Engineering Justification Paper Addendum

Dynamic Line Rating (DLR)

Document Classification |
HIGHLY CONFIDENTIAL

Scottish & Southern Electricity Networks
TRANSMISSION

Executive Summary

In February 2025, we submitted the CP30 Supplementary Information Submission as an addendum to our RIIO-T3 Business Plans to Ofgem. This submission included a range of initiatives aligned with the UK Government's Clean Power Action Plan for 2030 (CP2030), notably the development of Dynamic Line Rating (DLR) projects. DLR is a key enabler of operational efficiency in the electricity transmission network, allowing real-time assessment of overhead line capacity and helping to reduce curtailment of renewable energy sources.

As part of Ofgem's Draft Determination, DLR projects were not approved under the Load Use it or Lose it (UIOLI) mechanism. Following further engagement, Ofgem requested additional clarification before considering approval, specifically seeking stronger evidence on the certainty of need and cost associated with DLR deployment.

This paper has been prepared in response to Ofgem's request and provides:

- A clear and substantiated justification for the enduring need for DLR in real-time network management.
- Robust evidence supporting the cost assumptions underpinning DLR implementation.

Through this submission, we aim to demonstrate that DLR investment under the Load UIOLI mechanism is both necessary and efficient, delivering long-term consumer value while supporting the UK's clean energy transition.

1. Introduction

The purpose of this paper is to respond to Ofgem's request for further information following our February 2025 CP30 Supplementary Information Submission. It provides additional detail on the need and cost certainty for Dynamic Line Rating (DLR) within the Load UIOLI mechanism.

2. Need Case and Optioneering for DLR

In our February 2025 CP30 Supplementary Information Submission to Ofgem, we outlined our plans for deploying Dynamic Line Rating (DLR) projects as part of the RIIO-T3 Business Plan to support the UK Government's Clean Power 2030 objectives. DLR enables real-time optimisation of overhead line capacity, reducing renewable curtailment, improving system resilience, and maximising the use of existing assets without extensive reinforcement.

We proposed a pipeline of DLR projects including an initial deployment on the north of Beauly circuits, preparatory assessments for Kintore - Tealing (XT1/XT2), and an estimated [redacted] funding requirement within the Load UIOLI to deliver up to 15 installations during RIIO-T3. Ofgem has requested detail on certainty, and these are presented below:

2.1. Summary

Dynamic Line Rating (DLR) is a technology that allows the assessment of the real-time capacity of power lines to carry electricity. Unlike traditional Static Line Rating (SLR), DLR takes into account real-time environmental conditions to determine the actual transmission capacity of a line. It facilitates more efficient use of existing assets; avoids congestion restrictions; and supports the efficient integration of renewable generation onto the system. Consumers would benefit from maximising the use of existing network assets, reducing renewable energy curtailment and associated constraint costs, ultimately lowering overall system costs and delivering better value for money.

Earliest In Service Year:	2026
Cost (2023/2024 prices):	[redacted]

2.2. Need Case

The need for DLR across transmission networks is highlighted as part of grid enhancement technologies outlined in CP2030. NESO has also identified a pipeline of priority DLR projects, which are detailed in the table in Section 2.7.

2.3. Project scope

Deployment of DLR technology across SSEN Transmission network, with integration into Control Room activities for both SSEN Transmission and NESO.

2.4. Optioneering

In relation to our pilot project LT000331 North of Beauly DLR, we undertook optioneering and a preferred option assessment as part of our MSIP re-opener submission in January 2022. NESO cost and benefit

analysis has evaluated alternatives, including DLR, re-profiling and a do-nothing counter-factual approach. The analysis recommended that both DLR and the re-profiling options (with the latter progressed as a separate project).

Ofgem concluded in September 2022 that the installation of DLR technology together with a static line rating increase (which is also referred to as 'OHL line reprofiling') best met the network needs. Accordingly, our MSIP submission concentrated solely on the DLR component, while the static line rating increase was being handled via a separate project.

Optioneering on pilot project North of Beauly:

Option	Description	Progressed	Rationale
Do Nothing	No change to scenario	N	Network is constrained and to do nothing will not alleviate this constraint, and result in ongoing cost to consumers.
Partial DLR	Application of DLR partially across a circuit	N	A partial DLR system is not viable as the full line needs to be monitored in order to use DLR.
Rebuild Circuit	Rebuild of circuit to increase capacity	Y	Circuit could be rebuilt to allow for greater carrying capacity. Addition of DLR to this rebuild line may also provide additional benefit during periods of high generation.
DLR	Installation of DLR across a circuit	Y	It provides additional capacity on the area of the network where it is installed. It Is low cost with potential for significant constraint cost savings. This benefits consumers by avoiding unnecessary constraint payments.

In November 2024, NESO provided SSEN Transmission with a list of circuits identified as delivering the greatest benefits from DLR installation. This list has formed the basis for the Recommended DLR Priority Circuits as presented in Section 2.7 in this addendum.

2.5. Project Status and Funding Mechanisms

The pilot project (LT331) at North of Beauly has been installed and is currently being calibrated and monitored, with full operation expected by the end of 2025. This pilot project has been funded through the MSIP mechanism, although some OPEX costs were rejected by Ofgem.

SSEN Transmission intend to roll out the DLR technology more widely across its network, prioritising circuits that will deliver the greatest benefit. Funding for this roll out should be covered via the Load UIOLI to ensure maximum consumer value. NESO has provided SSEN Transmission with a recommended list of future circuits, that is included in the Recommended DLR Priority Circuits list.

2.6. High level Program and Risks

We expect to follow a standard programme for the installation of DLR which will involve:

1. Assessment of circuit
2. Invitation to tender to find suitable supplier
3. Sensor installation
4. Calibration and monitoring of system
5. Operation

Key risks include supply chain availability, outage windows and NESO's ability to use the information in decision making around short-term constraints. We are continuing to engage with the supply chain and NESO to manage these risks.

2.7. Recommended DLR Priority Circuits

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
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[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

2.8. Key considerations

Project cost:

Individual DLR projects will vary in length, topology, access constraints, outage requirements and integration complexity, all of which can influence the outturn cost. Accordingly, we apply an indicative unit budget of [redacted] benchmarked against the north of Beauly deployment, which provides headroom for increased hardware, installation and commissioning, license costs and operational readiness activities, including control room enhancements to ingest and process multiple DLR data streams across SSEN Transmission and NESO.

Connection dates & operating window:

The indicative connection dates and operating windows have been aligned with our current investment programme, however, these remain subject to change as they are interdependent on wider network development activities, such as the timing of ASTI and LOTI energisation date.

Voltage:

The voltage levels to which DLR will be applied may vary depending on our investment plans. For instance, future upgrade of certain circuits for major initiatives such as ASTI and other strategic projects.

3. Conclusion

Dynamic Line Rating (DLR) is a necessary, proportionate and efficient means of unlocking latent capacity on existing overhead lines, reducing renewable curtailment, improving system resilience, and delivering consumer value in support of the UK's Clean Power 2030 objectives.

This addendum draws on the installed north of Beauly pilot (LT331), now in calibration ahead of expected operation by end-2025, NESO's recommended priority circuits, and a delivery plan predicated on a [redacted] to enable up to 15 installations from 2026.

We respectfully request Ofgem's approval to confirm DLR's inclusion within the Load UIOLI for RIIO-T3, so that consumer benefits can be realised at pace while maintaining proportionate regulatory oversight.