Public Sli.do #NESO_DT

Webinar – Data Interpretation

Dispatch Transparency Programme

7 August 2025

NESO
National Energy System Operator

Welcome and Agenda

	Agenda Item	Presenter
14:00 - 14:05	**Introduction**	Hannah Kirk-Wilson
14:05 – 14:35	**Interactive Dashboard Demo**	Vivian Echebima
14:35 – 14:55	**Constraints and constraints actions**	Matt Chapman
14:55 – 15:10	**2025 Roadmap & Programme Updates**	Hannah Kirk-Wilson Juliette Richards Anna Blackwell Philippa Banks
15:10 – 15:30	**Q&A**	John Clifford

To interact throughout the event, go to Sli.do code #NESO_DT

Submit questions to be answered in a live Q&A

Please note the following:

- **Ask your questions as early as possible** to give our experts time to respond
- **Please provide your name or organisation** as we won't answer live questions from unidentified parties
- **Questions will be answered in the upvoted order** whenever possible
- **All questions will be recorded and published,** and any questions not answered on the day will be included, with answers, in the slide pack in our website

Polls will also be provided throughout the event – please give us your thoughts!

The Sli.do link will remain open until **5.30pm August 7th** for questions and poll responses

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Interactive Dashboard Demo

Vivian Echebima

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You Said...

Dashboard Requested

Presented at the May 1st Event and voted as highest priority

We Did...

Dashboard Designed

Action taken to develop an interactive dashboard

Now...

Collect Feedback

Demonstrate usage and request feedback

Purpose

- To support stakeholder and industry understanding and interpretation of the skip rates data
- To improve transparency in ENCC dispatch decision
- To enable data-led stakeholder engagement

What You Requested

- Clear and easy graphs to interpret
- Filters to slice charts based on user need – technology type / provider / BMU
- Drill-down feature

Find the dashboard on our webpage: Skip Rates Dashboard

Overview

Data Used:	Post-System Action In-merit Data
Stage:	5

Key Metrics

- Skip Rate Trend
- Technology Breakdown
  - Relative Technology Skip Rate
  - Technology Specific Skip Rate
- Skipped Volume Ratio
- Total Skipped Volume & Skip Rate
- In-merit Volume vs Skipped Volume vs Skip Rate

Key Filters

- Per month||week||day||half-hour
- By technology type
- For individual BMUs
- For specific providers
- Bid or Offer

Multi-select filters

DEMO

As a BM Unit or a Market Participant

- Analyse dashboard to gain insights into:
  - ✓ high/low bid or offer skip rate periods
  - ✓ dispatch behaviour and equity
  - ✓ technology impact on skipped volume
  - ✓ relationships and patterns between volumes and rates
- Filter to specific BM Unit or Provider

Next Steps

- Demo to industry at webinar 
- Collect feedback for improvement
- Implement feedback and finalise design

Constraints & Constraint Actions

Matt Chapman

NESO
National Energy System Operator

What is a constraint?

"A constraint is defined by a critical fault that requires action, the overloading circuit as a consequence of that critical fault, and any generation, demand and equipment that are effective in managing the constraint."

Position of the boundary

- Cuts through the critical fault
- Cuts through the critical overload
- Encompasses "effective" plant

"Effective Plant"

- Generators driving an overload
- Demand driving an overload
- Reactive equipment
- Substations with effective running arrangements
- Quad-boosters & SSSCs (Static Synchronous Series Compensators)

