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ESO Operational Transparency Forum

11 May 2022

nationalgridESO

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

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

Focus Areas

Managing constraints in real-time – inertia/ RoCoF

Signposts to:
Strategic Review of Balancing Capability
DC & DM & DR Dashboard

Questions outstanding from previous weeks

Q: Do you publish inertia forecasts?

A: We currently do not publish the inertia forecast. We publish inertia outturns, which is available under the link:

https://data.nationalgrideso.com/system/system-inertia

Q: Why does Gen per Type Other often not follow FPNs? For instance, HH15 FPN=310MW vs Generation 836MW.

A: We raised a ticket with Elexon to try to understand if there is an error driving this discrepancy. They have responded this morning to say that the values should not necessarily match. The Generation Per Type dataset is aggregated by (actual) generated volume per fuel type. Whereas, the FPN's shown on the Physical data page is an indicator of what a particular BMU thought they would generate/consume.

We do expect all units to submit accurate PNs. If you believe you have spotted a particular instance that you would like to raise with our Market Monitoring team then please email us at MarketReporting@nationalgrideso.com

Q: Regarding the SZB trip, its good to see only 55MW of emb. gen tripped as a result but inertia levels were v. high at 250GVAs as you state. What would have been the impact if inertia was running at the minimum 140GVAs required to run the system?

A: In line with our frequency and control policy, we apply a range of controls to secure frequency risks including holding response, taking actions to reduce large loss risks and operating a minimum inertia policy. The expected inertia of the system is a key input to determining our frequency response holdings, as well as the largest securable loss on the system, and demand. To secure this event during lower inertia periods would require higher response holdings.

Questions outstanding from previous weeks

Q. When will the TNUoS Generation zone shapefiles be made available on the ESO data portal?

A: We are currently working with the data portal team to setup this data set on the portal and will advise when its available. In the meantime we can email the files out to you if you request them by emailing tnuos.queries@nationalgrideso.com

Q: On 8th Apr 2022: The ndf (national demand forecast) was unusual - sudden drop in demand forecast for period 15 and then sudden rise in demand forecast for period 21 - was there any specific rational/reason for that forecast – referring to the within day 6 hour ahead forecast

A: We have checked all the forecasts prepared and published on that day. They were all correct. However between the forecast that left the Energy Forecasting team and the publication there appears to be an IT process error.

Questions outstanding from previous weeks

Outstanding questions we are still working on:

Q: It sounds like the LCM will result in costs to bid back generation but why you don't bid pumped storage to pump, often at lower cost than e.g. bidding back wind?

Q. Will the ESO be publishing any further information on the methodology behind the DC price caps and how these are being calculated day to day?

System Events

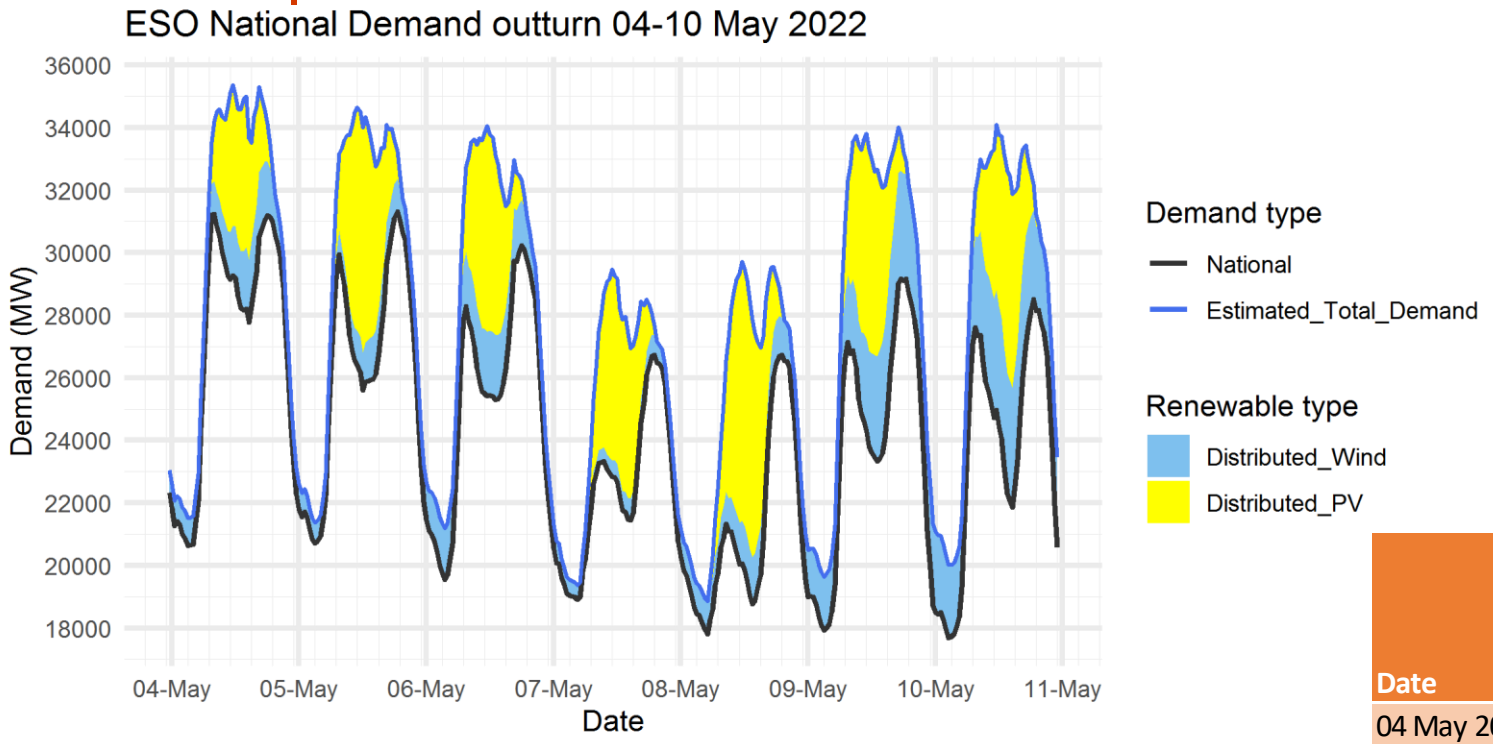
7th May:

At 03:55 IFA interconnector tripped while it was exporting 1028MW to France. Maximum Deviation 50.280 Hz

10th May

At 05:44 IFA interconnector tripped while it was exporting 1027MW to France. Maximum Deviation (Hz): 50.297Hz

Demand | Last week demand out-turn



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.

