



ESO Operational Transparency Forum

16 February 2022

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

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>

Please note that we have experienced a technical issue with the upload of the webinar recording. We continue to look into this and will upload previous recordings when we are able.

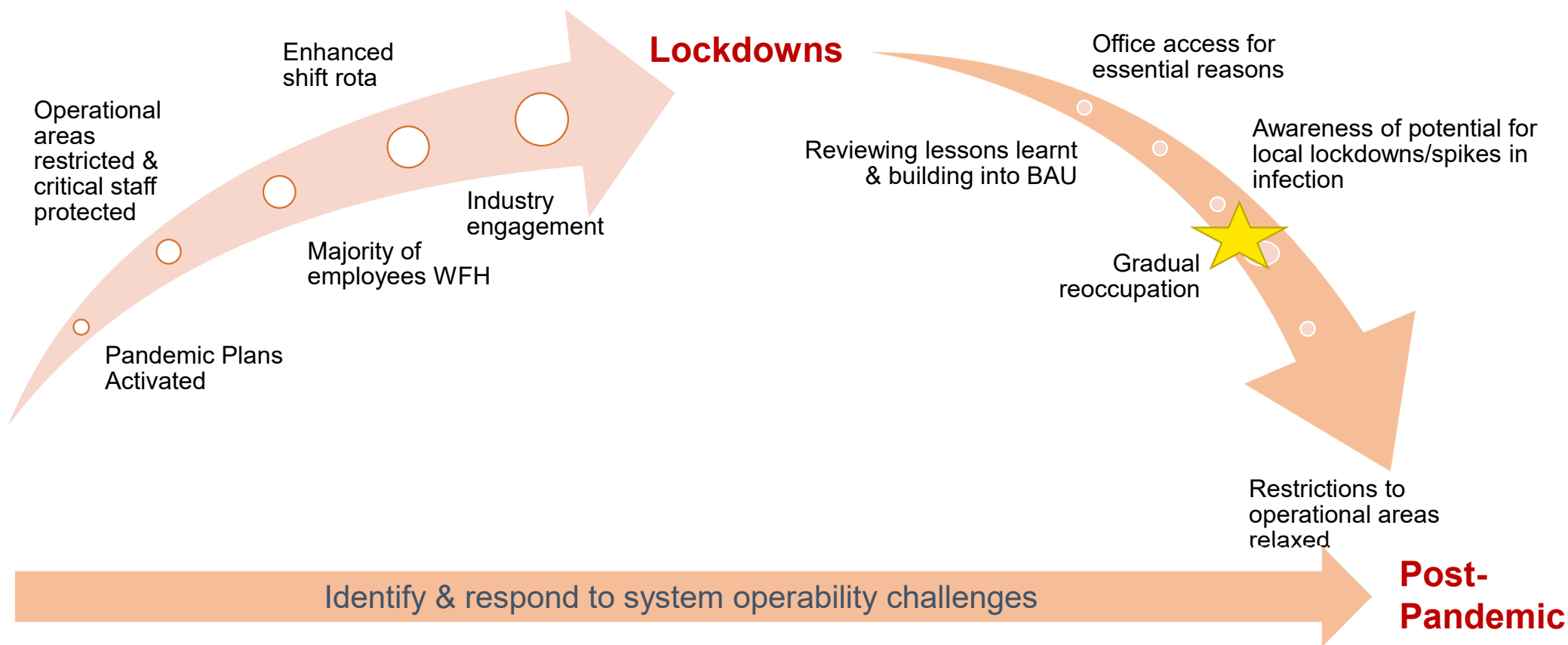
Regular Topics

- Questions from last week
- Business continuity
- Demand review
- Costs for last week
- Outlook
- Constraints

Focus Areas

- Balancing Services Adjustment Data (BSAD) Overview
- SO-SO Trades – application in practice

Protecting critical staff to maintain critical operations



Future forum topics

While we want to remain flexible to provide insight on operational challenges when they happen, we appreciate you want to know when we will cover topics.

We have the following deep dives planned:

Date TBC - Manifest Error Process Overview

23 February - Sterilised Headroom Overview

Questions outstanding from previous weeks

Q: Last week (early December) it was suggested the ESO balancing decision model has data that could, if published, improve transparency on system status on key metrics (e.g. volts, inertia, etc.) versus minimum system requirements before any BM constraint actions are taken. Has the ESO explored publishing it?

A: We are working with the person who asked this directly. We will consider publishing anything that will have value to the industry.

Q: Mat, you showed 3 charts showing "Forecast" and "Actual" transfer capacities. Is the "Actual" series equal to the "Day Ahead Flows" in the link referenced in the chart? If not, where can we find the data behind the "Actual" series?

A: Yes the 'Actual' is equivalent to the 'Limit' in the Day Ahead Constraint Flows and Limits csv file.

Q: It would be really helpful if you could publish the outturn and forecast documents as an excel documents please?

A: The BSUoS forecast is on the data portal as a csv (<https://data.nationalgrideso.com/balancing/bsuos-monthly-forecast>) in addition to the PDF (<https://data.nationalgrideso.com/balancing/monthly-balancing-services-use-of-system-bsuos-forecast-reports>). The outturn is provided as a PDF. The outturn data is provided as a PDF as this is an initial first view of monthly BSUoS outturn and should not be used as a replacement for the BSUoS data elsewhere on the data portal (<https://data.nationalgrideso.com/balancing/current-balancing-services-use-of-system-bsuos-data>). In addition, if you would like to see the latest in balancing costs this dataset is updated most regularly (<https://data.nationalgrideso.com/balancing/daily-balancing-costs-balancing-services-use-of-system>).

Q: On the BMRA Peak Wind forecast page the Total Installed Metered Wind capacity has been 19502MW for some time. Are there any new Farms going to connect shortly?

A: We have updated the value on BMRS Peak Wind Generation Forecast [page](#) in reference to the Total Metered Capacity. The latest value is 19932MW. This value is continuously reviewed to ensure it is as accurate as possible.

Questions outstanding from previous weeks

Q: Are the ESO working on other regions as well - in the NOA, there are issues around East Anglia and North England

A: Yes, and we will come back to you with details when we have more to share

Q: Is there an FAQ document that the ESO will publish with the B6 constraint pathfinder?

A: We'll publish any generic questions/answers in an FAQ log that will be uploaded to the website

Q: So if the control room goes for intertrip solution then there won't be BOAs for these intertrip instructions?