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Types of constraint

Thermal

- Limited by the current capacity and heating
- Can be export or import

Voltage

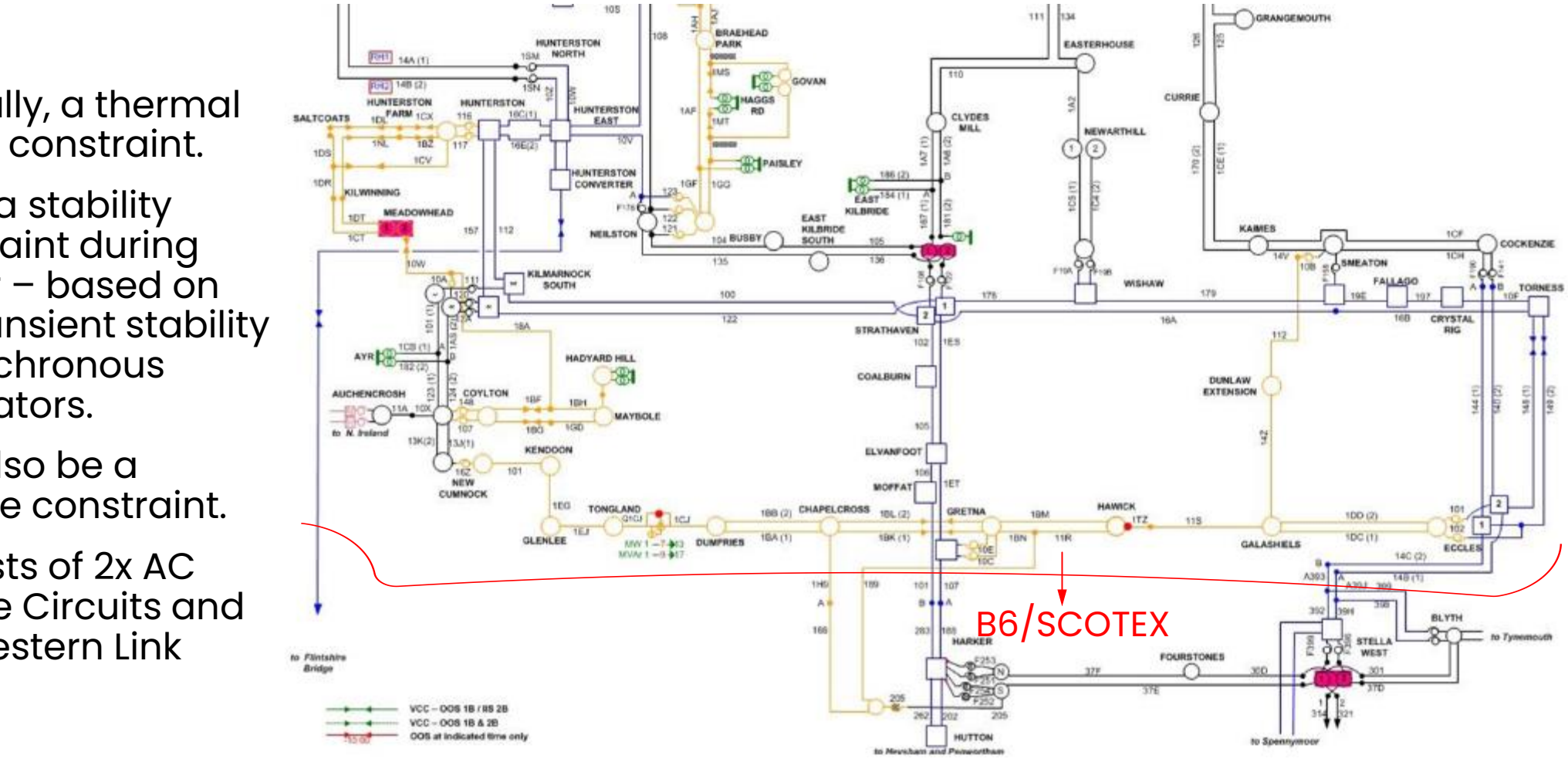
- Limited by SQSS steady-state or step-change limit
- More onerous in areas with lots of underground cables

Stability

- Limited by the transient stability of synchronous generators
- Is becoming more onerous with lower system inertia