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 04 May)			OUTTURN		
Date	Forecasting Point	National Demand (GW)	Dist. wind (GW)	Dist. PV (GW)	National Demand (GW)	Dist. wind (GW)	Dist. PV (GW)
04 May 2022	Afternoon Min	27.6	2.1	3.5	27.8	2.0	3.9
05 May 2022	Overnight Min	20.3	0.7	0.0	20.7	0.7	0.0
05 May 2022	Afternoon Min	25.8	1.4	6.2	25.9	1.2	7.2
06 May 2022	Overnight Min	19.1	1.7	0.0	19.5	1.6	0.0
06 May 2022	Afternoon Min	25.6	2.2	3.2	25.3	2.1	5.7
07 May 2022	Overnight Min	19.2	0.6	0.0	18.9	0.4	0.0
07 May 2022	Afternoon Min	20.5	0.7	5.7	21.4	0.7	4.8
08 May 2022	Overnight Min	18.1	0.6	0.2	17.8	1.0	0.0
08 May 2022	Afternoon Min	19.1	0.7	7.9	18.8	1.5	7.6
09 May 2022	Overnight Min	19.1	0.4	0.0	17.9	1.7	0.0
09 May 2022	Afternoon Min	24.7	0.5	8.0	23.3	3.4	6.0
10 May 2022	Overnight Min	19.7	0.5	0.0	17.7	2.3	0.0
10 May 2022	Afternoon Min	25.4	1.0	5.3	21.9	3.8	6.2

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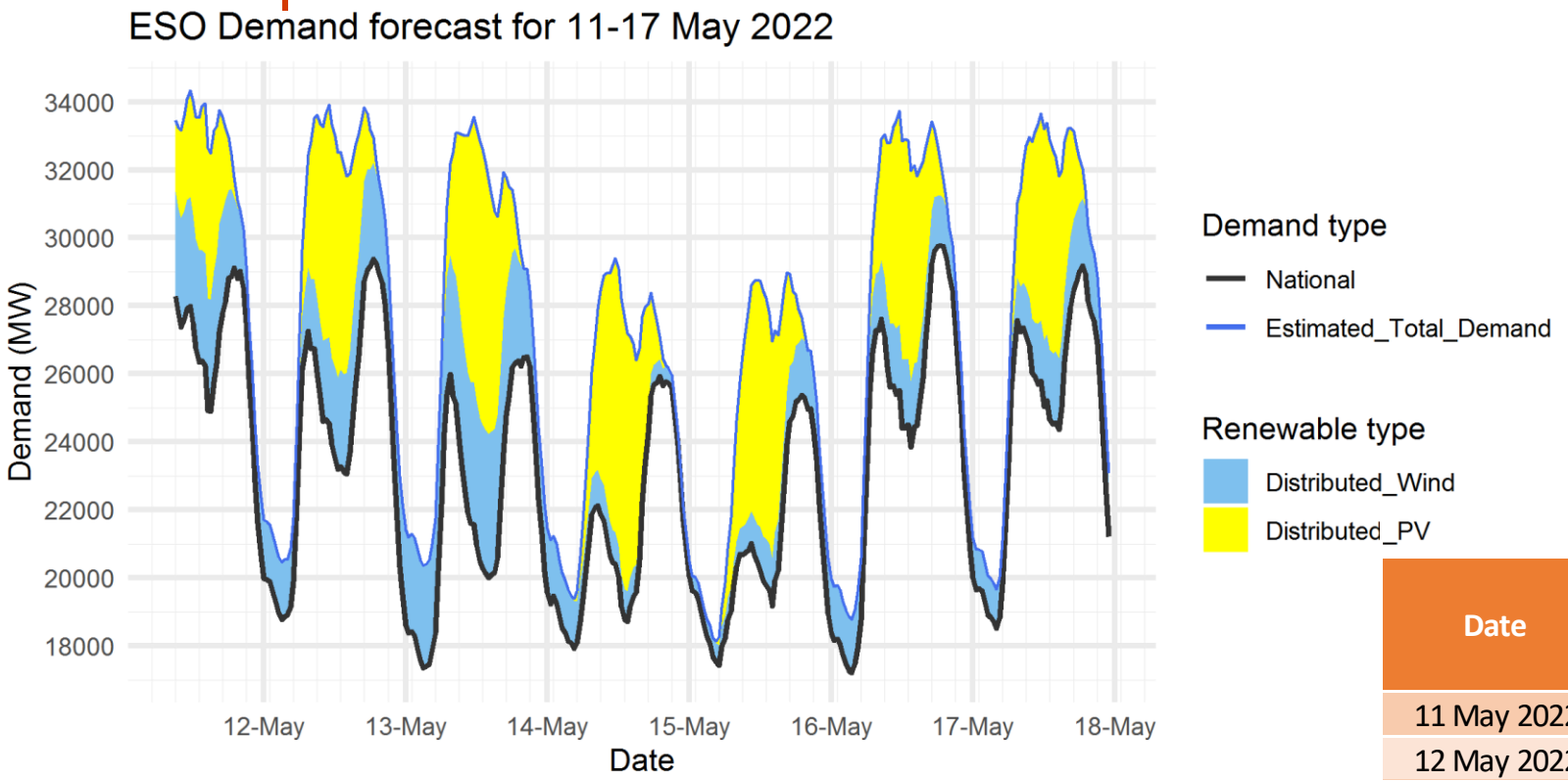
Demand | Week Ahead



