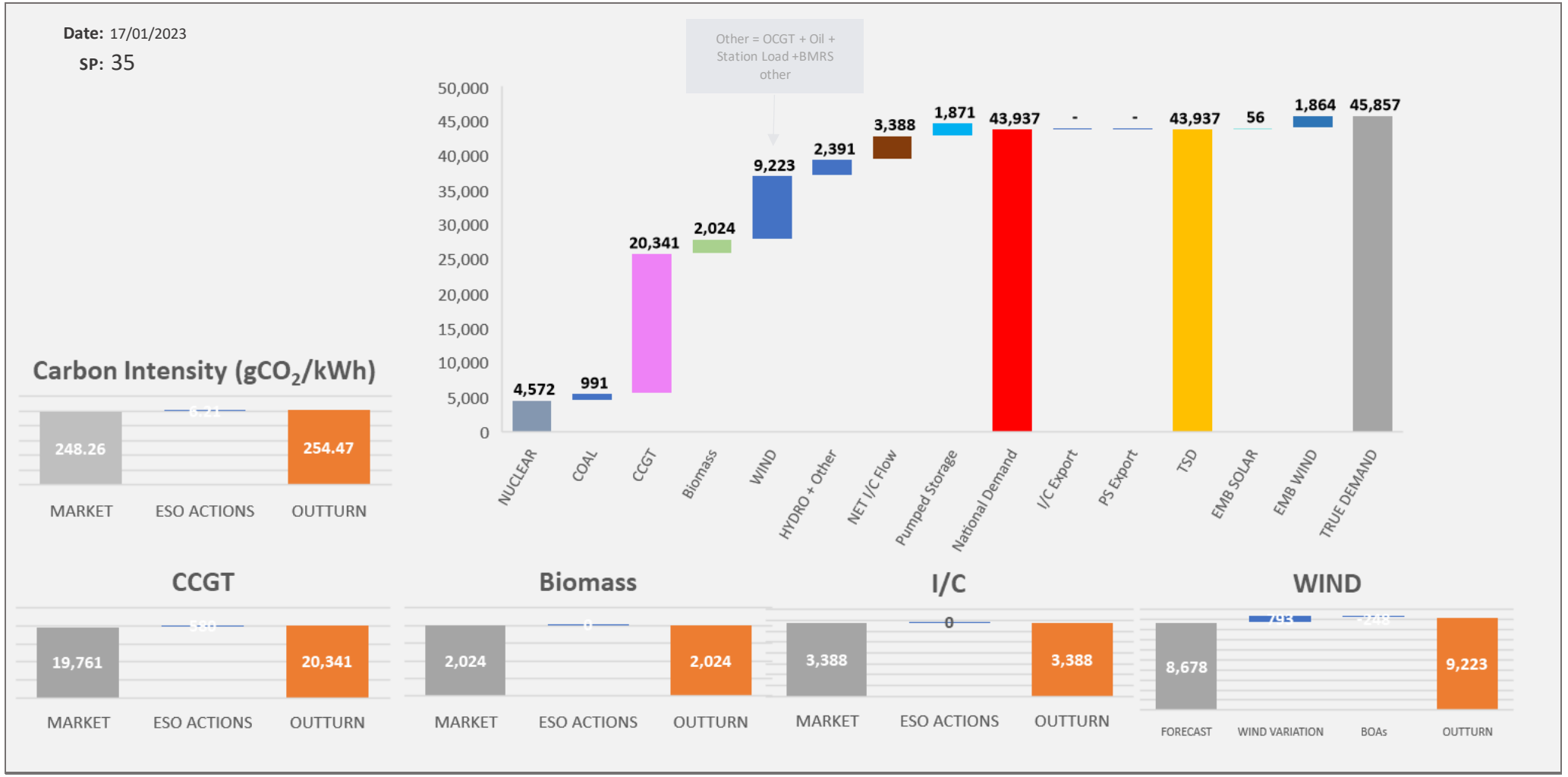
Thermal – network congestion
Actions required to manage Thermal Constraints throughout the week, with highest costs at the beginning of the week.

Voltage
Intervention was required to manage voltage levels at the start of the week.

Managing largest loss for RoCoF
No intervention was required to manage largest loss.