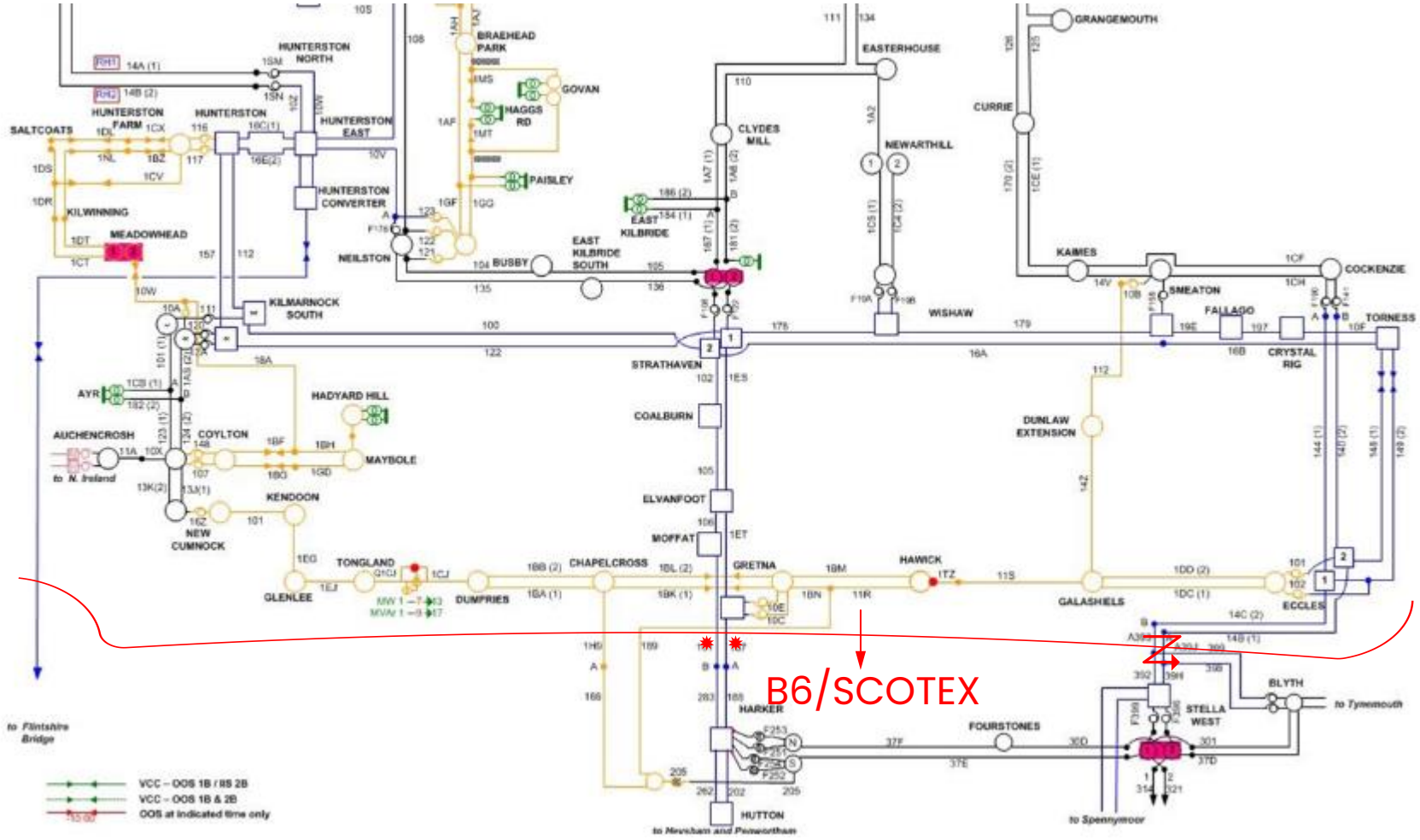
B6 Constraint – Anglo-Scottish Border

- Typically, a thermal export constraint.
- Often a stability constraint during Winter – based on the transient stability of synchronous generators.
- Can also be a voltage constraint.
- Consists of 2x AC Double Circuits and the Western Link HVDC.