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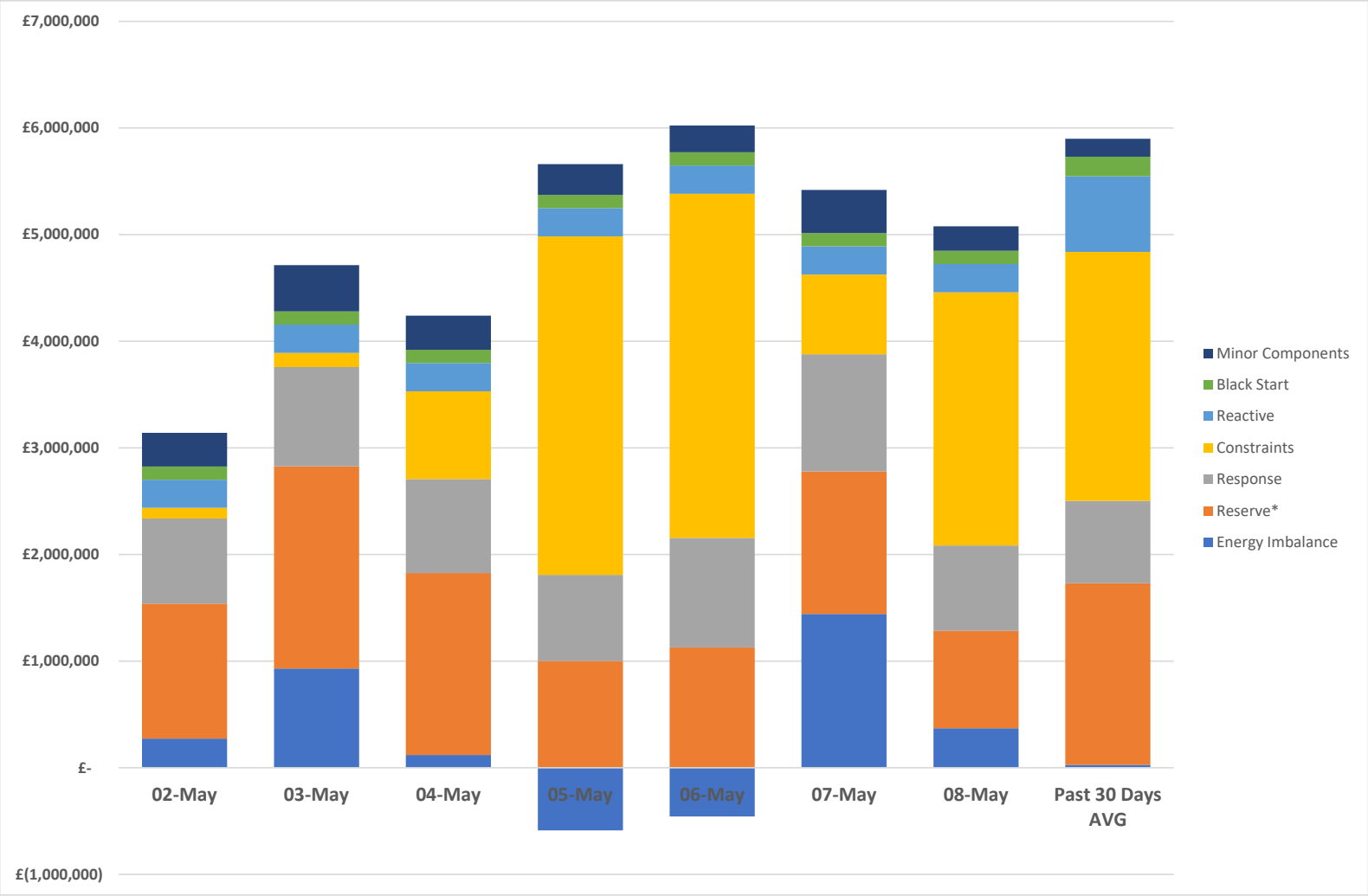
Forecast of the embedded solar & wind generation for the next 14 days can be found on the ESO Data Portal in the following data set: Embedded Solar and Wind Forecast

		FORECAST (Wed 11 May)		
Date	Forecasting Point	National Demand (GW)	Dist. wind (GW)	Dist. PV (GW)
11 May 2022	Afternoon Min	24.9	3.3	4.3
12 May 2022	Overnight Min	18.8	1.7	0.0
12 May 2022	Afternoon Min	23.0	3.0	5.8
13 May 2022	Overnight Min	17.4	3.0	0.0
13 May 2022	Afternoon Min	20.0	4.2	7.5
14 May 2022	Overnight Min	17.9	1.4	0.1
14 May 2022	Afternoon Min	18.7	0.9	7.6
15 May 2022	Overnight Min	17.4	0.6	0.2
15 May 2022	Afternoon Min	19.2	1.4	6.4
16 May 2022	Overnight Min	17.2	1.6	0.0
16 May 2022	Afternoon Min	23.9	1.9	6.2
17 May 2022	Overnight Min	18.5	1.1	0.0
17 May 2022	Afternoon Min	24.4	2.1	5.4