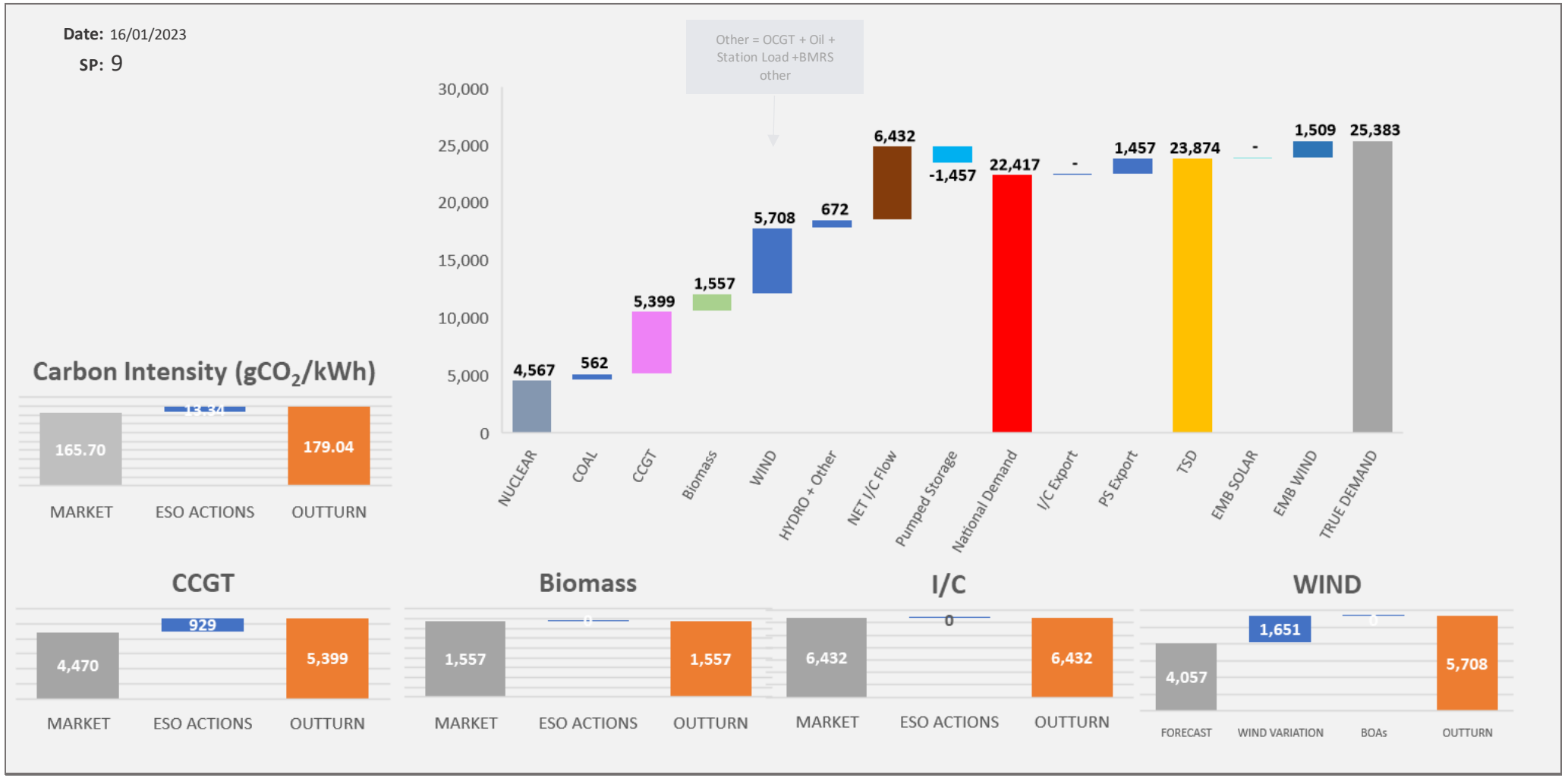
Increasing inertia
No intervention was required to manage system inertia.

ESO Actions | Tuesday 17 January – Peak Demand – SP spend ~£134k



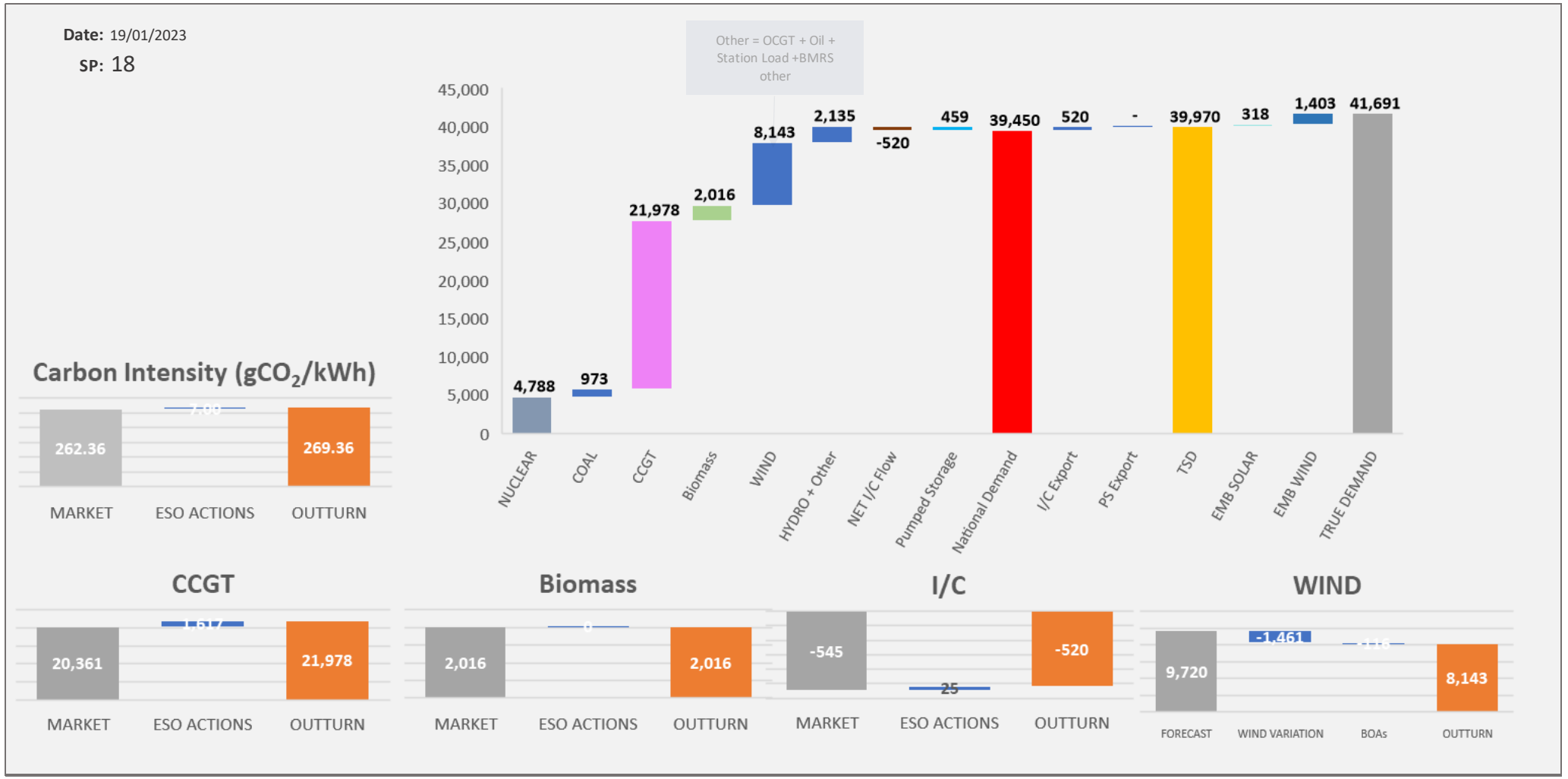
Carbon Intensity data on data portal: https://data.nationalgrideso.com/carbon-intensity1/carbon-intensity-of-balancing-actions