A: Not necessarily, the control room could use the intertrip along side the BOAs i.e. take a pre-fault drop to keep the constraint within limit and post fault intertrip if needed

Q: Why does Constraint Management Pathfinder (CMP) need to trip plant off in 150ms and why does this have to be a TO circuit breaker?

A: The type of constraint that CMP is needed to solve is stability which means post fault, fast-acting protection timescales are required to disconnect generation to prevent synchronous plant from going unstable. To ensure this happens, duplicate trip links are required along with quick fault clearance times. This is critical to ensure the safety of system operation. These requirements are readily met by transmission owner circuit breakers on the network. The generator circuit breakers often don't meet these requirements and may need modifications, and this can be time consuming and expensive. Thus the TO circuit breaker was the preferred option.

Questions outstanding from previous weeks

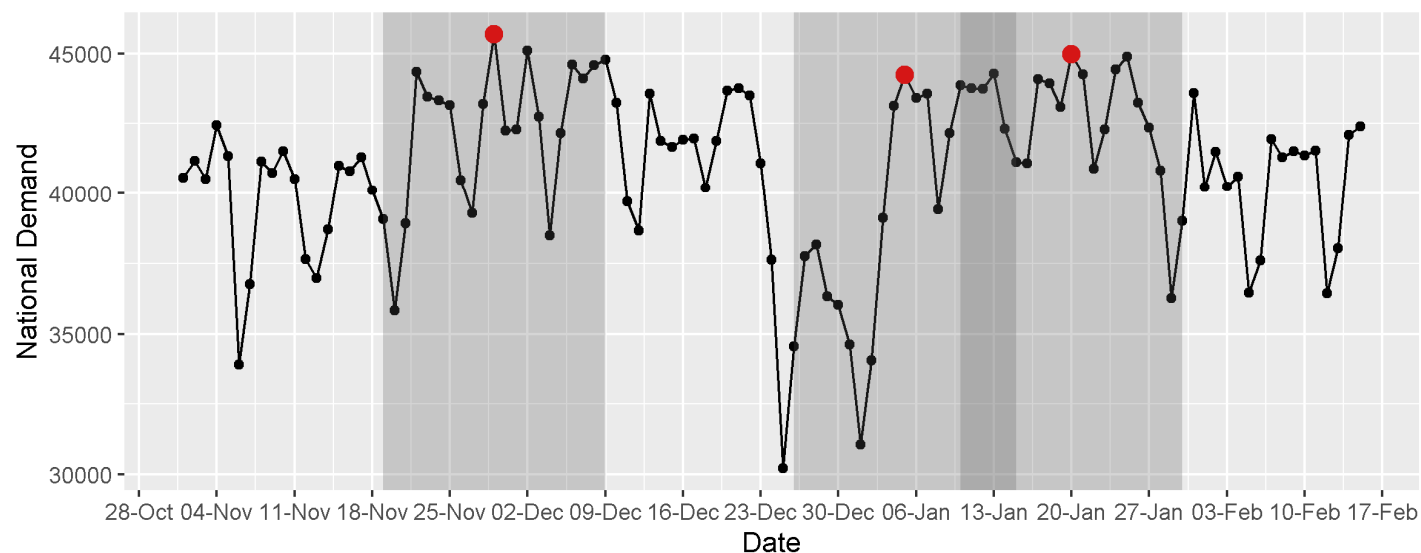
Outstanding questions we are still working on

Q: Does REMIT data always take priority over PN/MEL data? E.g. with Keadby currently, we should ignore FPN/MEL's because REMIT says 0MW even though FPN/MEL may not. I.e. does this hierarchy always prevail?

Q: What are the 900MW unavailable for 2022-23 that NGENSO are now aware of - is the information in the public domain?. Surely REMIT would say it should be?

A: We have been looking at this question for a couple of weeks now and have been unable to understand what it is related to. Please could you provide clarification so we can respond?

Demand | Indicative Peak National Demand



| ESO operational metering | | | |
|--------------------------|------------------|----------------------|---|
| Date | Time (HH ending) | National Demand (MW) | Estimated triad avoidance (HH corresponding with the time of the peak) (MW) |
| 29/11/2021 | 1730 | 45679 | 0 |
| 20/01/2022 | 1730 | 44977 | 400 |
| 05/01/2022 | 1800 | 44245 | 0 |

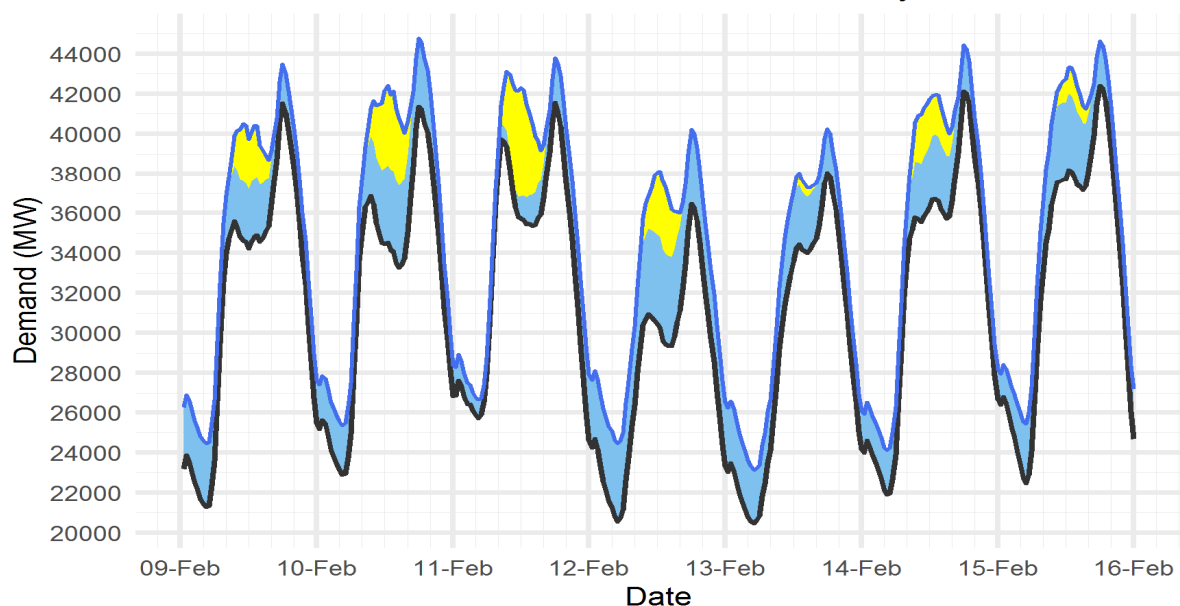
We present National Demand operational metering because triad demand is calculated on the basis of demand excluding interconnector exports. This definition of demand is neither National Demand nor Transmission Demand, but more closely tracked by National Demand.