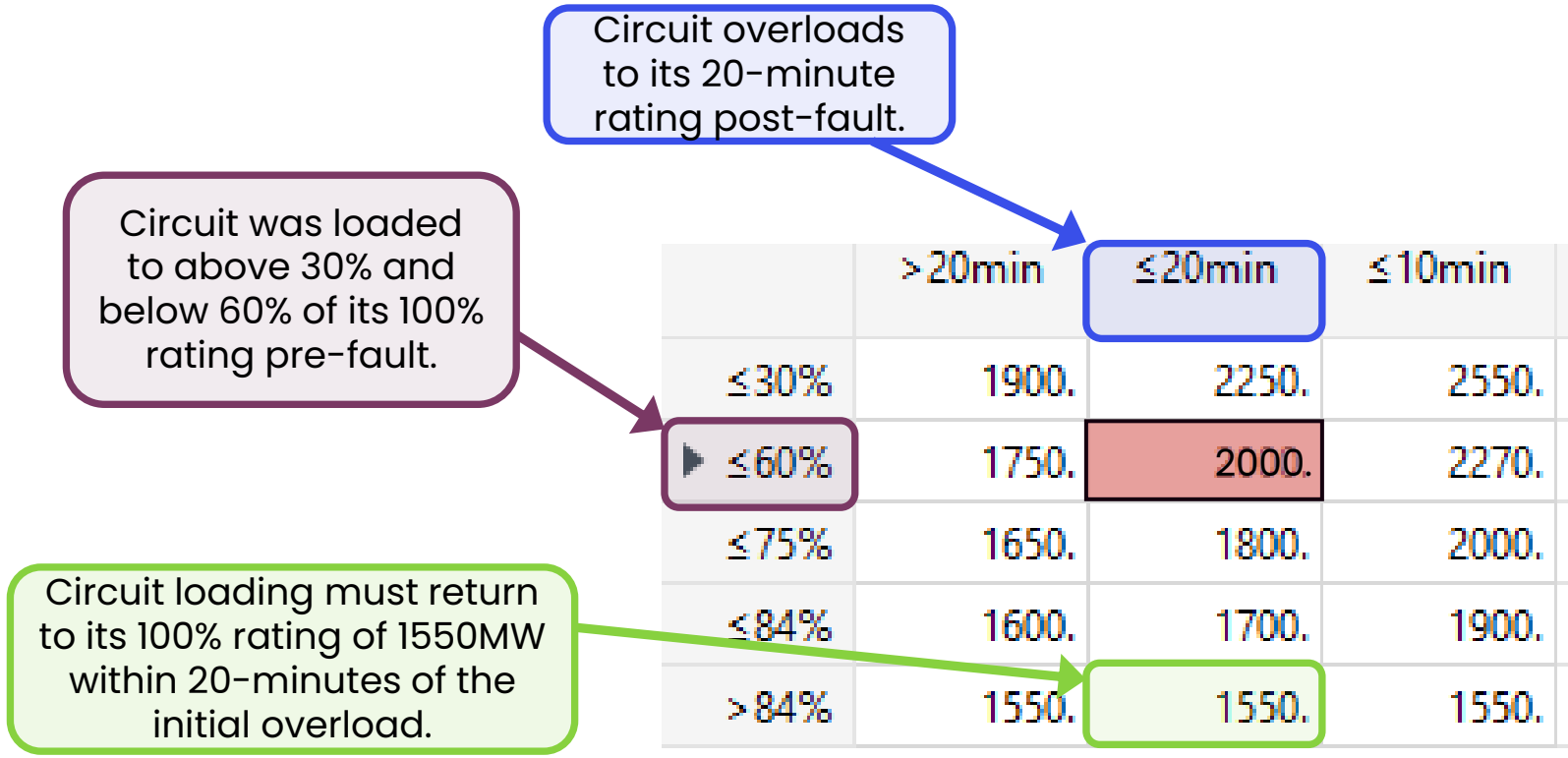
Thermal constraint on B6

- Firstly, ensure pre-fault loading on all circuits is secure.
- Consider a double circuit fault on the East Coast double-circuit.
- The generation in Scotland does not change immediately and now flows down the West Coast double circuit and the Western Link HVDC.



Post-fault loading of a thermal constraint on B6

- Circuits have different short-term ratings based on the pre-fault loading.
- Short term ratings are based off the temperature of the conductor – this is a product of insulating temperature (typically air) and electrical current flowing through the circuit.



	>20min	≤20min	≤10min
≤30%	1900.	2250.	2550.
≤60%	1750.	2000.	2270.
≤75%	1650.	1800.	2000.
≤84%	1600.	1700.	1900.
>84%	1550.	1550.	1550.

Figure shows a typical rating schedule on a transmission circuit. Following a fault, this circuit has been overloaded to 2000MW, this is also its 20-minute rating based on <60% pre-fault loading.

Effectiveness of generation

- The **B6 limit is 6000MW**: post-fault, 2000MW will flow down the Western Link and 4000MW down the West Coast Double Circuit.
- Circuits on the West Coast are overloaded into their 10-minute rating (**450MW above 100% rating**).
- **Generation drop required** to reduce circuit loading by 450MW:
  - Gen. A: $\frac{450}{30\%} = 1500\text{MW}$
  - Gen. B: $\frac{450}{45\%} = 1000\text{MW}$
- Most likely to take generation drop at Gen. B as less MW's required to resolve overloading.