ESO Actions | Category costs breakdown for the last week

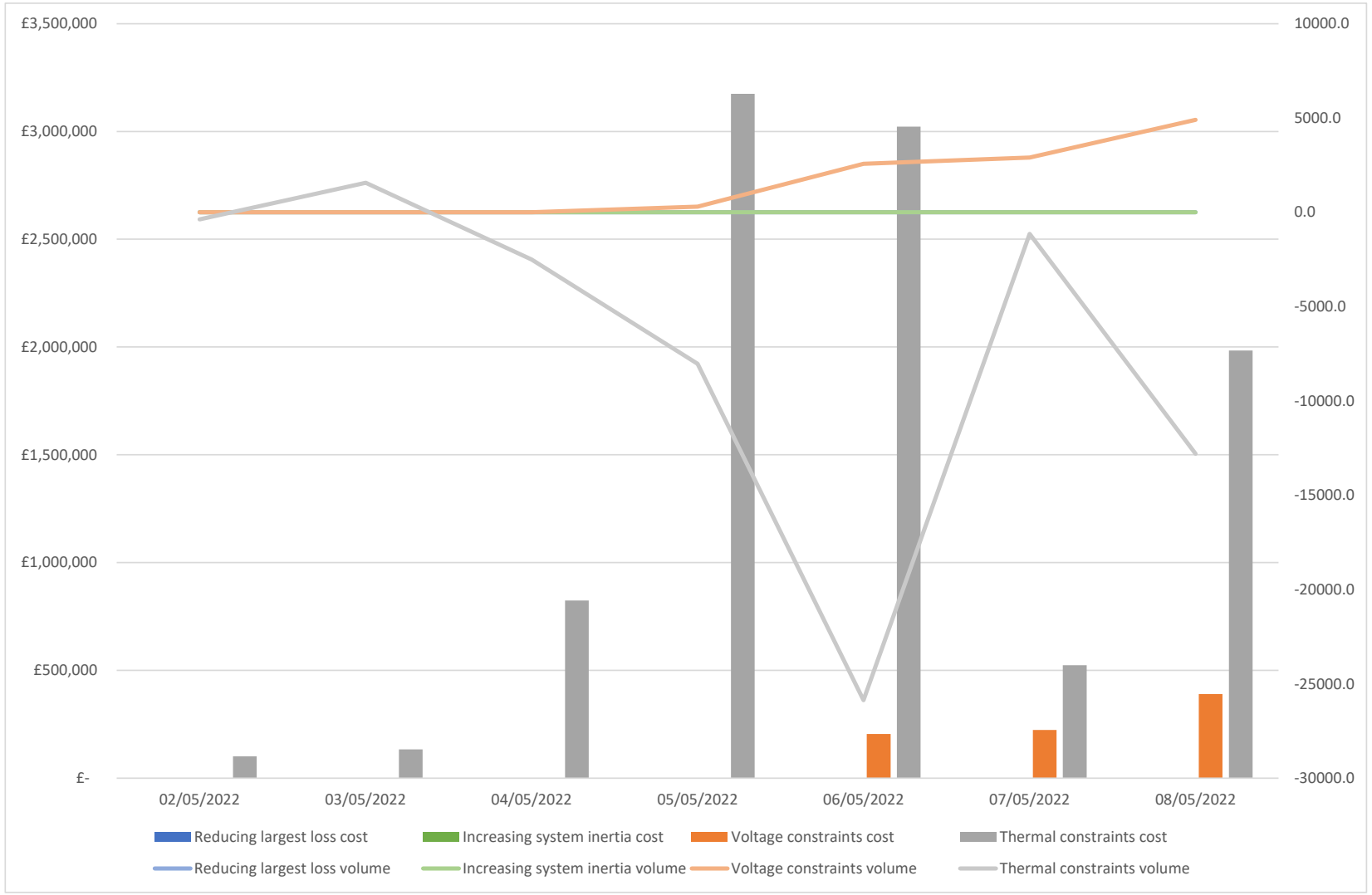


Date	Total (£m)
02/05/2022	3.1
03/05/2022	4.7
04/05/2022	4.2
05/05/2022	5.1
06/05/2022	5.6
07/05/2022	5.4
08/05/2022	5.1
Weekly Total	33.2

Key driver of costs was Constraints category on most days

Past 30 Days Average is displayed in the chart

ESO Actions | Constraint Cost Breakdown



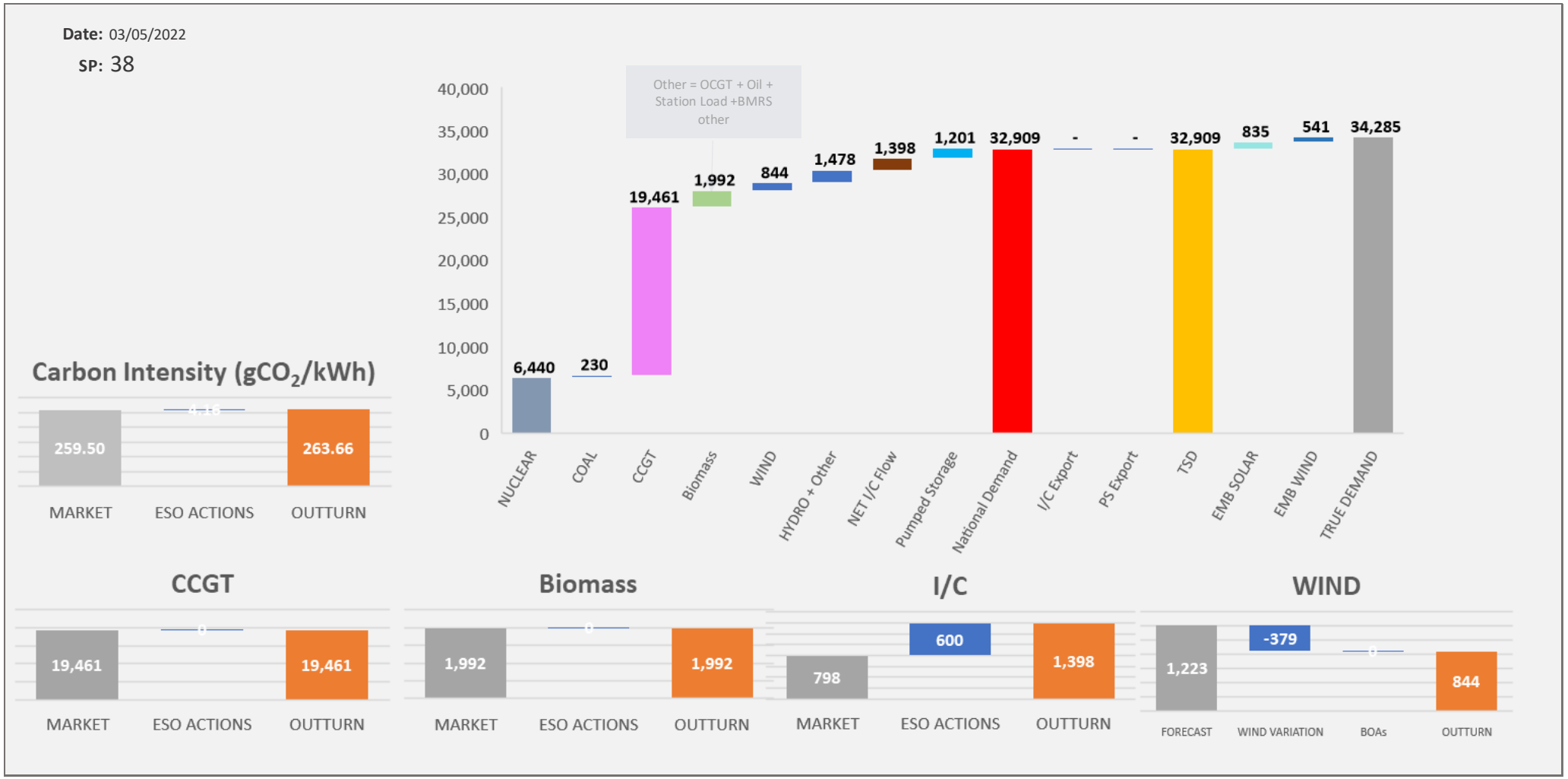
Thermal – Network Congestion
Thermal Constraints actions were required throughout the week