National Demand 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). It shows time as half hour beginning.

Demand | Last week demand out-turn

ESO National Demand outturn 09-15 February 2022



Renewable type

- Distributed_PV
- Distributed_Wind

Demand type

- Estimated_Total_Demand
- National

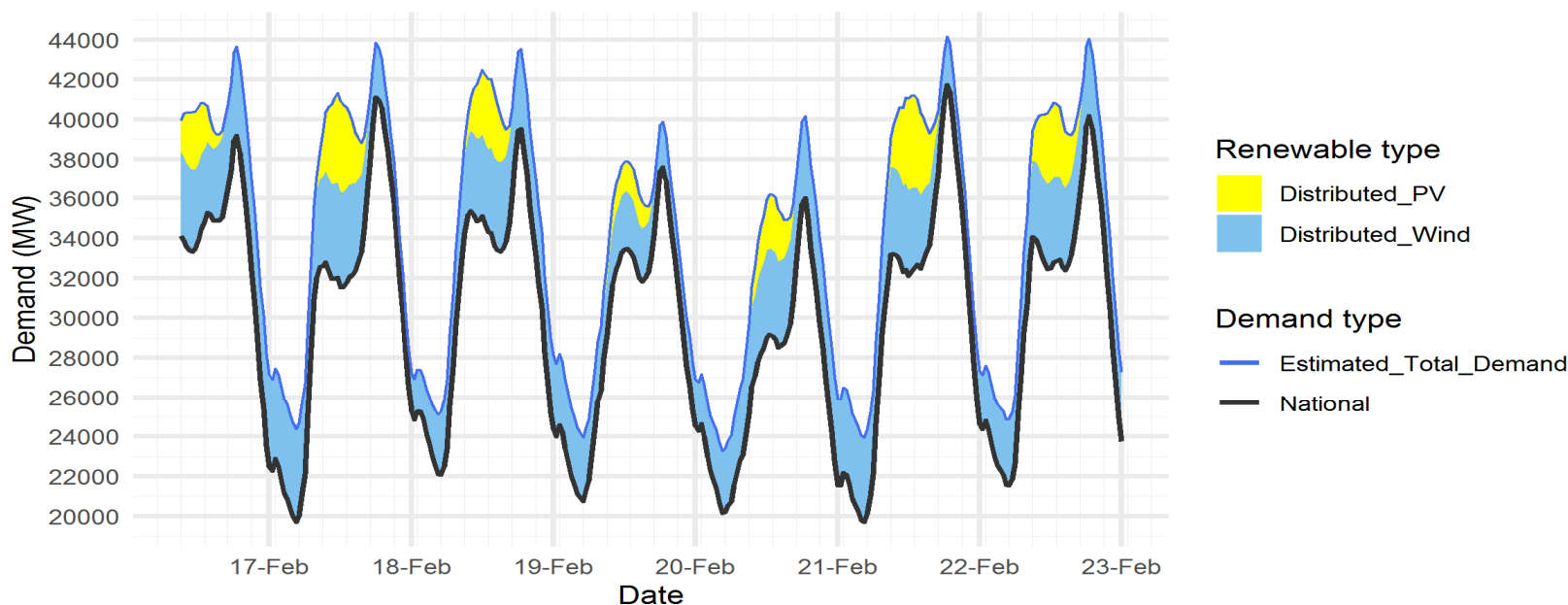
| Date | Forecasting Point | FORECAST (Wed 09) | | OUTTURN | | | |
|--------|-------------------|----------------------|-----------------|----------------------|---------------------------|--------------------------------|-----------------|
| | | National Demand (GW) | Dist. wind (GW) | National Demand (GW) | Triad Avoidance est. (GW) | N. Demand adjusted for TA (GW) | Dist. wind (GW) |
| 09 Feb | Evening Peak | 41.7 | 2.0 | 41.5 | 0.0 | 41.5 | 2.0 |
| 10 Feb | Overnight Min | 22.3 | 2.8 | 22.9 | n/a | n/a | 2.5 |
| 10 Feb | Evening Peak | 41.7 | 2.7 | 41.4 | 0.0 | 41.4 | 3.4 |
| 11 Feb | Overnight Min | 24.9 | 1.3 | 25.7 | n/a | n/a | 0.9 |
| 11 Feb | Evening Peak | 41.6 | 2.1 | 41.5 | 0.0 | 41.5 | 2.3 |
| 12 Feb | Overnight Min | 21.2 | 3.7 | 20.6 | n/a | n/a | 3.9 |
| 12 Feb | Evening Peak | 36.6 | 3.7 | 36.5 | 0.0 | 36.5 | 3.8 |
| 13 Feb | Overnight Min | 20.5 | 3.3 | 20.5 | n/a | n/a | 2.7 |
| 13 Feb | Evening Peak | 37.3 | 3.4 | 38.0 | 0.0 | 38.0 | 2.2 |
| 14 Feb | Overnight Min | 20.8 | 3.4 | 21.9 | n/a | n/a | 2.2 |
| 14 Feb | Evening Peak | 41.5 | 3.2 | 42.1 | 0.0 | 42.1 | 2.4 |
| 15 Feb | Overnight Min | 22.3 | 3.0 | 22.5 | n/a | n/a | 2.9 |
| 15 Feb | Evening Peak | 41.5 | 3.2 | 42.4 | 0.9 | 43.3 | 2.2 |

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

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.