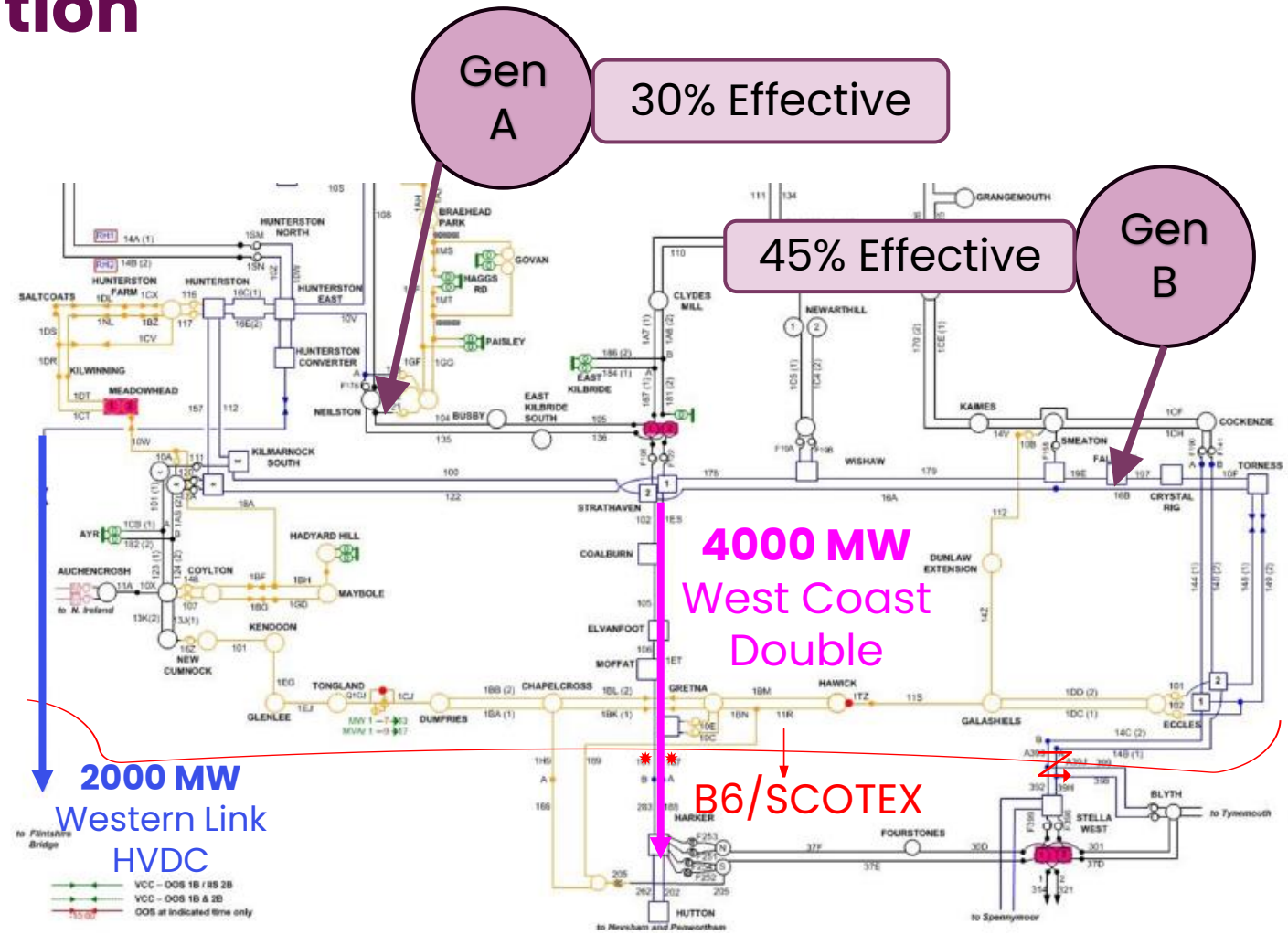


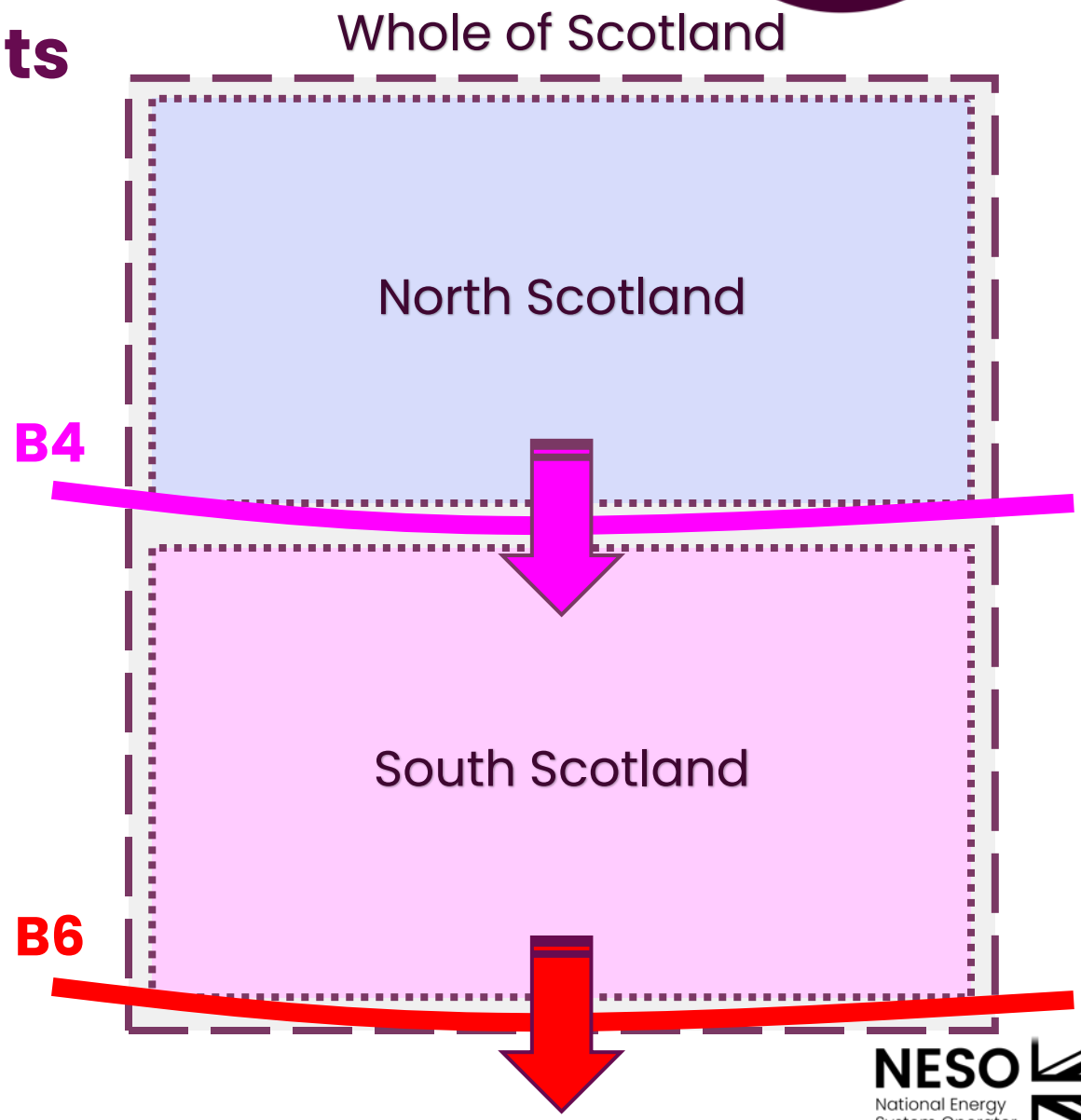
Figure shows the impact of a double circuit fault on the East Coast of B6, and the effectiveness of generators A and B on the post-fault loading on the West Coast double circuit.