Voltage
Actions taken to synchronise generation to meet voltage requirements were required between Friday and Sunday

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

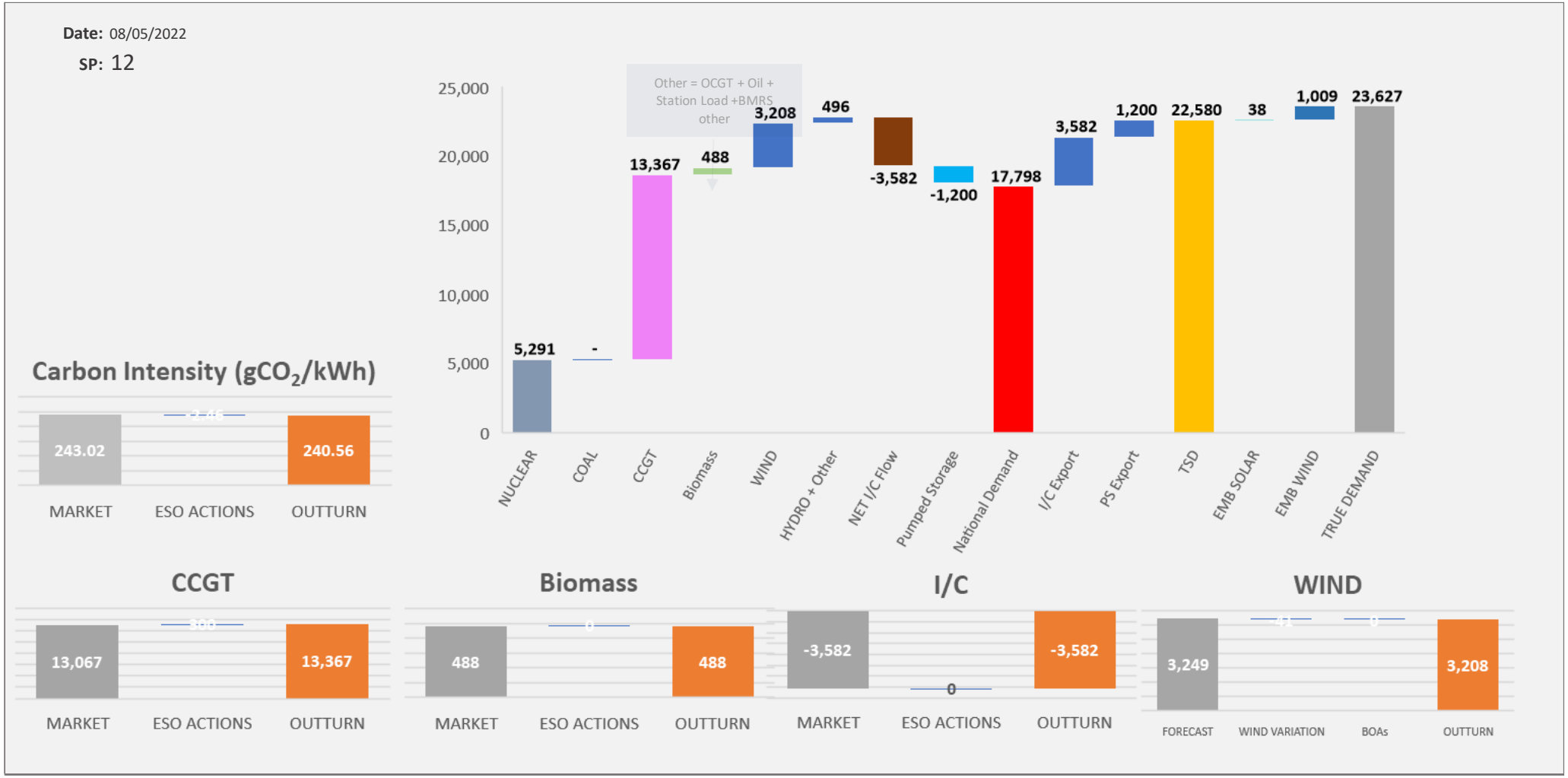
Increasing inertia
No Intervention required to increase minimum inertia

