General
Public

Break out session 3

NAP Projects

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Accelerated Storage

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NESO
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Content

1. What is Accelerated Storage?
2. Accelerated Storage Enduring Process
3. Next Steps

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What is Accelerated Storage?

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Objectives of Accelerated Storage

A Policy to enable earlier grid connection for Energy Storage

Grants customers non-firm access to the grid (approx. 10)

Allows NESO to restrict import/export capacity against pre-fault overloading

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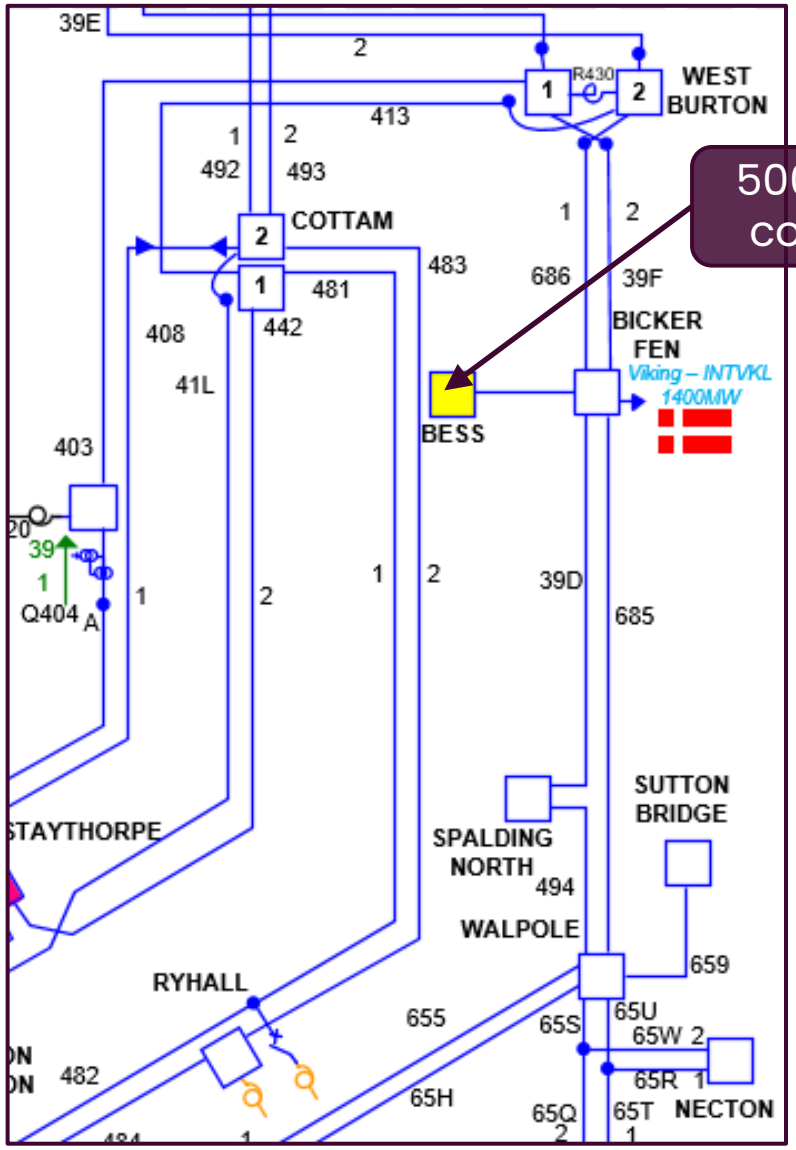
Study Case

- 500MW BESS requests a firm connection
- The firm connection date may be set on re-enforcement works and/or network upgrades
- Under Accelerated Storage, the customer could be offered a Non-Firm connection date several years ahead of the flexible Firm connection date.