Demand | Week Ahead

ESO Demand forecast for 16-22 February 2022



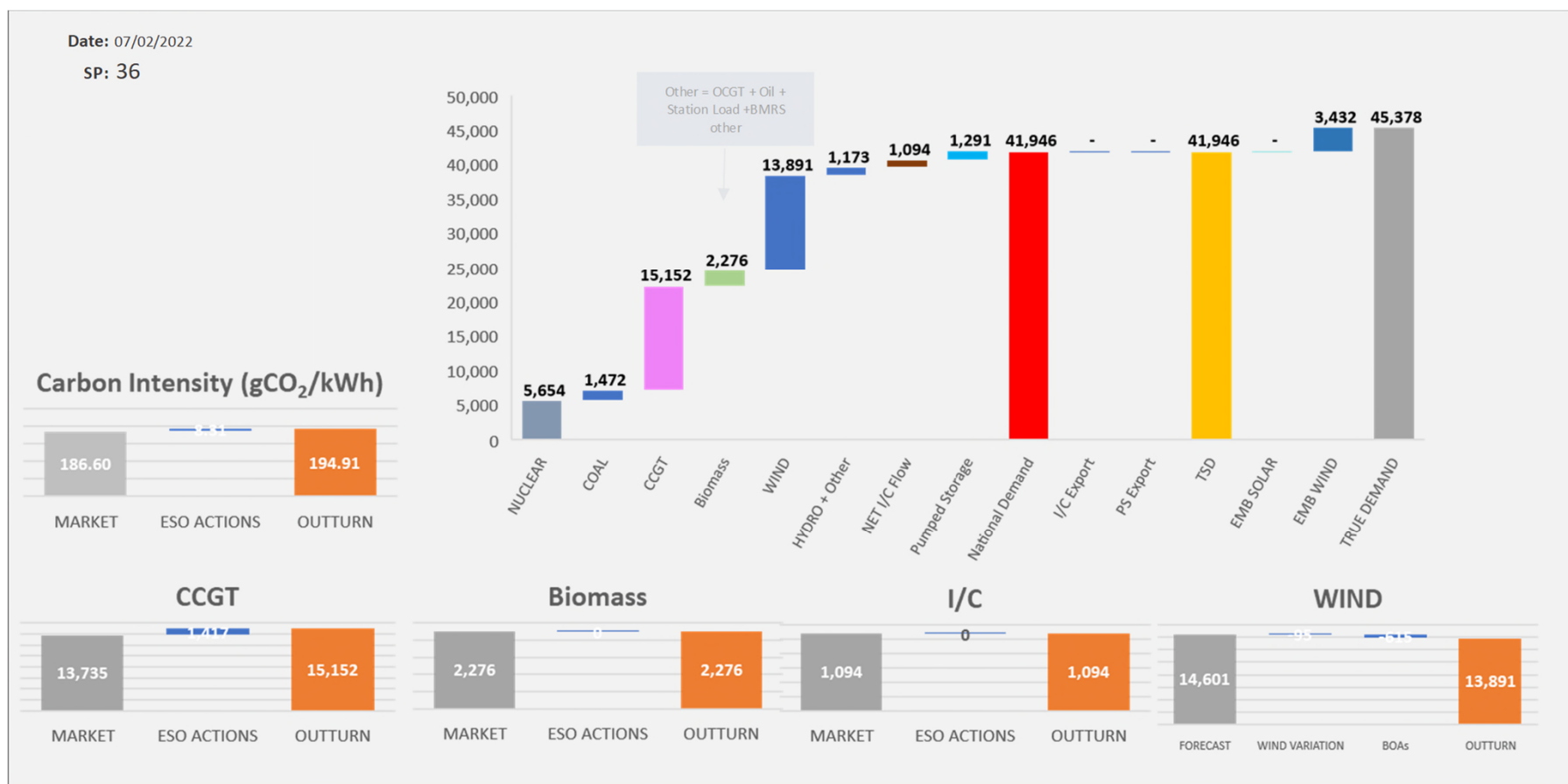
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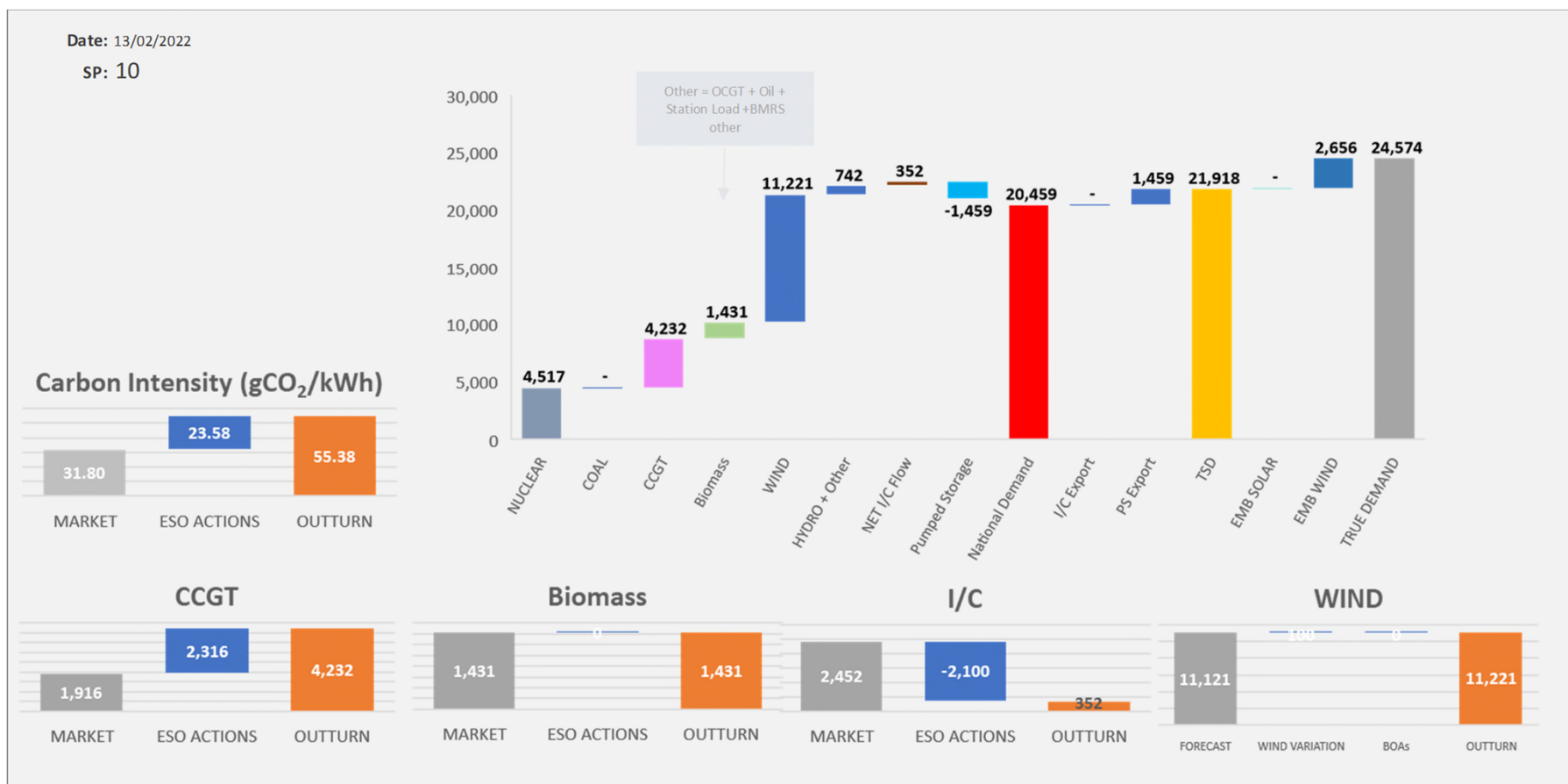
First time ESO shares its Triad Avoidance adjusted **National Demand** forecast is after 21:00 on D-1