ESO Actions | Tuesday 03 May Peak



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

ESO Actions | Sunday 08 May Minimum



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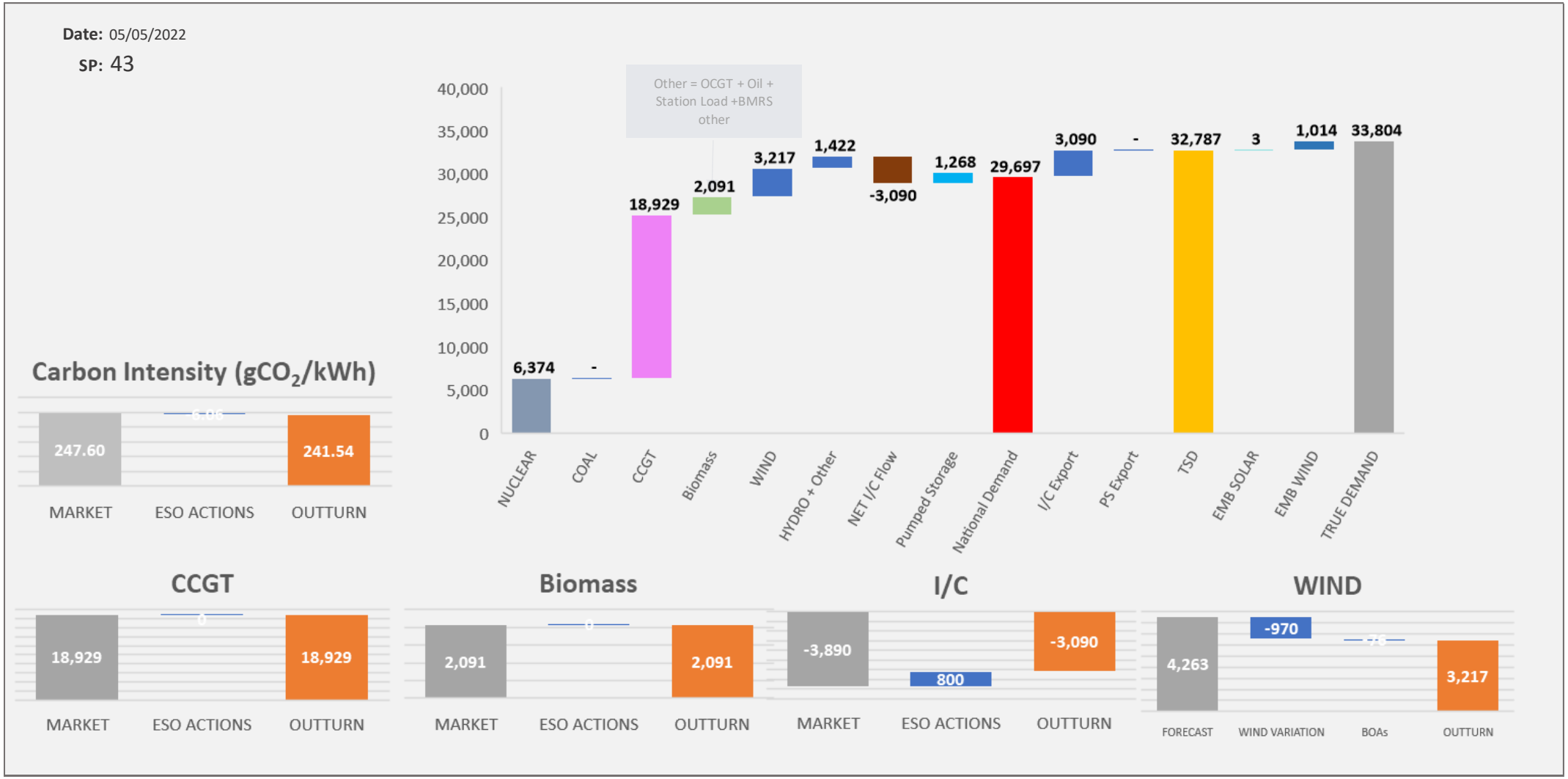
ESO Actions | Thursday 05 April Highest Spend ~£0.3m



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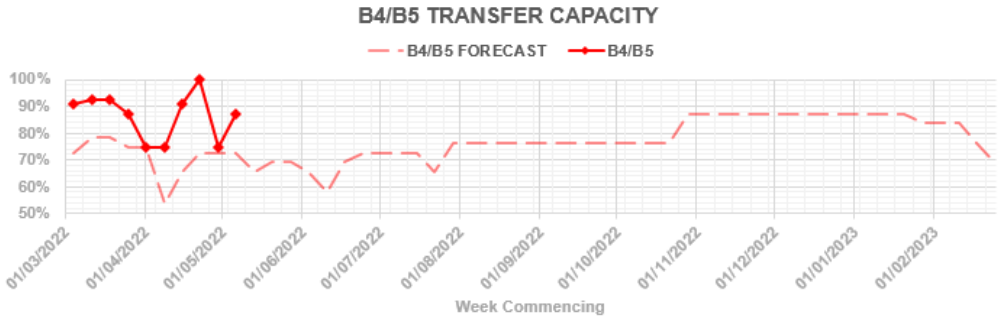
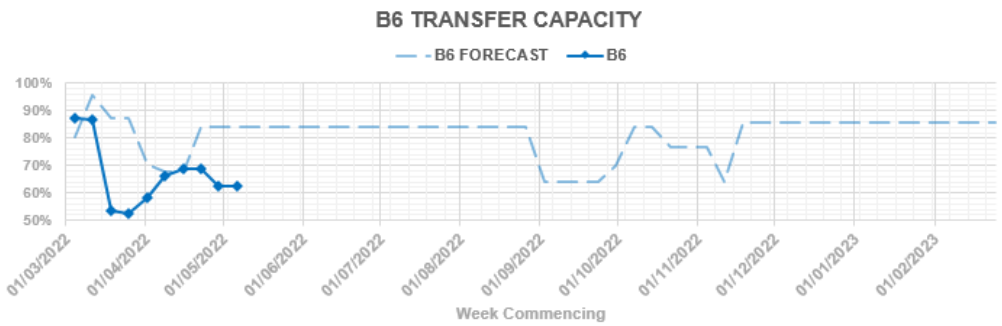
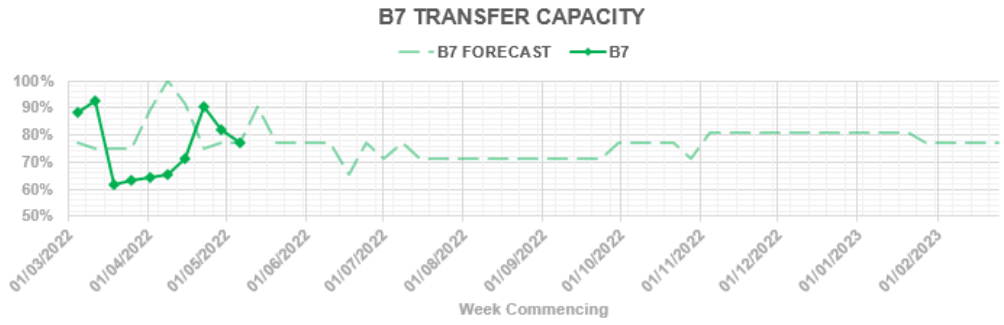
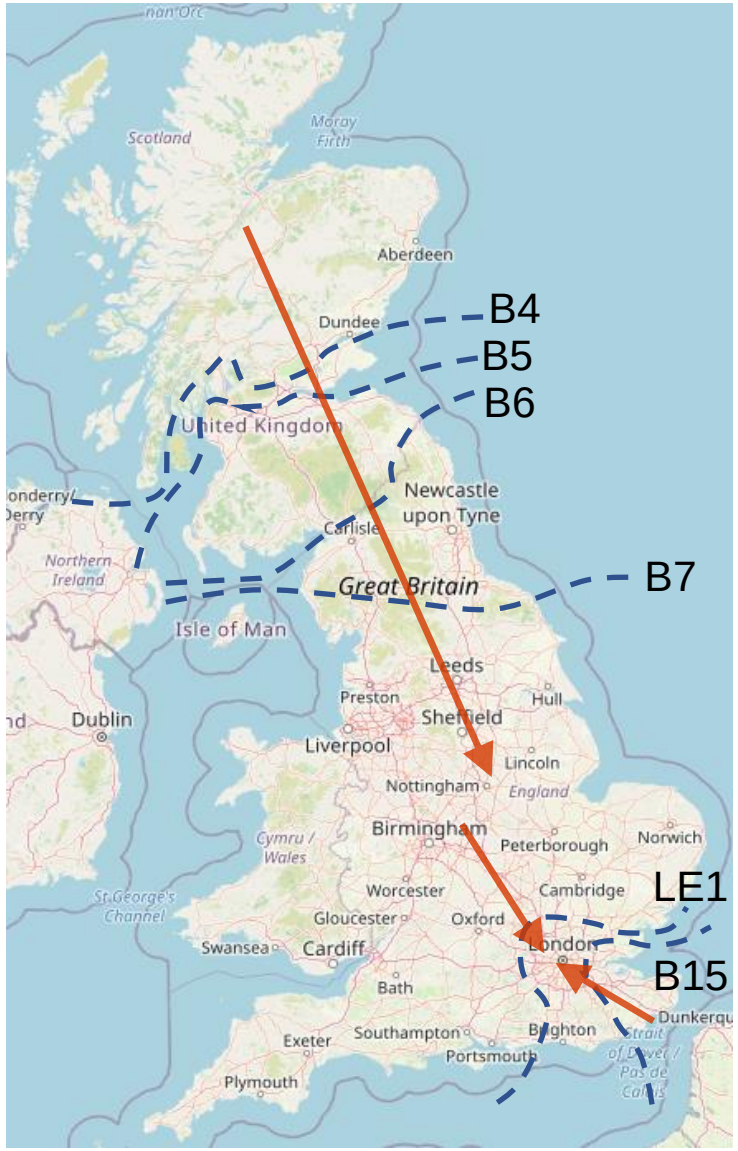
Transparency | Network Congestion