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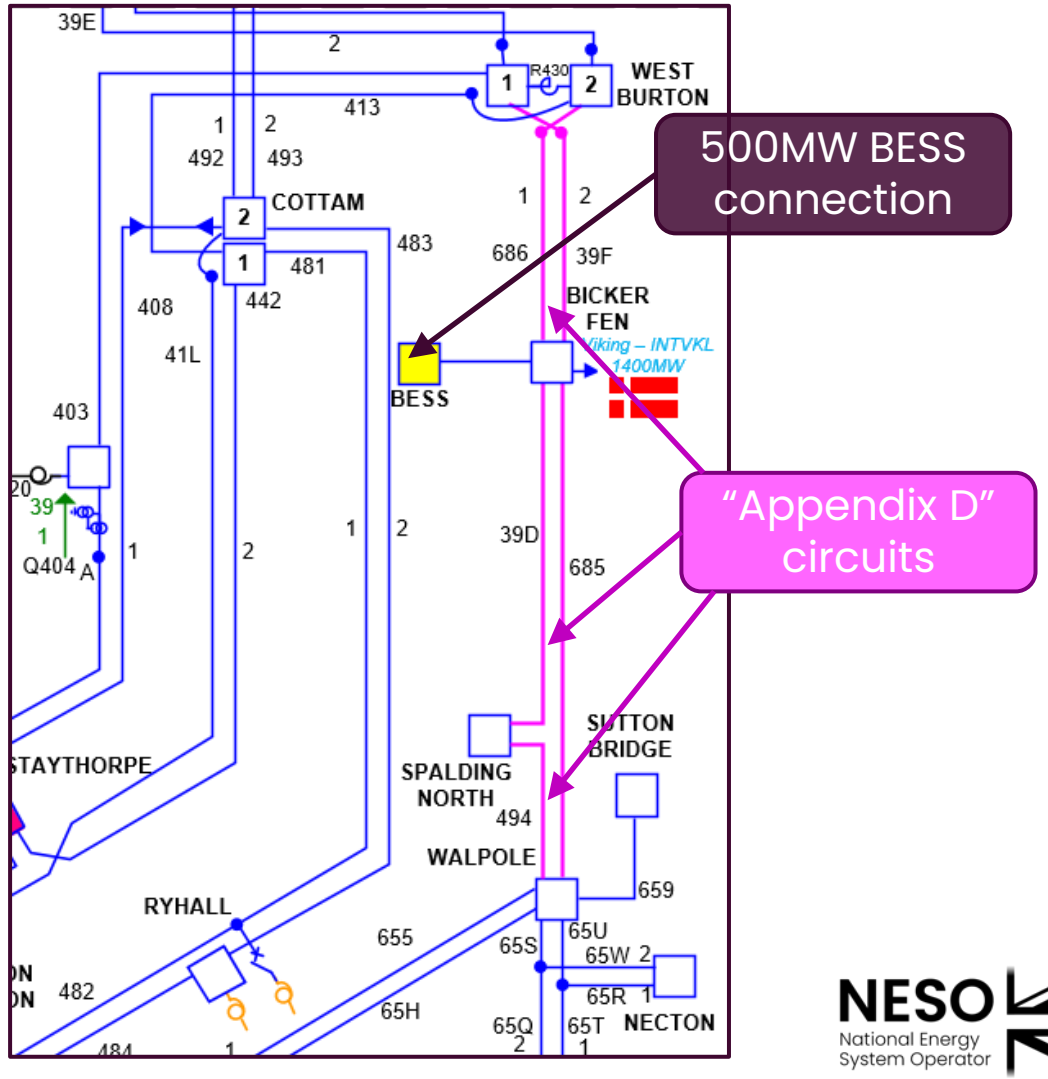
Non-Firm Consideration

The Accelerated Storage **contract** will include a list of **"Appendix D" circuits**.

As network re-enforcements are not commissioned, the BESS can be **restricted** if it causes **pre-fault overloading** on "Appendix D" circuits



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Accelerated Storage Enduring Day Ahead Process

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High-level process map

09:00	• Beginning of Day Ahead (DA)
11:00	• Physical Notification (PN) received from generating sites
11:15	• New study is released to the DA Engineer which includes the generator PN
11:30	• DA carry out analysis in the new study • Restriction of import and export capacity calculated for each customer
By 13:30	• Notification of restriction is sent to each customer

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Next Steps

The study analysis process has been successfully automated

Agree the handover process of restrictions to the Electricity National Control Centre (ENCC)

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Dynamic Line Ratings (DLR)