ESO Actions | Monday 16 January – Minimum Demand – SP Spend ~£104k



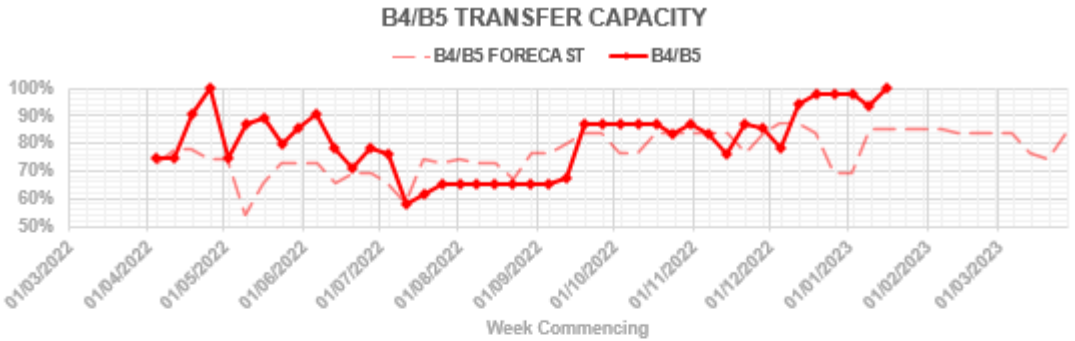
Carbon Intensity data on data portal: https://data.nationalgrideso.com/carbon-intensity1/carbon-intensity-of-balancing-actions

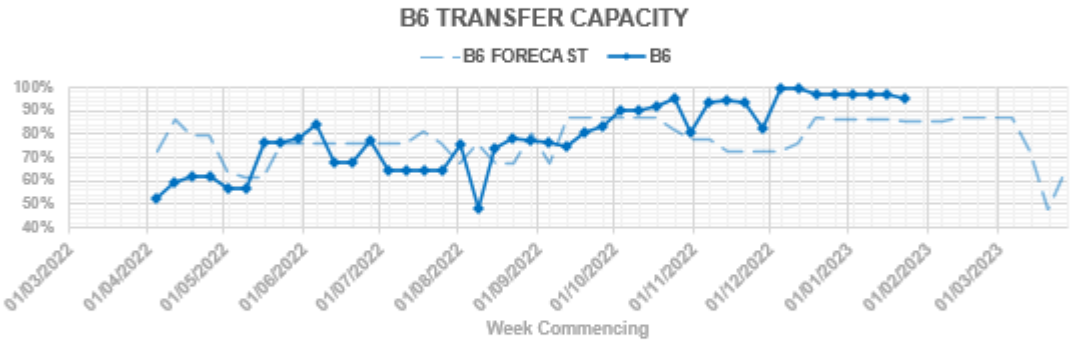
ESO Actions | Thursday 19 January – Highest SP Spend ~£336k