Constraints behind constraints

For a thermal constraint, if bids are taken in North Scotland instead of South Scotland, both the B4 and B6 constraints can be resolved in a single action.

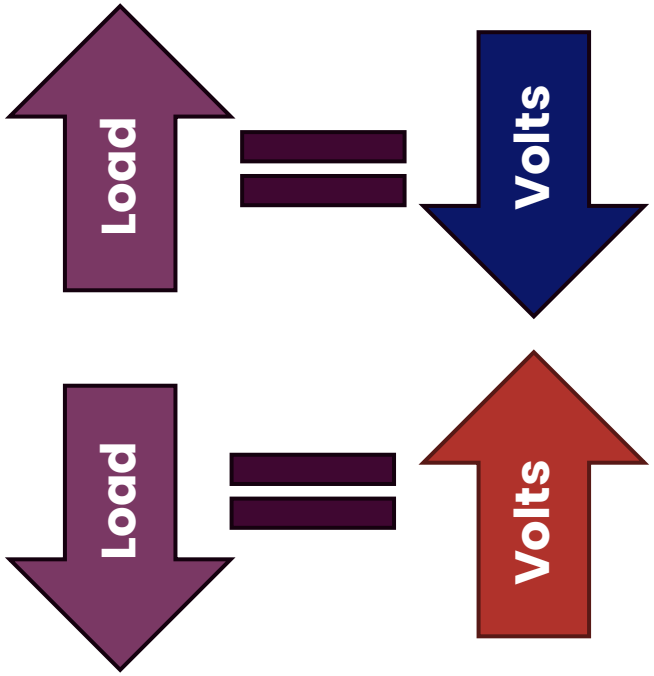
In the 2024-25 Fiscal year, B4 was the costliest and most constrained boundary on the network, hence, there has been a lower wind capacity within the whole of B6 after securing to the B4 limit.

Therefore, B6 is far less likely to be an active constraint and real-time, and this has contributed to the infrequent arming of the B6 inter-trip over the past 12-18 months.



Causes of Voltage and Stability constraints on B6

Unlike a thermal constraint, unacceptable voltage or generator instability must be avoided completely or resolved immediately by automatic action.



Voltage Issues

High voltage issues on the transmission system are also driven by **low load** and **high embedded generation**.

Low voltage issues on the transmission system are typically seen post-fault due to **thermal overloading**.

Generator Instability

Low voltage (<1.00 per unit) in the region.

No control over generator voltage settings – NESO does not own, or operate, the generator directly and has no control over on-site settings.

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Resolving voltage and stability constraints

When armed, Anglo-Scottish Auto Close Scheme (ASACS) monitors the 2x AC circuits across B6. For example, if a fault is detected on the East Coast route, capacitors will be immediately switched in service on the West-Cost route to prevent an extreme voltage drop.

Voltage

Reduce generation and **improve voltage profile** in the region pre-fault to avoid any unacceptable voltage post-fault.

Arm automatic schemes which will resolve post-fault voltage such as the **Anglo-Scottish Auto Close Scheme (ASACS)** for B6

Stability

Reduce generation and **improve voltage profile** in the region **pre-fault** to avoid any instability post-fault.

ASACS can be armed to manage stability against the B6 constraint post-fault.