| Date | Forecasting Point | FORECAST (Wed 16) | |
|--------|-------------------|----------------------|-----------------|
| | | National Demand (GW) | Dist. wind (GW) |
| 16 Feb | Evening Peak | 39.2 | 4.5 |
| 17 Feb | Overnight Min | 19.7 | 4.7 |
| 17 Feb | Evening Peak | 41.1 | 2.7 |
| 18 Feb | Overnight Min | 22.1 | 3.2 |
| 18 Feb | Evening Peak | 39.5 | 4.0 |
| 19 Feb | Overnight Min | 20.8 | 3.2 |
| 19 Feb | Evening Peak | 37.6 | 2.3 |
| 20 Feb | Overnight Min | 20.2 | 3.1 |
| 20 Feb | Evening Peak | 36.0 | 4.2 |
| 21 Feb | Overnight Min | 19.7 | 4.2 |
| 21 Feb | Evening Peak | 41.7 | 2.4 |
| 22 Feb | Overnight Min | 21.6 | 3.3 |
| 22 Feb | Evening Peak | 40.2 | 3.8 |

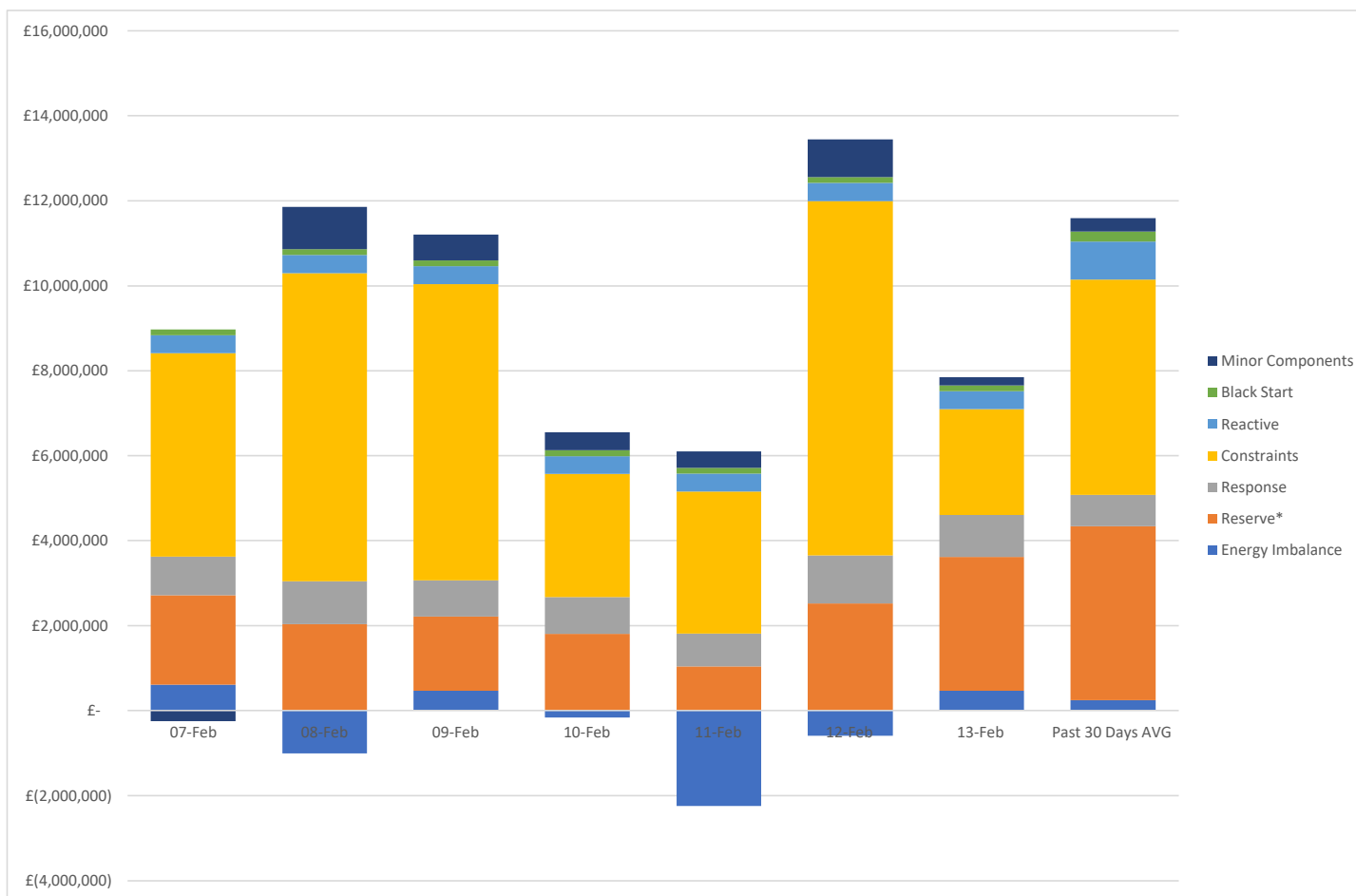
ESO Actions | Monday 07 February Peak



ESO Actions | Sunday 13 February Minimum



Transparency | Costs for the last week

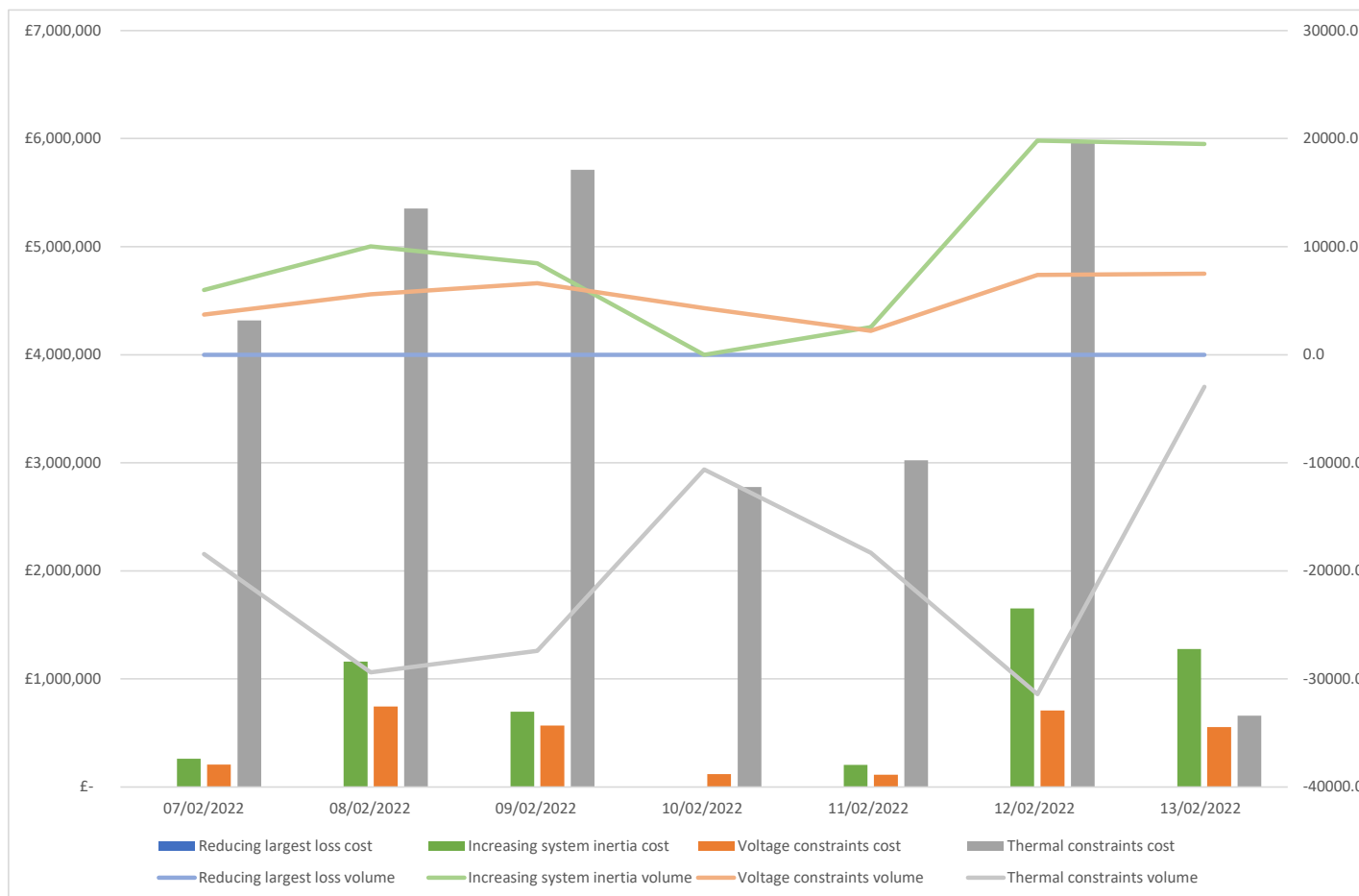


Saturday 12th was the most expensive day with a spend of £13m. Both Tuesday 8th and Wednesday 9th the daily spend was nearly £11m.

The main component of the daily spend throughout the week was costs associated to constraint actions.

Past 30 Days Average added

Transparency | Constraint cost breakdown



Thermal – network congestion

Throughout all days, actions were required to manage thermal constraints, with little intervention on Sunday.

Voltage

Action taken to synchronise generation to meet voltage requirements were required throughout the week.

Managing largest loss for RoCoF

No intervention required to manage largest loss on interconnectors.

Increasing inertia

intervention required to increase minimum inertia every day except Thursday.

<https://data.nationalgrideso.com/balancing/constraint-breakdown>

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, imports and peak demand. This is based on information available to National Grid ESO as of 16 February and is subject to change. It represents a view of what the market is currently intending to provide before we take any actions.

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.