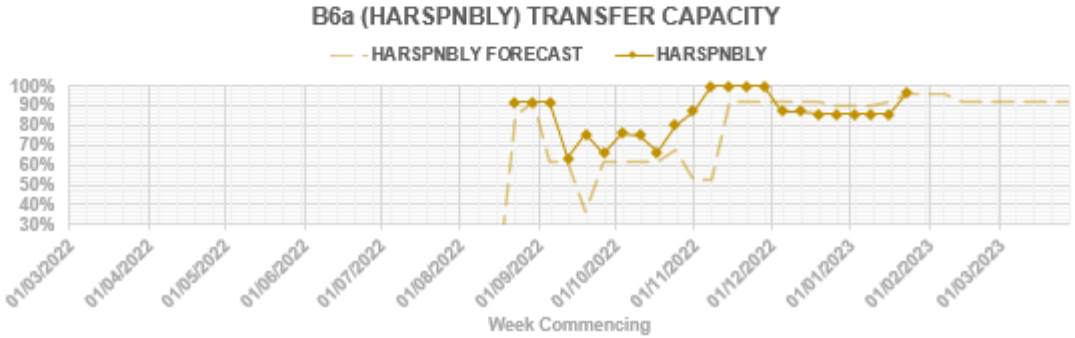


Carbon Intensity data on data portal: https://data.nationalgrideso.com/carbon-intensity1/carbon-intensity-of-balancing-actions