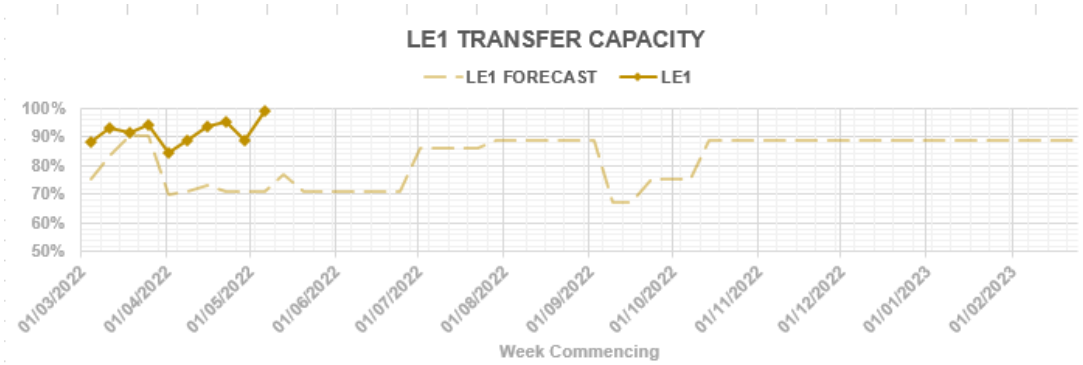


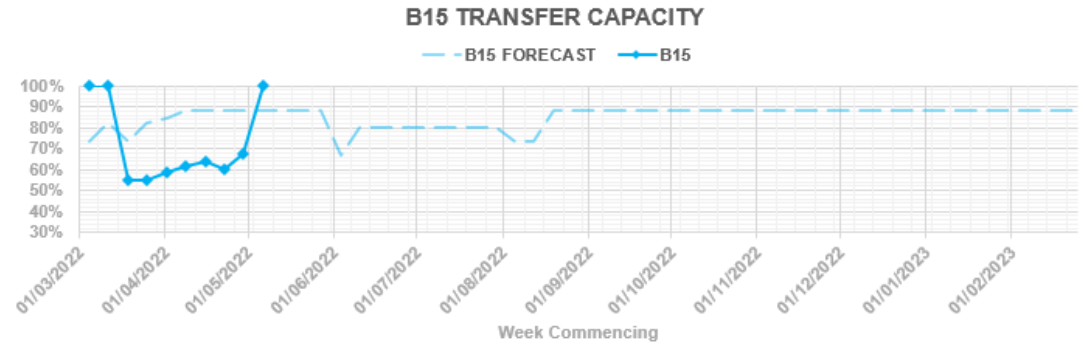
Boundary	Max. Capacity (MW)
B4/B5	2750
B6	5600
B7	8400
LE1	7300
B15	7500