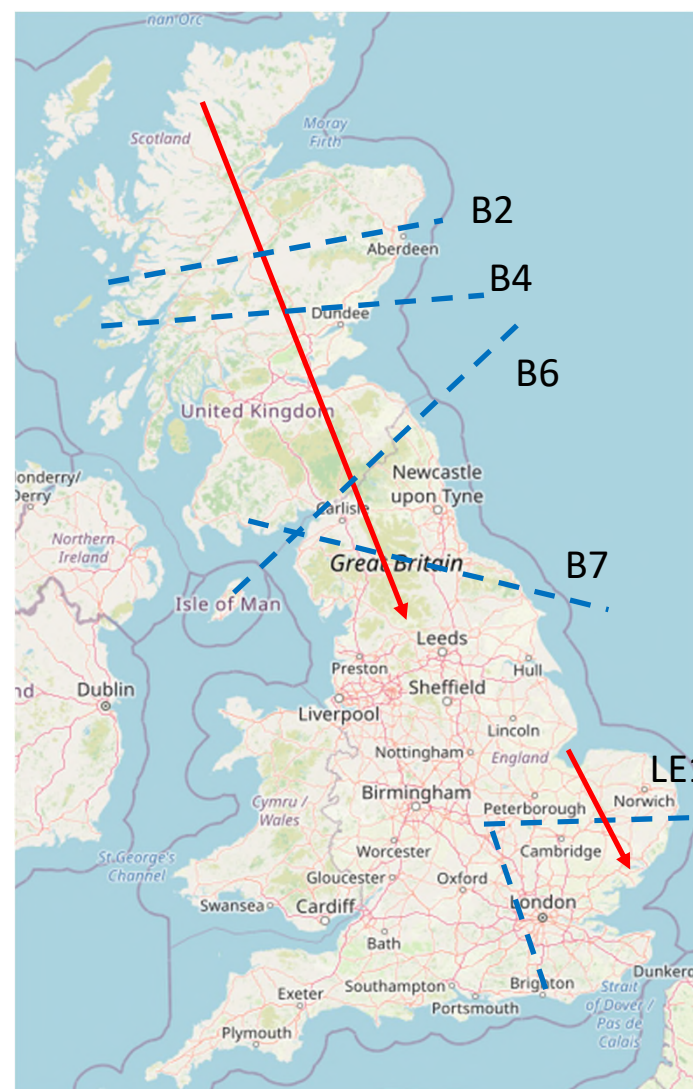
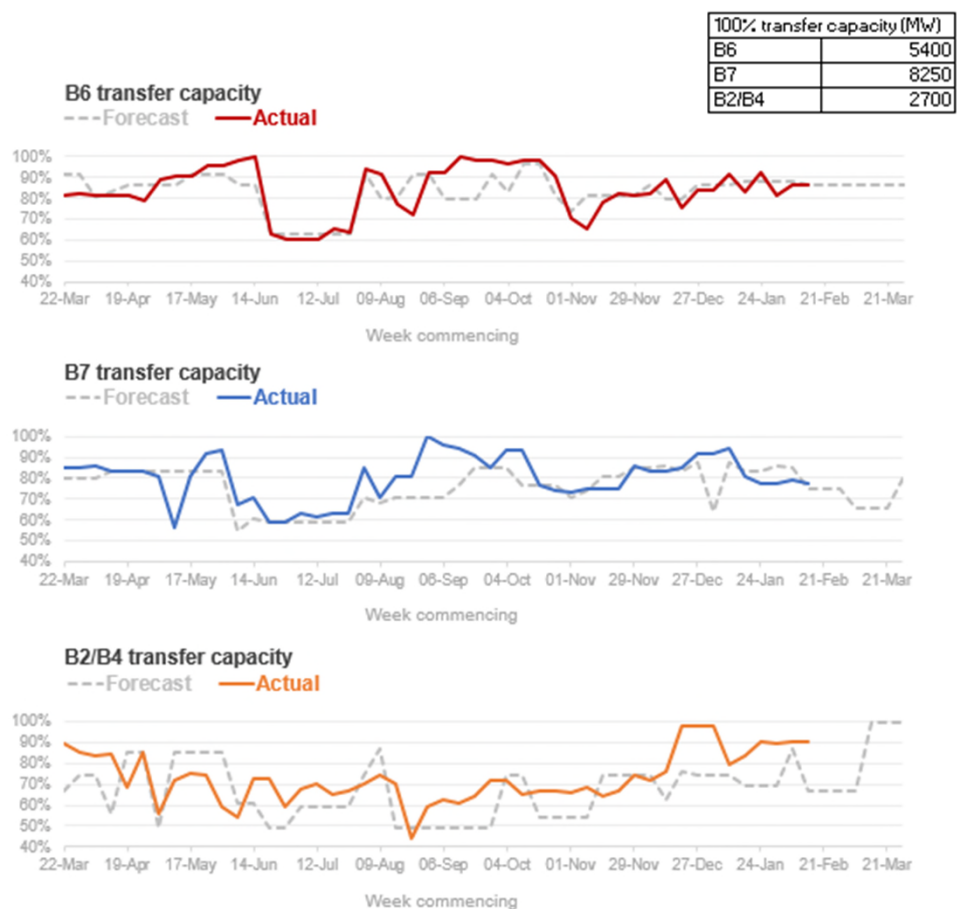
For higher surplus values, margins are expected to be adequate and there is a low likelihood of the ESO needing to use its tools. In such cases, we may even experience exports to Europe on the interconnectors over the peak depending on market prices.

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 seven days.

| Day | Date | Notified conventional generation (MW) | Wind (MW) | Interconnector availability (MW) | Peak demand (MW) | Indicative surplus (MW) |
|-----|------------|---------------------------------------|-----------|----------------------------------|------------------|-------------------------|
| Thu | 17/02/2022 | 40544 | 11194 | 4250 | 41237 | 10619 |
| Fri | 18/02/2022 | 43761 | 13183 | 4250 | 39830 | 16647 |
| Sat | 19/02/2022 | 42494 | 9406 | 4250 | 37871 | 13822 |
| Sun | 20/02/2022 | 43484 | 14390 | 4250 | 36673 | 19117 |
| Mon | 21/02/2022 | 44167 | 9731 | 4250 | 42036 | 11190 |
| Tue | 22/02/2022 | 44732 | 14156 | 4250 | 40920 | 15724 |
| Wed | 23/02/2022 | 44502 | 10573 | 4250 | 42162 | 11870 |

Transparency | Constraint Capacity



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>

Balancing Services Adjustment Data (BSAD) Overview

Balancing Services Adjustment Data is the mechanism by which the costs and volumes of relevant Balancing Services settled outside of the BM are fed into the calculation of Electricity Imbalance Prices under the Balancing Settlement Code.

BSAD has changed over the years following a number of modifications, such as P217, P305 and more recently P399, which is making the identity of balancing service providers visible in BSAD.

Information included in BSAD

Any relevant balancing service including non-BM Short Term Operating Reserve (STOR) and non-BM Fast Reserve (FR) actions, taken outside the Balancing Mechanism

May include, but are not limited to, the following balancing services:

- Forward Contracts - energy related products, system to system services (including services via Interconnectors, Constraint Management, Balancing service and Emergency Assistance service)
- Maximum Generation
- Emergency De-energisation Instructions
- System-to-Generator Operational Intertripping
- Commercial Intertrip
- Optional Downward Flexibility management (ODFM)
- BM Start Up costs

Information included in BSAD

BSAD data for each settlement period:

- Unique sequential number for each Balancing Services Adjustment Action
- For each such Balancing Services Adjustment Action:
 - the Balancing Services Adjustment Volume
 - the Balancing Service Adjustment Cost
 - whether the NETSO has classified such Balancing Services Adjustment Action as “SO Flagged”
 - whether the NETSO has classified such Balancing Services Adjustment Actions as “STOR Flagged”
 - the Party ID, Asset ID, Tendered Status and Service Type, as defined in P399
- Buy Price Adjustment
- Sell Price Adjustment

BSAD Submissions

Files are submitted to Elexon at various times, for a Settlement Period and for a day

NETBSAD and DISBSAD Files

NETBSAD Contains Buy Price Adjuster, an adjuster associated with BM Start Up Costs

DISBSAD Disaggregated BSAD typically consists of a number of Balancing Services Adjustment Action items

- non-BM STOR
- non-BM Fast Reserve
- Interconnector actions
- Trade data

Explaining the DISBSAD file data

For each half hour period:

Id - identifier which is unique within each Settlement Period

Cost (£) and **Volume (MWh)** – for Interconnector trades:

The **net BSAD volume is always with respect to NGC**: a positive volume is a Buy, and a negative volume is a Sell

Where there are multiple Trades for the same settlement period the net positions of all trades grouped by interconnector, instigator and trade type are reported, i.e. if there are two equal and opposite trade occurring within the same period, i.e. a zero volume, then they are not reported to IP

SO-flag – the reason for the trade- T means the trade has been flagged as System; F means Energy. The descriptive terms System or Energy are used for Cash out purposes.