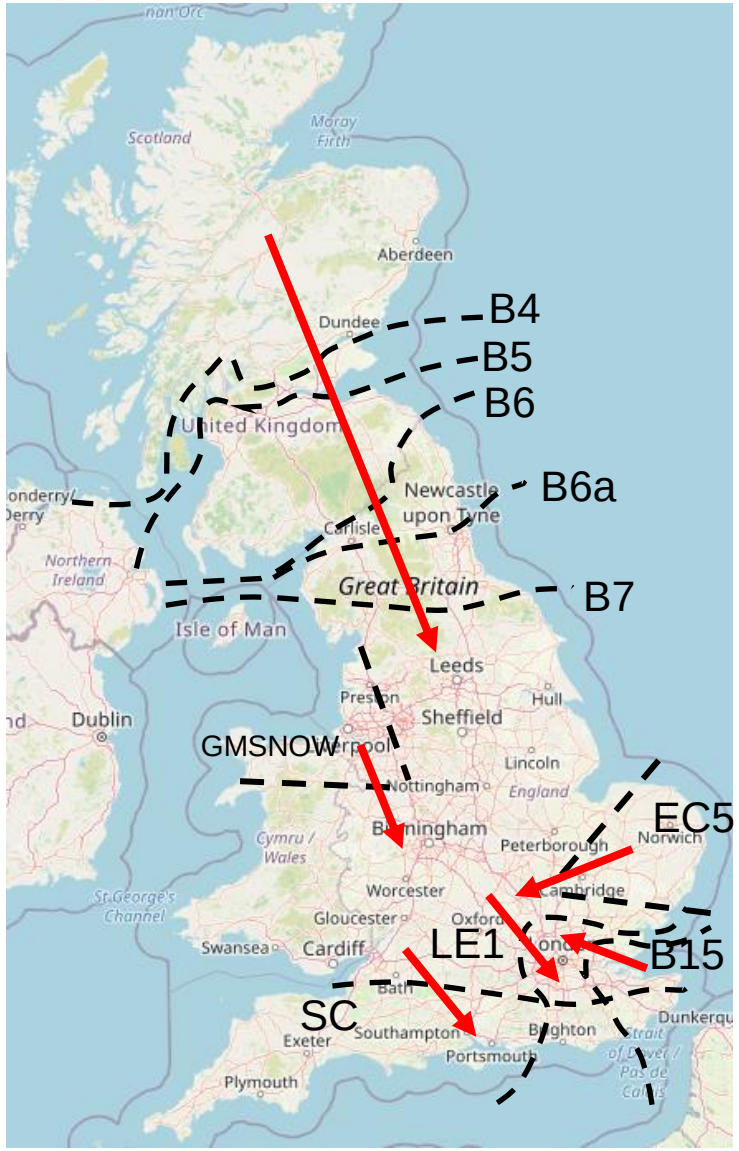
Transparency | Network Congestion





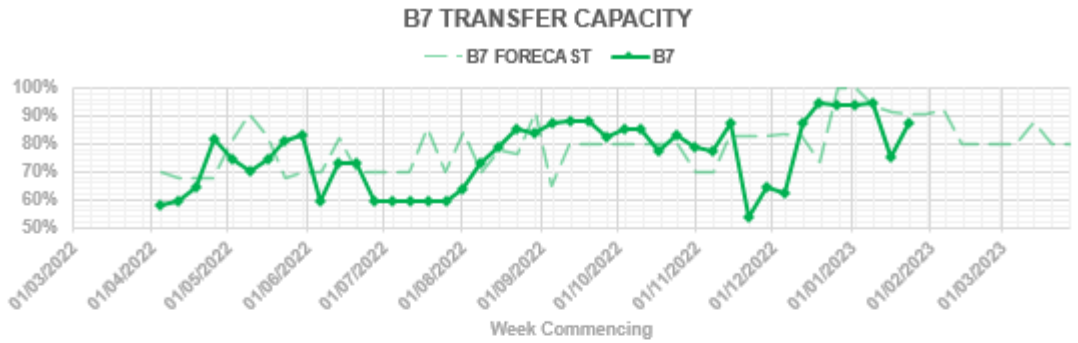


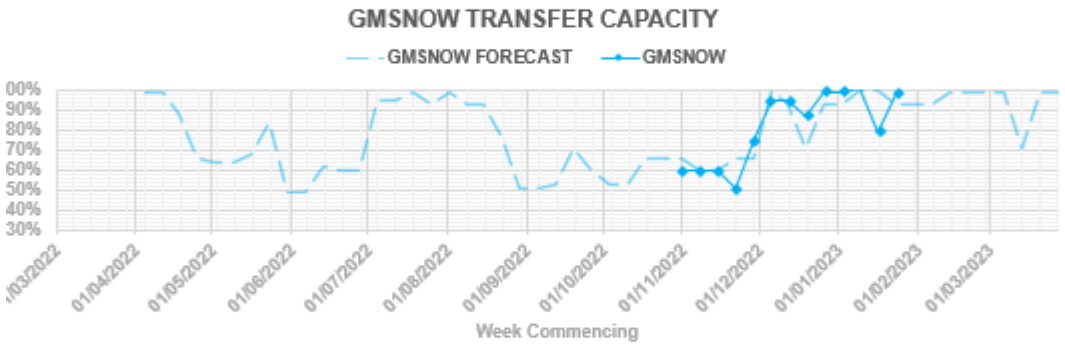
Boundary	Max. Capacity (MW)
B4/B5	2750
B6	6200
B6a	6300
B7	9300
GMSNOW	4550
EC5	5000
LE1	8500
B15	7500
SC	7000

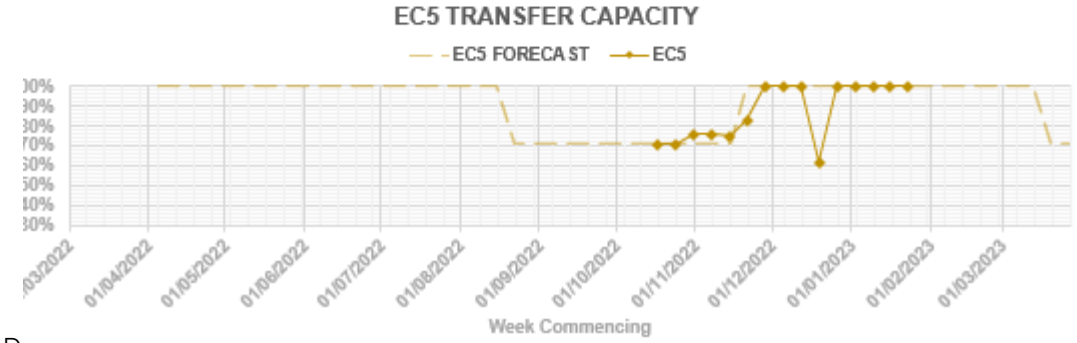


Day ahead flows and limits, and the 24 month constraint limit forecast are published on the ESO Data Portal:
https://data.nationalgrideso.com/data-groups/constraint-management