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2025 Roadmap & Other Programme Updates

Hannah Kirk-Wilson
Juliette Richards
Anna Blackwell
Philippa Banks

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Significant change is planned for this year

Improvement Key

- IT system changes
- Dispatch efficiency measurement & transparency
- Market change
- Forecasting improvements
- Complete

Root Cause Analysis & improvements

Dispatch Strategic Review

GC1066 Approval
Ofgem approval of GC1066 code modification

OBP: constraint management
Improved situational awareness for dispatch of units behind constraints

OBP: constraint optimisation
Further improved dispatch efficiency for units behind a constraint

Transparency tool improvements
UI improvements live in control room

Slow Reserve Go Live
More sustained delivery in a post fault event

Continuous improvements
Ongoing skip rate monitoring and improvements

Increased response holding
Managing frequency fluctuations

OBP: national optimisation
Improved dispatch advice and efficiency

Skip Rate Methodology improvements
Addressing limitations in LCP Delta methodology

Additional dispatch control engineers
Full time battery dispatch engineer providing 24/7 cover

Quick Reserve Phase 2 Go Live
Quicker energy imbalance restoration

Fourth dataset release
Including unit exclusion reasons

Skip rate materiality
Kicking off skip rate materiality work

Forecasting improvements
Implemented in control room

2025 | Jan - Mar | Apr - Sep | Oct - Dec | 2026

Investigations and reviews

Strategic dispatch review

- Independent review of Control Room operations – started in July, recommendations expected in October
- Will review current scheduling and dispatch processes and consider the best approach for a 2030 Clean Power system
- Implementation of recommendations will begin in 2026

Grid Code modification GC0166

- Code modification is currently with Ofgem for decision making

Materiality update

New data to be included to align to future methodology changes

- We are currently building a model that will incorporate future data changes around Mandatory Frequency Response (MFR) and spin gen / spin pump. These actions will be excluded from the materiality analysis to ensure that the results align with forthcoming changes to the skip rate methodology.

Accounting for interdependency of time periods

- At the May forum we discussed the concept of economic skips, and proposed to introduce a rule in our analysis where there is an exclusion period either side of battery units being used to capture the effect of them needing to charge / discharge, or to capture where they may have been held back for use in a future SP.
- However since this point, we think this rule will be complex to include in our analysis and we are instead **suggesting to 'cap' the use of batteries to one cycle per day *for the purpose of the cost analysis***. This is the approach taken by Modo in their cost of skip rates analysis in May 2024.
- Should you have any comments on this proposed method we would be pleased to hear them - please contact the skip rates box: box.SkipRates@neso.energy

Tools, process and analysis

Skip rate monitor tool

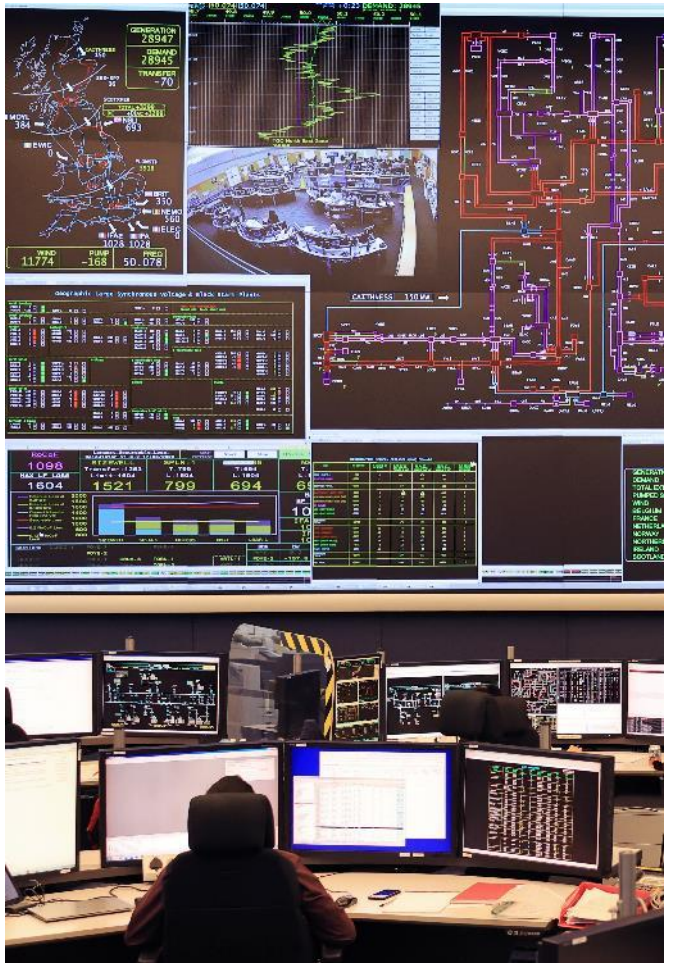
- Further improvements to assist with decisions
- Added technology level skip rates

Mandatory Frequency Response (MFR) and **Pumped Storage** (Spin Gen/Pump)

- Requirements and changes developed and in testing
- Dependent on data being within Open Balancing Platform (OBP), currently on roadmap for end of 2025

