Kintore to Kincardine Reconductoring

East Coast 400kV Upgrade

Enhanced Scope

Net Zero Re-Opener Submission

Scottish & Southern Electricity Networks

TRANSMISSION

Contents

Executive Summary

We are enhancing the project scope of our **East Coast Onshore 400kV Upgrade (ECUP)** for the purposes of delivering part of a future Peterhead-Persley-Kintore-Kincardine 400kV Upgrade Project (**PKUP**).

This proactive approach to accelerate a strategic network upgrade in the process of delivering on our RIIO-T2 Business Plan will result in our estimate of £40 to £50million saving to consumers (against a standalone project to be delivered in 2033) and immediately prepares our network to handle the influx of power from offshore wind from off the north coast of Scotland. This enhanced project develops critical national infrastructure as sensitively and efficiently as possible, while minimising and mitigating community and environmental impacts and also maximising local and national economic opportunities and jobs.

We are grateful for the positive and constructive engagement with Ofgem.

Our Pathway to 2030 electricity transmission network reinforcements, which form part of a major upgrade of the electricity transmission system across Great Britain, are underpinned by UK and Scottish Government energy policies and associated targets. NESO has assessed the need for these projects as required and made recommendations that they proceed, including the proposed technology choice, through its Pathway to 2030

Over the last twelve months, we have developed a project delivery programme that will upgrade the overhead line from Kintore to Kincardine needed to deliver on the system requirements for PKUP which has an Earliest In-Service Date of 2033. This upgrade has the NOA code **KKRE**.

The enhanced programme of work includes four projects across ECUP that have been rescoped to deliver KKRE. This includes significant work across the Kintore to Kincardine OHL, including foundation upgrades, tower upgrades and installing a higher specification of conductor across 30% of the OHL. The programme also includes associated works across three substations: Alyth, Kintore and Fettersso. The programme as had to consume additional costs under our existing allowances for ECUP responding to the upgraded work and now are only requesting the incremental increase of our costs to deliver the enhanced scope beyond our RIIO-T2 baseline allowances.

This document is our application to modify Special Condition 3.9 (Wider works Price Control Deliverable (WWt)) within our Electricity Transmission Licence. This modification will reflect the enhanced scope and associated allowances of work for the East Coast 400kV upgrade.

This document has been created with reference to Chapter 3 of Ofgem's Re-opener Guidance and Application Requirements Document published on 17 February 2023

Summary

Project Name	**East Coast 400kV Enhanced Upgrade**
	Kintore to Kincardine Reconductoring (KKRE)
Investment Driver	**Transitional Centralised Strategic Network Plan 2**
Start Year	**2021**
End Year	**2030**
Total Net Increase Cost Estimate	[redacted]
Cost Estimate Accuracy (%)	[redacted]
Project Spend to date	[redacted]
PCD Identification	**SpC 3.9 Wider Works Price Control Deliverable**
Project Name	**East Coast 400kV Upgrade (ECUP)**
Delivery Status	**In Progress**
Current Stage Gate	**Gate 4 (Execution)[1]**
Delivery Date	**31 March 2026**

Allowance[2] (£m 18/19)	T1	21/22	22/23	23/24	24/25	25/26	T3	Total
		[redacted]	[redacted]	[redacted]	[redacted]	[redacted]		[redacted]

Expenditure[3] (£m 18/19)	T1	21/22	22/23	23/24	24/25	25/26	T3	Total
		[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

[1] Blackhillock PSTs are excluded from this Current Stage Gate Assessment

[2] Taken from Appendix 1 of Special Condition 3.9 Wider works Price Control Deliverable (WWt)

[3] This is based on our on-cost assumptions used for statutory accounts.

[4] We are forecasting Expenditure during the RIIO-T3 period. We are considering Ofgem's RIIO-T3 Draft Determinations in the context of developing the most appropriate approach to recovering expenditure into RIIO-T3.