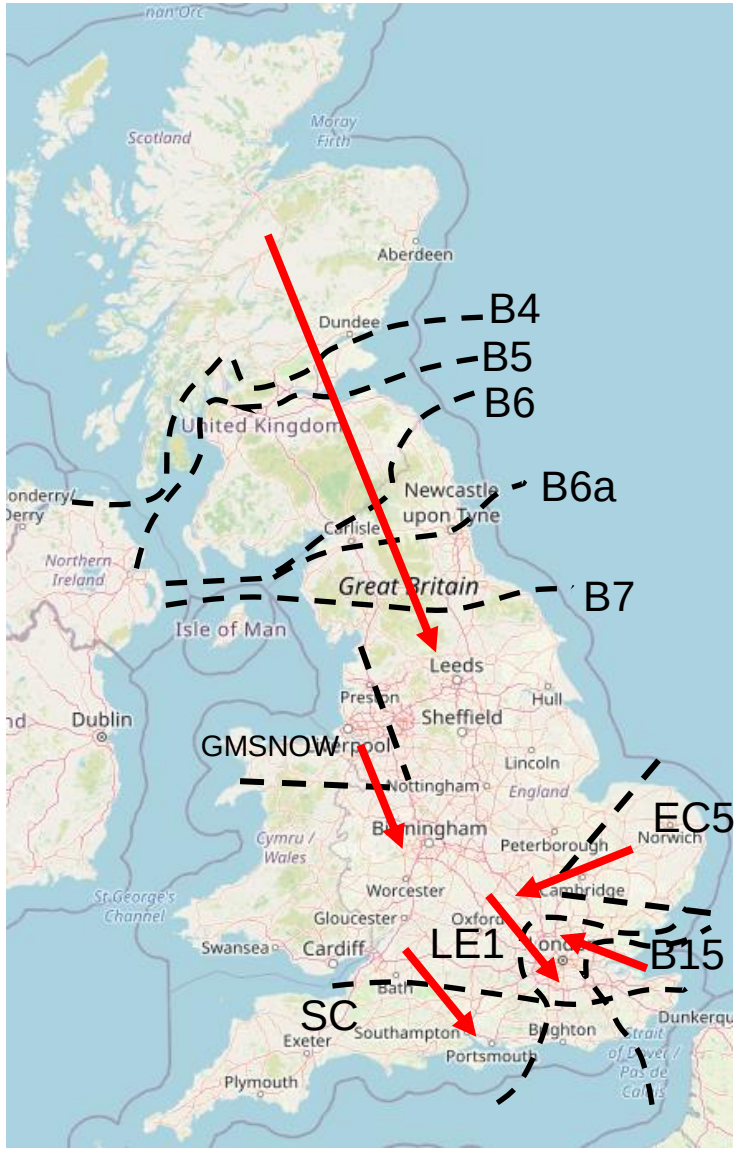
Transparency | Network Congestion





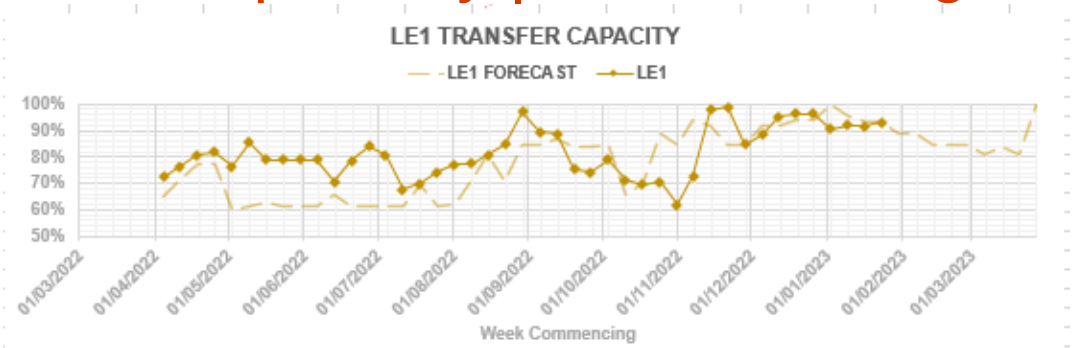


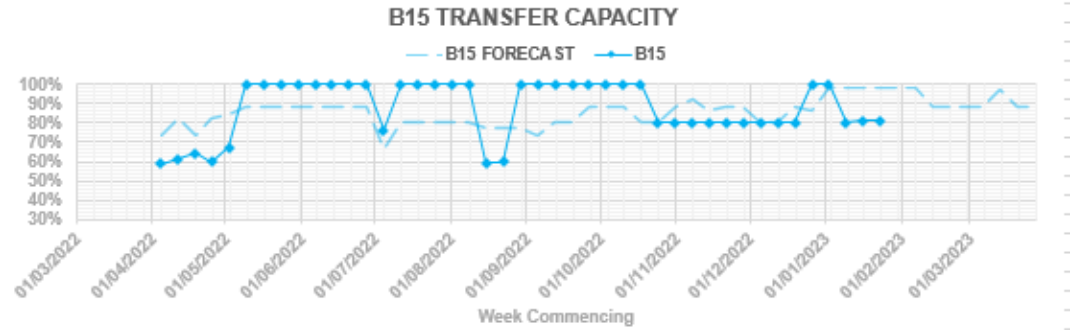
Boundary	Max. Capacity (MW)
B4/B5	2750
B6	6200
B6a	6300
B7	9300
GMSNOW	4550
EC5	5000
LE1	8500
B15	7500
SC	7000

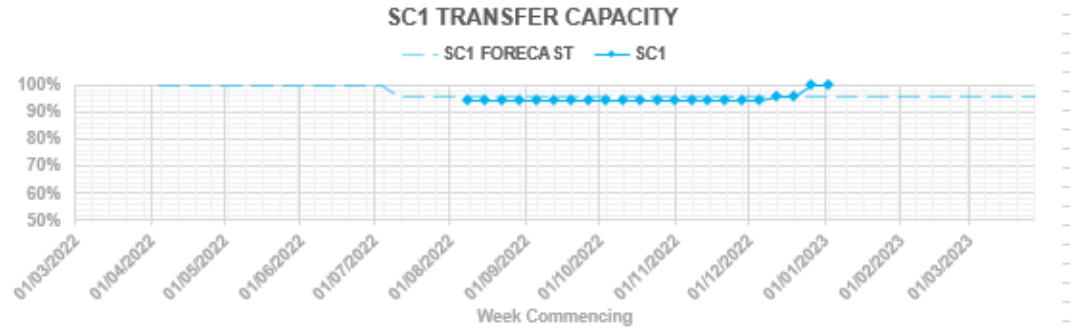


Day ahead flows and limits, and the 24 month constraint limit forecast are published on the ECC Data Portal:
https://data.nationalgrideso.com/data-groups/constraint-management