Faisal Sattar

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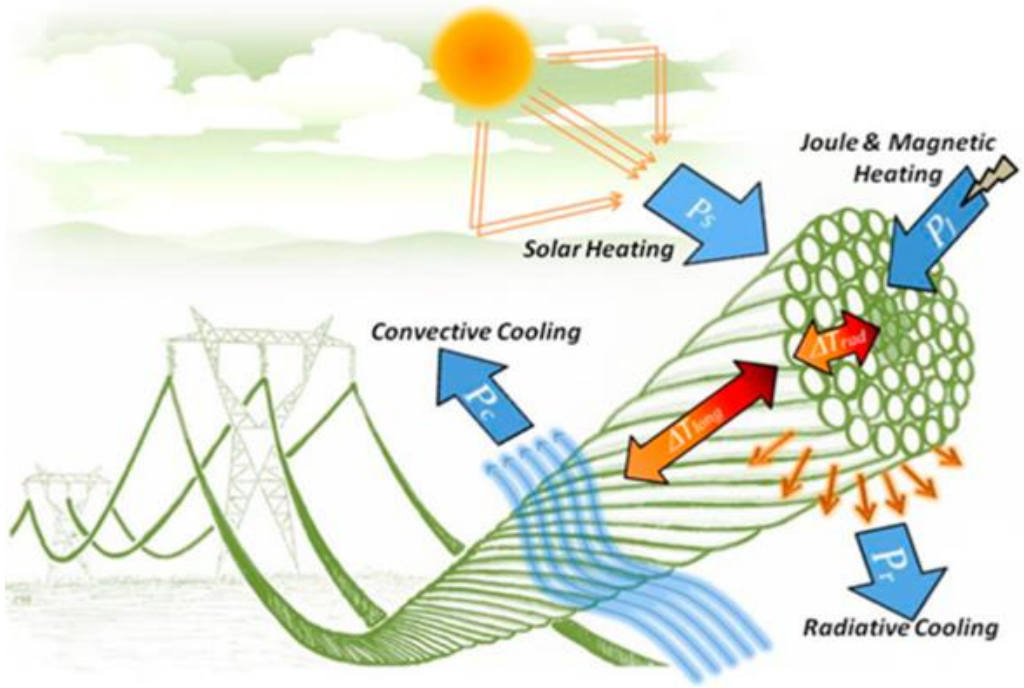
What is Dynamic Line Rating (DLR)?

Dynamic Line Rating is a method of determining the real-time current carrying capacity of overhead transmission lines.

Depends on:

- Ambient temperature
- Wind speed and direction
- Solar radiation
- Conductor conditions



Conductor temperature is calculated from the heat balance equations.

$$q_c + q_r = q_j + q_s + q_m$$

Where:

q_c = Convective cooling

q_r = Radiative cooling

q_j = Joule heating (I^2R losses)

q_s = Solar heating

q_m = Magnetic heating (e.g., from steel cores)

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Benefits of the DLR

- More accurate enhanced circuit ratings
- Better utilisation of the existing infrastructure
- Deferment in the infrastructure upgradation cost
- Reduction in the thermal constraint management cost
- Enable renewables integration

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Dynamic Line Ratings Solutions

Conductor mounted

Requires an outage to install. Developing Drone installation techniques to remove outage requirement.

Direct measurement
- Electrical Parameters
- Direct Conductor Temperature
- Sag Calculations
- Environmental Sensors

LineVision

A non-contact solution removes the need for outages or destructive testing.

LiDAR Sensor for conductor position monitoring

Computational Analytics Software combines sensor data with topological, weather and engineering data.

Optical fibre

Either using the fibre wrap in the earth wire or installation of fibre in the conductor.

Using vibration monitoring to detect conductor motion and derive conductor sag and wind conditions.
Does not require and outage to install.

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View of DLR roll-out from NESO

This table shows the number of circuits identified (as of Mar 2026) for sensor based DLR and assessed for rating headroom and constraint benefit in 2024 – 2025.

Also shown are the number of non-sensor based DLR circuits available.