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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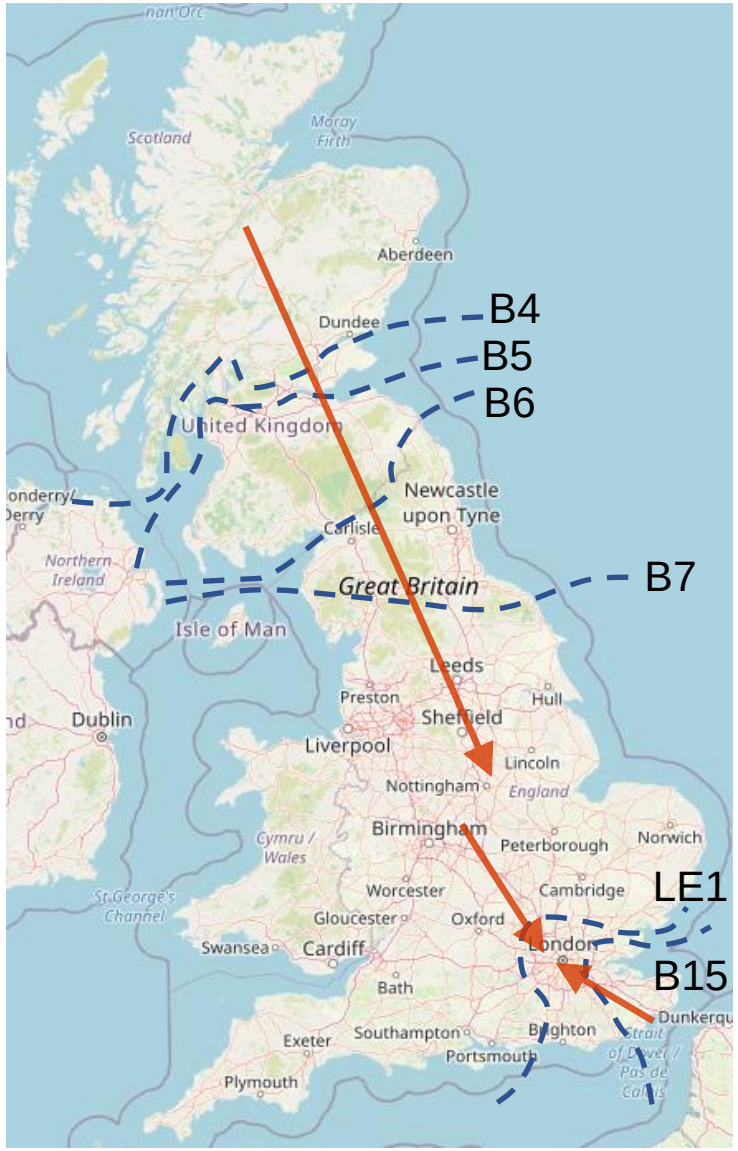

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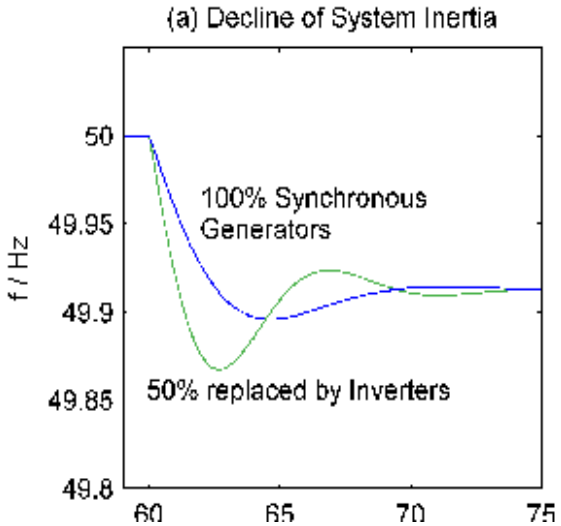
Optimising Inertia in Real-Time

Inertia is the **ability of a power system to oppose changes in frequency** caused by a mismatch of supply and demand and due to resistance provided by kinetic energy of rotating masses connected to the system.

Why do we require Inertia?

- Fundamental to secure system operation
- Inertia prevents frequency falling beyond a certain level for a given loss
- The ‘constraint’ is a minimum level of 140GVAs across all timescales
- Traditionally this ensured ROCOF <0.125Hz/s for a 700MW instantaneous loss



Our Net Zero ambition relies heavily on renewables which reduce system inertia

- Invertor connected plant doesn’t provide inertia (though demand does)
- Renewable generation can displace high inertia machines
- Increased interconnector flows can also reduce inertia at short notice

Changing approach to frequency management has led to

- LOM change program removed unintended consequential tripping of generation for transmission faults
- FRCR has enabled us to accept certain ROCOF losses whilst maintain frequency limits
- Developments have brought other frequency management products to market
- Network solutions encouraged via stability pathfinder contracts (phase 3 underway)

A night in the life of an Operational Strategy Manager

Challenging overnight shift:

- Wind >10GW and above day-ahead forecast
- Large rotating mass generation is lower than planned
- Interconnector redeclares from exporting to importing
- This adds MWs without inertia backing off FLOWSOUTH
- Re-schedule plant for voltage control first, fixing geographical issues
- Solve any inertia shortfall with available plant
- Potentially bid other generation to balance
- Both the voltage machines and the inertia machines will be tagged as system
- Additional sets required to increase inertia aren't geographically specific

Developments in estimation / forecast of system inertia:

- New technologies to measure system inertia
- Undergoing comparison tests with NPL to verify and measure against our current model

Our aspirations:

- *Traditional Plant: flexibility of running configuration, low MNZT, low MZT, low SEL, high Inertia, low £*
- *Contract providers: partake in market / auctions*
- *All relevant parties: Partake in pathfinder contract processes*
  Develop products with us

Strategic Review of Balancing Capability

Sli.do code #OTF

Stepping back to assess our options

Our understanding of the complexity and scale of the transition from existing to future balancing capability has developed greatly since we submitted our first RIIO-2 business plan.

Engaging with the industry

- Want to get industry input to find better ways to meet our strategic objectives and the needs of our customers.
- Work together to create a plan to transform our balancing capabilities and enable Net-zero operability
- Your chance to have an input into how we deliver the future balancing systems

Next in-person workshop on Wednesday 18th May in London 10:00- 16:00

- Already involved? Join us and be part of this unique opportunity.
- Sign up before noon Thursday 12th May.

https://forms.office.com/r/BPvYGFs6as

Phase 1	**Explore**	• Outline current capabilities • Understand market challenges and pain points and future requirements • Review transformation and new capabilities • Challenge assumptions
Phase 2	**Develop**	• Identify options • Prioritise capabilities with greatest benefits • Consider costs of development • Understand how to transition to new capabilities
Phase 3	**Agree**	• Consider the roadmap for the transformation • Plan for future industry engagement to progress together
Phase 4	**Progress**	• Maintain clarity on development • Keep stakeholders involved and informed on a regular basis

More information

Further details are available on our website
https://www.nationalgrideso.com/industry-information/balancing-services/balancing-programme/strategic-capability-review

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Transparency | DC & DM & DR Dashboard

- This week we have updated the frequency response dashboard on ESO data portal. We have implemented the following changes to the dashboard:
  - ✓ DM auction data is now available.
  - ✓ All volume data are measured in MW so that the unit of measurement is consistent across the dashboard.
- Link to the dashboard: https://data.nationalgrideso.com/ancillary-services/dynamic-containment-data

*An overview of this dashboard was presented at the OTF last month and slides can be viewed here: p19-21, OTF slides.

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slido

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

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