Transparency | Network Congestion







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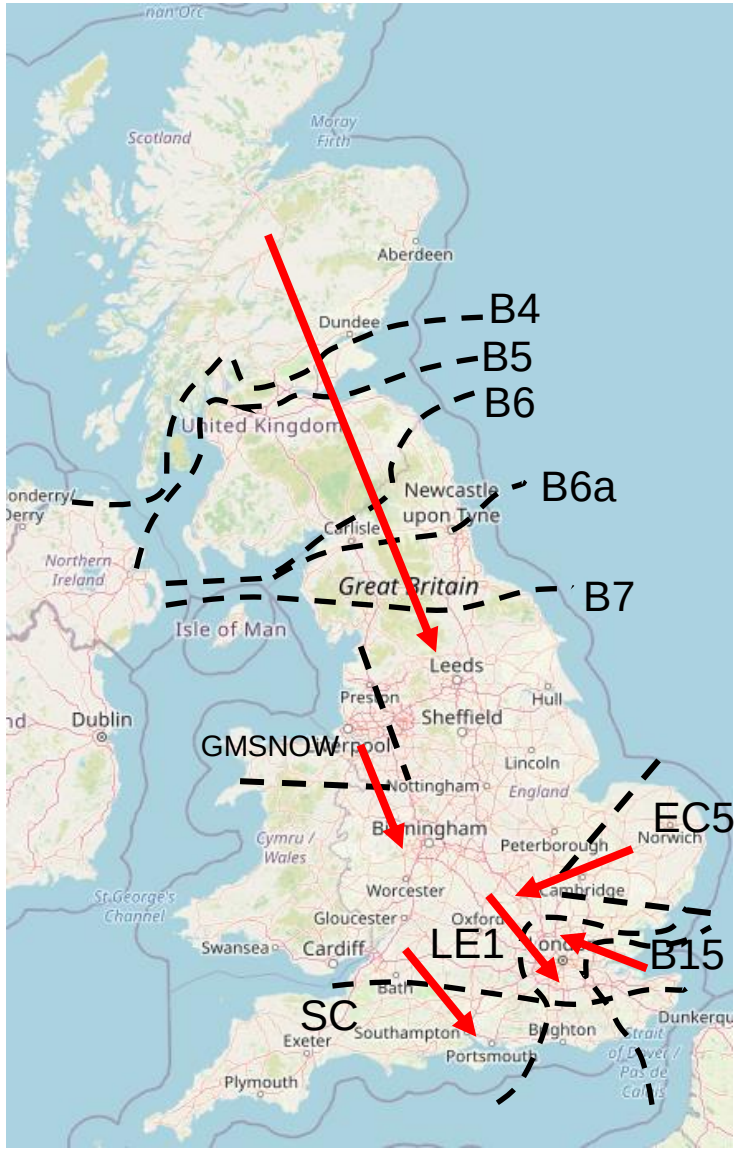


Day ahead flows and limits, and the 24 month constraint limit forecast are published on the ESO Data Portal:
https://data.nationalgrideso.com/data-groups/constraint-management

Help test the ESO Data Portal

As part of a programme of website improvements in 2023, we'll be integrating the Data Portal into the main ESO website. We'd like to invite you to provide feedback on the prototype of our new Data Portal experience. Your feedback is important to ensure we deliver the best possible digital experience for Data Portal users.

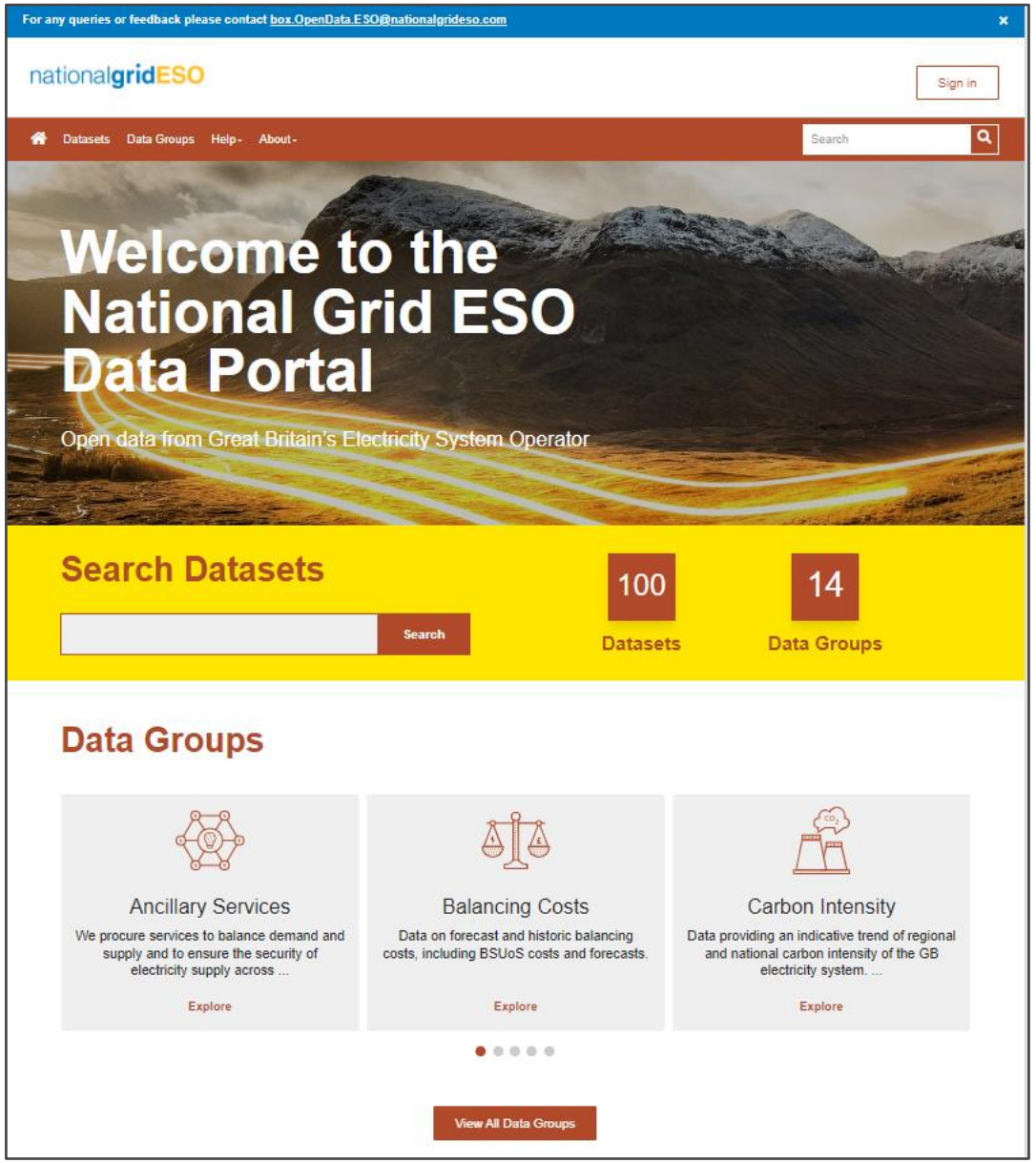
We've put together a short study, comprising of 11 tasks that will take you around 15 minutes to complete. The study will record your screen and voice, allowing you to provide verbal feedback as you complete the tasks.