	Sensor based DLR								Non-sensor DLR	
	Circuits considered	Delivered	Planned	Delivered + planned	Limited[1]	No benefit[2]	To assess	Average rating increase at DA	Non-sensor DLR available	Average rating increase at DA
NGET	186	12	25	37	71	69	9	3 to 5%	61	3 to 5%
SPT	20	0	0	0	17	3	0	TBC	104	TBC
SSE	24	10	2	12	22	0	0	TBC	0	TBC

1. Limited by circuit elements other than the OHL, or the available headroom is very small
2. Enhancing the rating of this circuit would not increase a constraint limit

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SSE DLR Progress

- North of Beauly DLR pilot project has installed sensors across 10 circuits.
- The process for DLR data sharing is established.
- NESO have provided SSE with a list of circuits for their assessment.
- Limiting circuit elements (isolators, protections systems) have prevented installations on circuits so far.

Source: SSEN Transmission Implementing Dynamic Line Rating Network in the UK | TD World

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SPT DLR Progress

- Not installed any DLR sensors yet
- NESO have provided SPT with a list of circuits for their assessment, similar to SSE all circuits were found to have limited OHL headroom.
- Recently SPT have submitted a new list of circuits that they intend to target.
- NESO has reviewed and shortlisted the beneficial circuits.
- SPT do have Thermally Adjusted Ratings System (TARS) on all circuits - small ratings increase

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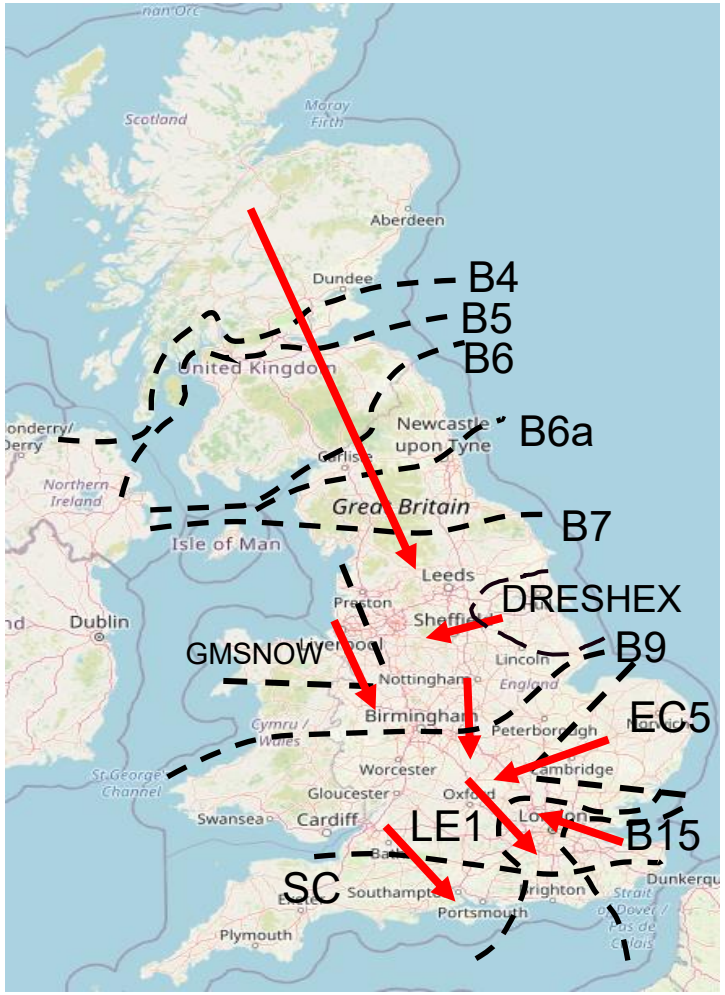
NGET DLR Progress – Completed