Overview

Content and Structure

The purpose of this document is to outline the background and justify the use of the Net Zero Re-Opener to modify our East Coast 400kV Upgrade (ECUP) Price Control Deliverable (PCD) under Special Condition 3.9 (Wider Works Price Control Deliverable) of our Electricity Transmission Licence. This document aims to provide sufficient detail on background and justification, the technical design of the works, cost, risk, procurement processes, and delivery programme. We have worked to develop a high-quality application to take account of Ofgem's summer publication deadlines. The project costs are presented in the form of templates that give a detailed presentation of the efficient delivery and procurement strategy we've undertaken. We have sought to address each of the specific aspects Ofgem highlighted to us in their letter of 1 July 2025. This document is structured into six parts:

Section	Chapter Title	Description
Section 1	**Overview**	Outlines the structure of the submission and explains the content of each section.
Section 2	**Background**	Includes the background to ECUP from our RIIO-T2 Business Plan and Ofgem's RIIO-T2 Final Determinations; explains the strategic planning linkages with the investment drivers from NESO and the proceed critical signal which justifies the "need" for KKRE and the East Coast 400kV Enhanced Upgrade. This part describes: 1. The needs case for the proposed option to revise the scope of ECUP to upgrade the full route to triple Upas conductor (current scope is for 70% with triple Upas and 30% with twin Totara conductor to enhance the scope of ECUP). 2. The proceed critical signal from the NESO Network Options Assessment (NOA) for the East Coast 400kV requiring a further upgrade for the purposes of delivering the Peterhead - Persley – Kintore - Kincardine 400kV upgrade. 3. The range of options we considered in developing our submissions to NESO as part of tCSNP2. 4. The change in circumstances arising from the NESO's strategic planning that requires new investment across the East Coast 400kV.
Section 3	**Technical Summary**	Includes both the technical specification of ECUP and KKRE and provides a summary of the East Coast 400kV Enhanced Upgrade. This part describes an overview of the different technologies we considered and the reason for our selection of triple Upas.
Section 4:	**Delivery Strategy**	Includes the delivery strategy for the East Coast 400kV Enhanced Upgrade and includes our assessments of the stakeholder impact. This part describes the reprogrammed works, the project timeline and the delivery plan, and our approach to considering the most effective and efficient procurement strategy.
Section 5:	**Cost Summary**	Includes evidence of the justification of the increase in cost from ECUP to the East Coast 400kV Enhanced Upgrade as a result of delivering KKRE. This part describes the cost breakdown per year including the expenditure incurred to date and our approach to risk and contingency for the project.
Section 6:	**Regulatory Mechanism**	Includes a summary of the rationale and justification for the Net Zero Re-Opener being the appropriate regulatory mechanism.

We credit the constructive and collaborative manner Ofgem has approached our engagement on this matter. We formally request that Ofgem trigger the Net Zero Re-Opener to modify the output, delivery date and allowance in Special Condition 3.9 (Wider works Price Control Deliverable (WWt) to reflect the enhanced scope of work for the East Coast 400kV upgrade).

Background

RIIO-2 Electricity Transmission – Final Determinations

In January 2019, NESO established in its Networks Options Assessment 2018/19[5] that *East coast onshore 400kV incremental reinforcement, or ECUP,* was on the optimal path and critical in all four scenarios. NESO recommended that ECUP proceeded. In Ofgem's RIIO-2 Final Determinations[6], Ofgem accepted our baseline funding request to deliver this strategic network capability and to increase the boundary transfer capability of the B4 boundary by 1090MW by 31 March 2026. Ofgem specified discrete Price Control Deliverables (*PCDs*) within our Electricity Transmission Licence to measure the delivery of this strategic network capability. These PCDs are:

- **the East Coast 275kV upgrade** to deliver a B4 boundary uplift of 610MW by 31 October 2023; and
- **the East Coast 400kV upgrade** to complete the OHL works and substation works by 31 March 2026, such as is required to allow commissioning to commence and deliver the boundary B4 boundary uplift of 480MW by 31 October 2026 (ref: NOA code ECUP).

The East Coast 400kV works are the second part of the phased onshore reinforcement on the East Coast[7]. The works comprise of replacing the conductors, insulators and fittings on the existing OHL steel lattice towers between Kintore, Fetteresso, Alyth up to the border with Scottish Power Transmission (SPT) near to Blairingone to allow the OHLs to operate at 400kV.