STOR Provider flag – as defined for post [P305](#) Settlement dates - action provided by a STOR Provider

Example of BSAD Trade: 15/11/2021, SPs 33 – 38, EWIC

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The BSAD data was sent to ELEXON after the gate closure of each Settlement period:

Interconnector data for SP 33 – 15/11/2021 at 16:38

Interconnector data for SP 34 – 15/11/2021 at 17:08

Interconnector data for SP 35 – 15/11/2021 at 17:38

Interconnector data for SP 36 – 15/11/2021 at 18:08

Interconnector data for SP 37 – 15/11/2021 at 18:38

Interconnector data for SP 38 – 15/11/2021 at 19:08

The 2 BMRS BSAD Final Files for 15/11/2021, containing all BSAD data for all SPs, were sent to ELEXON on 16/11/2021 at 10:45.

BMRS Publication

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ELEXON BMRS: <https://www.bmreports.com/bmrs/?q=/balancing/balancingserviceadjdata/2022-01-31/6>

Use the + against a row to display additional information: Party ID, Asset ID, Tendered Status & Service Type as defined in P399

| | Settlement Date | SP | ID | Cost (£) | Volume (MWh) | Price (£/MWh) | SO-flag | STOR Provider flag |
|---|-----------------|----|----|-----------|--------------|---------------|---------|--------------------|
| + | 2021-11-15 | 32 | 1 | 0.00 | 0.000 | 0 | T | F |
| + | 2021-11-15 | 33 | 1 | -2676.28 | -9.375 | 285.46 | T | F |
| + | 2021-11-15 | 34 | 1 | -21410.25 | -75.000 | 285.47 | T | F |
| + | 2021-11-15 | 35 | 1 | -40144.22 | -140.625 | 285.47 | T | F |
| + | 2021-11-15 | 36 | 1 | -41821.36 | -146.500 | 285.47 | T | F |
| + | 2021-11-15 | 36 | 2 | 3047.72 | 12.969 | 235.00 | F | F |
| + | 2021-11-15 | 37 | 1 | -31116.23 | -109.000 | 285.46 | T | F |
| + | 2021-11-15 | 37 | 2 | 2239.79 | 9.531 | 235.00 | F | F |
| + | 2021-11-15 | 38 | 1 | -10705.13 | -37.500 | 285.47 | T | F |
| + | 2021-11-15 | 39 | 1 | 0.00 | 0.000 | 0 | T | F |

15/11/2021, DISBSAD File, SPs 33 – 38, EWIC, Instigator Eirgrid

BMRS Publication - ID

Sli.do code #OTF

ELEXON BMRS: <https://www.bmreports.com/bmrs/?q=/balancing/balancingserviceadjdata/2022-01-31/6>

| | 2021-11-15 | 33 | 1 | -2676.28 | -9.375 | 285.46 | T | F |
|---|-----------------|----|--------------|-----------|----------|--------|---|---|
| | Party Id | | | | | | | |
| | EIRG | | | | | | | |
| | Asset Id | | | | | | | |
| | EWIC | | | | | | | |
| | Tendered Status | | Service Type | | | | | |
| | Tendered | | System | | | | | |
| + | 2021-11-15 | 34 | 1 | -21410.25 | -75.000 | 285.47 | T | F |
| + | 2021-11-15 | 35 | 1 | -40144.22 | -140.625 | 285.47 | T | F |
| + | 2021-11-15 | 36 | 1 | -41821.36 | -146.500 | 285.47 | T | F |
| + | 2021-11-15 | 36 | 2 | 3047.72 | 12.969 | 235.00 | F | F |
| + | 2021-11-15 | | | | | 285.46 | T | F |

15/11/2021, DISBSAD File, Details of trade for SP 33, including the Party ID, Asset ID, Tendered Status and Service Type, as per P399.

Interconnector Trades and BSAD inconsistencies

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Issue identified with interconnector trades; root cause due to interconnector trades needing to be carried outside systems

- We have reviewed all Interconnector trades for the past year
- Testing carried out with Elexon to validate resubmission process
- Created and validated new BSAD data
- Resubmitted BSAD files as needed
- Resubmissions will be completed by the end of w/c 14/02
- The implementation of a new IT tool has been approved and is under development to make the submission and resubmission of BSAD files more robust
- A new process has been put in place to update IC trades post event quicker

SO-SO Trades – Application in practice

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The standard tool NGENO uses to adjust cross border flow to manage system issues is via third party trading – Use of counterparties in market based auctions. However, to avoid reliance on emergency measures, SO-SO trades can be developed with neighbouring TSOs which allows control closer to real time.

A non firm service – neither TSO is required to provide. Performed directly Control Room to Control Room (not trading desk).

Usage – SO-SO trades are considered in the stack of alternative actions and will only be utilised if economically viable compared to other market alternatives.

Rarely enacted – See all 2021 SO-SO trades below. (1) non-emergency usage & (2) NGENO instigated:

| Date | Total Volume (MWh) | Average Rate (£/MWh) | Border |
|-----------|--------------------|----------------------|---------|
| 08-Feb-21 | 334 | 56 | France |
| 06-Mar-21 | 416 | 494 | Ireland |
| 11-Mar-21 | 40 | 592 | Ireland |

SO-SO Trades – Price setting

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Pricing – Depends upon product design co-ordinated between the two system operators – will differ by border e.g. :

- **Set in advance** - are set at Day-ahead and are based on the forecasted highest potential cash-out price on an hourly basis. Because this is done in advance and they are only a forecasted price, the real-time/post-event market price could be lower (e.g. if the wind was higher than forecast and NGENSO only took cheaper offers or bids) or higher so in this case the GB consumer would be paying less.
- **Agreed between SOs as part of the Trade** - agreed at the time of the trade request between TSOs, at the same cost of replacement energy;
- **Set post-event** - set retrospectively at the highest bid/offer cost (depending on volume direction) during each settlement period. Some TSOs do not have foresight of rebalancing action costs, the actions are carried out regardless of cost.

Future Development - NGENSO is currently looking at improving the suite of SO-SO services (under the Trade and Cooperation Agreement workstream), with the aim of making these services more standardised and reflective of market prices

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Audience Q&A Session

 Start presenting to display the audience questions on this slide.

Q&A

Please remember to use the feedback poll after the event. We welcome feedback to understand what we are doing well and how we can improve the event ongoing.

If you have any questions after the event, please contact the following email address: box.NC.Customer@nationalgrideso.com