B7 Boundary

No. Of Circuits	Delivered	Planned	Limited	No benefit	To assess
21	12	-	7	2	-



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NGET DLR Progress – Planned

B6a Boundary

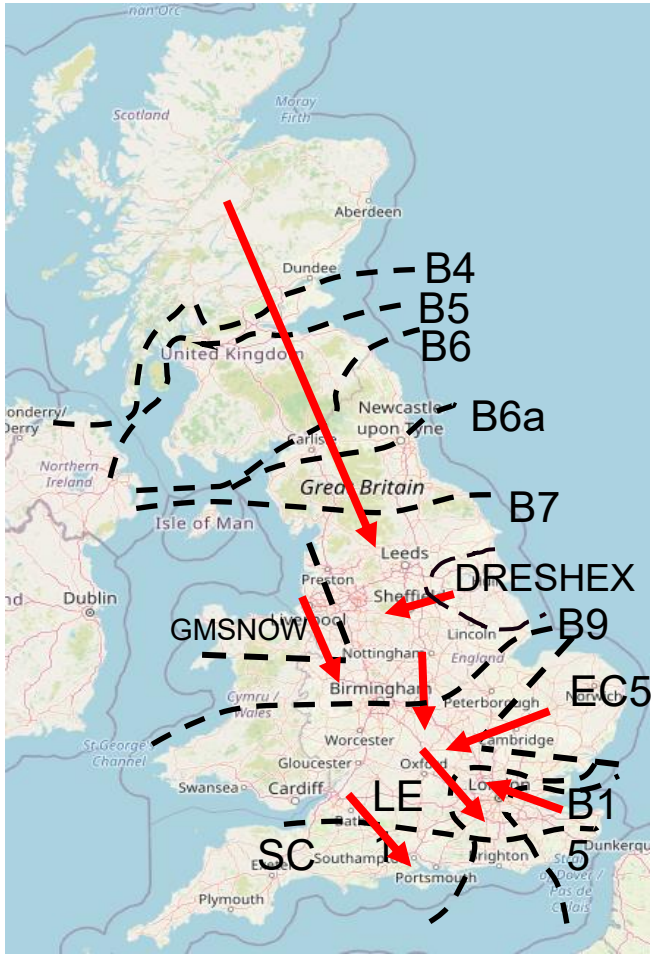
No. Of Circuits	Delivered	Planned	Limited	No benefit	To assess
19	-	15	3	1	-

DRESHEX

No. Of Circuits	Delivered	Planned	Limited	No benefit	To assess
12	-	7	2	3	-

EC5 boundary

No. Of Circuits	Delivered	Planned	Limited	No benefit	To assess
16	-	6	10	-	-



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NGET DLRs B7 Boundary Results

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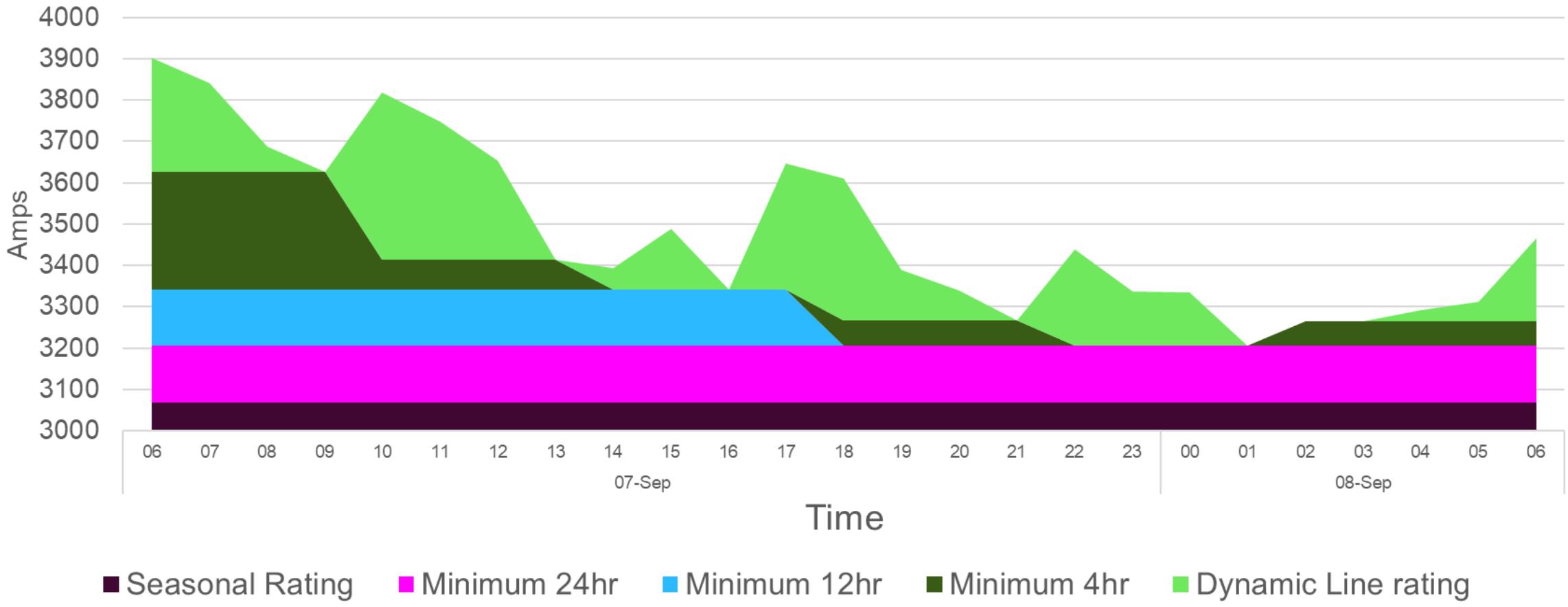
NGET Circuit Results: Capacity Lifts