A few other useful things to know:

- You'll need to complete the study on a desktop or laptop device
- The study works best in the Google Chrome browser; we'll ask you to download an extension to enable us to record your screen (just while you complete the tasks)
- The prototype is clickable, but not fully functional, so don't worry if it doesn't behave the way a normal website would

To participate, and help shape the future of the Data Portal, click the link below and complete as soon as you can.

Begin the study now



Sli.do code #OTF

Balancing Programme Quarterly update

Overview

This programme was established to develop the balancing capabilities that the Electricity National Control Centre needs to deliver reliable and secure system operation, facilitate competition everywhere and meet our ambition for net-zero carbon operability.

Commitment for engagement

Following our strategic review with industry stakeholders last year, we made commitments to keep engaging with you on a quarterly basis, whilst also provides updates on our website.

Engaging with the industry

- Provide updates on our industry co-created roadmap we created as part of strategic review last year.
- Ensure the balancing capabilities we are delivering still meets the requirements of our stakeholders.
- Your chance to have an input into how we deliver the future balancing systems.

More information

Further details about the Balancing Programme and our previous engagement with industry can be found on our website.
https://www.nationalgrideso.com/industry-information/balancing-services/balancing-programme

Next in-person workshop

Date/Time

Thursday 9th February 10:00 – 16:00

Location

Hilton London Paddington,
46 Praed St,
London,
W2 1EE

Register

https://forms.office.com/pages/responsepage.aspx?id=U2qK-fMlEkKQHMd4f800lRPd2d7O7JlFsIm9miOGUVtUNzVTS1kwMEVMQ0k1NjAxUkRNWlpXMk9NQi4u

Advance questions

Q: My question is related to flexibility provisioning by large industrial consumers. Does ESO enable demand response programs for industrial plants in the day-ahead market?

A: We procure a number of our services day ahead of service delivery and these are open for parties to participate in. We recognise that certain services attract more industrial and commercial users than others. If there are specific services, you are interested in participating in or would like to have an overview of the options please reach out to the futureofbalancingservices@nationalgrideso.com and we can setup a session with one of our account managers to help you navigate that area.

The Demand Flexibility Service (DFS) has also seen participation from the I&C sector.

This service is open and runs until the end of March with new volume still able to onboard, you can view our list of approved providers at Approved Providers List | National Grid ESO, or contact us via demandflexibility@nationalgrideso.com if you would like to onboard directly.

Dispatch Transparency Event Q&A Update – Answered Questions

Q: Please can you share these slides

A: The slides have been uploaded here: https://www.nationalgrideso.com/document/273316/download

Q: Please could dates when functionality that will become part of OBP be deployed in ORT/SPICE be published so we can look for step change changes in behaviour?

A: Details of the Balancing Programme delivery timeline are shared as part of the regular quarterly engagement events where we update the industry on what our Balancing Programme have been delivering. More details are available at: https://www.nationalgrideso.com/industry-information/balancing-services/balancing-programme

Q: Do you foresee adding more tags for non-system actions that allow market participants to understand the reason behind an out-of-merit BOA?

A: There are no plans at present to change the tagging categories

Dispatch Transparency Event Q&A Update – Answered Questions

Q: How does the current lack of live knowledge around state of charge of battery storage impact how batteries are used in BM compared to other assets?

A: Not a significant impact at the moment, which is facilitated by the 15-minute MEL rule. As growth of storage of all types continues to grow, efficient dispatch is likely to require more information about the state of energy.

To support this the Balancing Programme is working with their Storage Stakeholder group. They will welcome your input to ensure we develop plans that are ambitious, achievable, and have considered the priorities of our stakeholders. If you would like to join us, please email us at: box.balancingprogramme@nationalgrideso.com

Q: Can we increase the question character limit please? Not many characters for a complex topic!

A: Unfortunately, we are constrained by the limitations of Sli.do. We will look in to whether it is possible to increase the character limit for future events. We welcome your suggestions for alternative tools we could use

Q: Live question around MFR contracts – have we armed small units?

We publish information about all instructed MFR volumes every month on our website Mandatory response services | National Grid ESO

Note: there are some outstanding questions from this event that we are still working to answer. We will aim to complete the answers to the outstanding question by the end of next week and will share the answers at the following OTF.

slido

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