Skips behind constraints

- Investigative work started



Tools, process and analysis

Root-Cause Analysis (RCA)

- Analysis to understand what causes skips (skipped volume and accepted 'out of merit' volume)
- Looking at:
  - Forecast errors
  - Operational decisions
  - System limitations
  - Market impacts
  - Methodology limitations
  - Technical parameters

- Working with Baringa Partners to:
  - Define hypotheses
  - Applying machine learning and AI to identify hidden patterns and prioritise hypotheses
- Data analysis underway to look at impact of interconnector trades on skip rates

GC0166 & Proof of Concept Testing – Expression of Interest

Philippa Banks

NESO
National Energy System Operator

GC0166 Proof of Concept Testing

- GC0166 addresses the problem that Electricity Storage Modules (of limited duration) can only export or import until empty or full.
- The current parameters of Maximum Delivery Period and Volume do not cater for bi-directional units, so NESO uses a '30-minute rule'.
- GC0166 working group proposes new parameters to support an Optimiser algorithm:
  - Maximum Delivery Offer (MDO)
  - Maximum Delivery Bid (MDB)
  - Future State of Energy (FSoE)
- These will provide Control Room means to increase economic dispatch of Electricity Storage Modules and improved operational planning.
- Code modification is currently with Ofgem for decision making

GC0166 Proof of Concept Testing Expression of Interest

- NESO seeks to undertake proof of concept testing with external partners later in 2025 ahead of operational implementation.

- We are looking for representative samples of BM Units of different types and categories and, for those selected, will be requesting additional data parameters for the test period.

- This testing will ask providers to submit ‘real time’ data, but for a recent historic period, recognising that neither providers nor NESO are currently set up for live streaming this data.

- To participate in this testing, (in Autumn 2025) please contact us ASAP

- For those selected we will issue a more detailed specification in coming weeks.

GC0166 Proof of Concept Testing Expression of Interest

For parties wishing to participate:

- Please contact: box.balancingprogramme@neso.energy asap
- Indicating clearly in the subject title: **"GC0166 Proof of Concept Testing Expression of Interest"**

Q&A

John Clifford

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Engage with us

Previous events

LCP webinar (7 Nov 2024)
Introducing methodology

Battery & Skip Rates webinar (27 Feb 2025) including methodology & data interpretation

Skip Rate Forum (1 May 2025) – workstream updates & breakouts: Datasets | Methodology | Materiality

Operational Transparency Forum (OTF)

- Weekly updates
- Deep dive - definitions & calculations (16 Jul 2025)

NESO website

Skip Rates page:

- Overview
- Technical information
- Link to data portal
- Event recordings & slides
- Progress updates
- Q&A

Future events

- Webinar (Oct 2025)
- Forum (Dec 2025)

Advertised in OTF

Programme mailbox

Send us your question and comments:
box.SkipRates@neso.energy

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Appendix

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2024 Recap: What we delivered

Battery Dispatch
- Release of Balancing Platform dispatch algorithm / dispatch efficiency constraint methodology
- Additional battery dispatch engineers provided to the Control Room
- Workflow automation for the OBP (Open Balancing Platform)
- Implementation of VERGIL control room improvements to address constraint despatch
- Quick reserve penalties implemented
- Ofgem collaboration document exploring exclusion rationale and roadmap to improvement

LCP Methodology
- Industry Webinar held
- Full report published – LCP Delta definition and methodology

New Transparency Tools
- All BM Skip rate and Post System Actions skip rate monitor live in the ENCC (Electricity National Control Centre)

Customer Engagement
- CEO Roundtable
- Customer visits to Control Room and NESO visits to Customer sites

Battery Storage Forum
- First Battery Storage forum hosted with the industry

External Dataset Release
- 3 datasets published

Post-fault actions to return circuits to 100% rating

In 10-minute rating

Option 1

- Up to **1320MW** generation drop at **1 station** per balancing desk
- A single switch operation

Option 2

- Up to **1320MW** generation drop at **1 station** per balancing desk
- A single or pair of quad-booster(s) tapped at 1 substation – no more than **6 taps**

In 20-minute rating

Option 1

- Up to **1320MW** generation drop at **3 stations** per balancing desk
- A single switch operation

Option 2

- Up to **1320MW** generation drop at **3 stations** per balancing desk
- A single or pair of quad-booster(s) tapped at 1 substation – no more than **15 taps**

Option 3

- A single switch operation
- A single or pair of quad-booster(s) tapped at 1 substation – **no tap limit**

- For a criteria of ≥1 hour rating, there is no restriction on the amount of generation drops, switch actions or quad-booster operations.
- However, generation drops of >1320 MW must be agreed with control room at day-ahead, and complex switch actions should be agreed with impacted parties by day-ahead.

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