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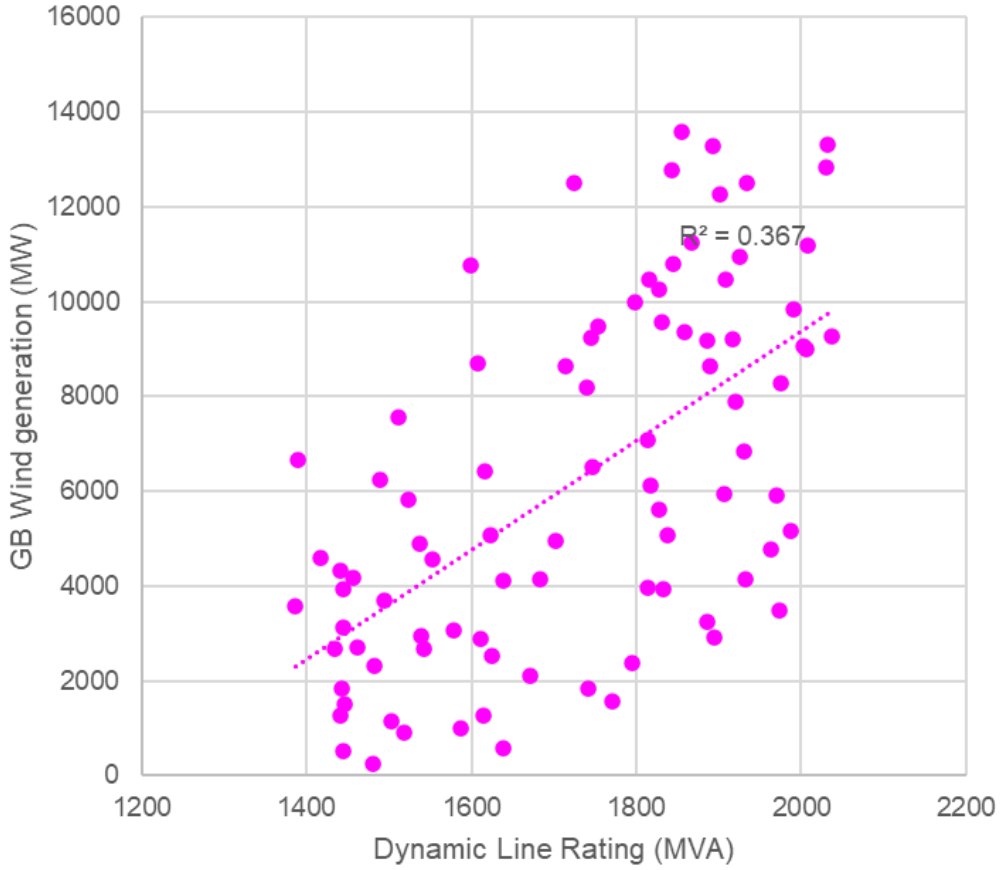
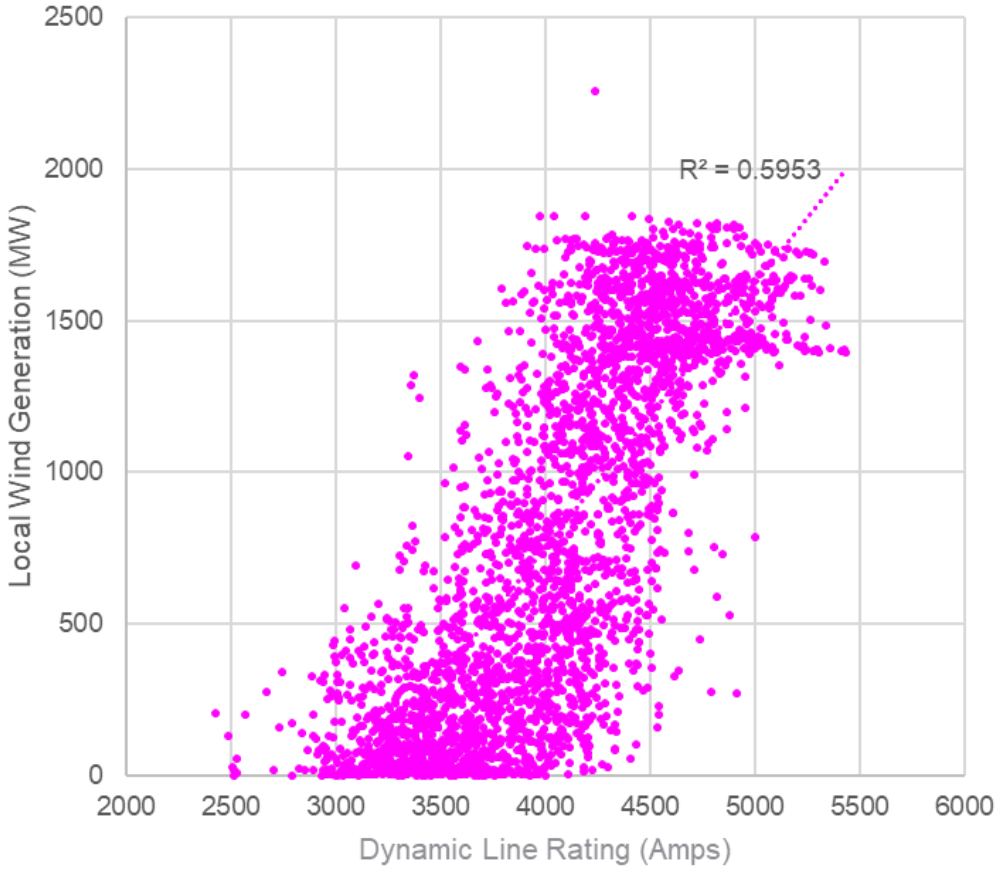
Wind Effect on DLR Ratings Enhancements





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Quantified Capacity Increases at Different Time Intervals

Average Time DLR>Static	Average 24Hr increase Over Static	Average 3Hr increase Over Static	Average 3Hr increase Over 24Hr
↑ 70.77%	↑ 3.32%	↑ 8.97%	↑ 5.46%

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DLR Ratings Data Transfer

- Ratings data transfer process is established with TOs – manual process.
- NESO end scripting to automate the process for operational planning.
- Updating the data in Rating Management System (RMS) is manual

Phase 1 - RMS5

- Part automate the ingestion of DLR data into RMS
- This enables automatic transfer of DLR data into PNA for use by control room staff.
- Delivery : Mar 2026

Phase 2 - RMS6

- API-based electronic interface built between TOs and NESO to update RMS automatically with DLR data.
- Delivery : TBC – but hopefully before end of 2026

Phase 3 - RMS7

- Re-design the operation and functionality of RMS and move to a modern platform from a legacy platform.
- Streamlined integration with OLTA/ future Grid OS/NCMS
- Delivery : Part of NESO1 business plan. April 2026 – April 2028.

DLR Delivery
Next Steps and Plan for 2026

Quarterly Transmission Innovation Deployment meetings

Standing items

- Provide update on benefits delivered from existing sensor and non-sensor based DLR - NESO
- Provide a timeline and updates for:
  - DLR sensor installation progress for circuits already approved - TOs
  - Updated plan-on-a page for expansion of DLR - TOs
  - TO/NESO ratings data transfer interface – NESO/TOs

For first TID in April

- Complete the Circuit Ratings Audit - confirm whether OHL ratings headroom is available on a list of circuits identified by NESO. This work was completed in 2024-25, but worth confirming that all opportunities for DLR have been identified on useful circuits.
- From the Circuit Ratings Audit, identify circuit elements that are preventing use of DLR – provide options to enhance or replace these circuit components. Provide updates at subsequent TID meetings.

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Thank You

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