<u>East Coast 400kV Incremental Upgrade</u>

- Reconductor and Reinsulate 170km overhead line between Kintore-Fetteresso – Alyth – Kincardine for 400kV operation
- Substation works at Kintore, Fetteresso and Alyth to accommodate 400kV
- Install two 275kV Phase shifting transformers at Blackhillock

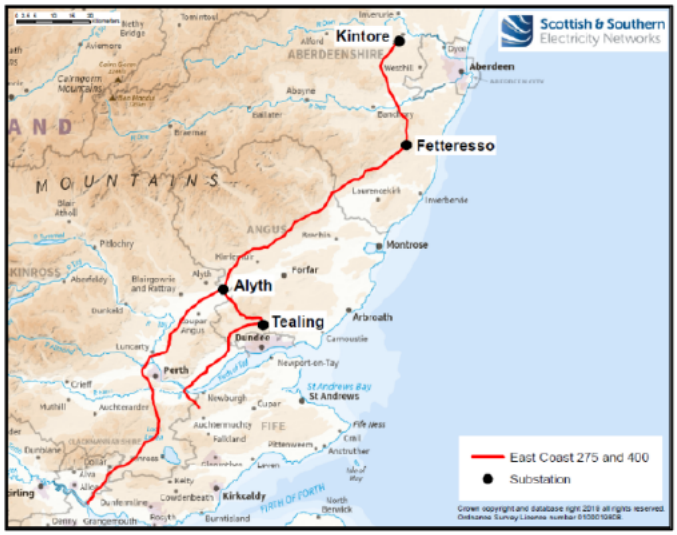

Figure 1: North of Scotland: East Coast 400kV Incremental

[5] Network Options Assessment 2018/19, January 2019

[6] RIIO-2 Final Determinations – SHET Annex (REVISED)

[7] East Coast 275kV & 400kV Overhead Line Reinforcement Projects, April 2021

Project Scope - East Coast 400kV Upgrade

ECUP includes facilitating the upgrade of the existing Kintore-Kincardine overhead line from 275kV to 400kV operation, involving works at:

- **Kintore Substation:** establishing a new 400kV G^3 gas insulated switchgear (GIS), with a double gas insulated busbar arrangement with space provision to accommodate future capacity.
- **Fetteresso Substation:** replacing the existing 275/132kV super grid transformer (SGT) with 1no. 400/132kV SGT and associated upgrade of equipment to operate at 400kV. Installation of digital control system.
- **Alyth Substation:** uprating the 275kV (built for 400kV operation) GIS double busbar arrangement for 400kV operation. Installation of two new 400/275kV SGTs to connect the existing 275kV OHL from Tealing Substation. The 400kV OHLs from Fetteresso and Kincardine Substations are to be connected to the 400kV busbar via dedicated circuit breaker bays. Uprating the reactive compensation for 400kV operation.
- **OHL:** upgrading 170km of 275kV OHL circuits to 400kV operation between Kintore, Fetteresso, Alyth, and the B4 boundary (the border between our and SPT's license areas).
- **Blackhillock:** installation of two Phase Shifting Transformers (PSTs) at Blackhillock Substation on the 275kV double circuit OHL to Knocknagael. The PSTs will have a minimum rating of 920MVA and a nominal on-load angle range of +15/-15 degrees

Upgrade to Triple Upas OHL Conductor

The original scope for the OHL works intended to reconductor the existing Twin Zebra ACSR conductor across the entire Kintore, Fetteresso, Alyth and Kincardine circuits with Twin Totara AAAC conductor (at 90°C operation at 400kV providing a winter post-fault rating of 2000MVA) giving an incremental capacity of 910MVA per circuit[8]. Twin Totara provided sufficient network capacity for the system requirements of ECUP. As the OHL project moved through development and delivery, we sought to address **noise considerations** and increased the technical specification of 70% of the Kintore, Fetteresso, Alyth and Kincardine circuits to a higher specification of conductor - **triple upas**. Our technical assessment leading to our selection of triple upas is outlined below in the **Technical Summary** chapter. Our assessment determined that noise mitigation was necessary across 70% of the Kintore, Fetteresso, Alyth and Kincardine circuit. Accordingly, 70% of the Kintore, Fetteresso, Alyth and Kincardine OHL would utilise triple upas, with the remaining 30% of the OHL utilising the originally scoped Totara.

This decision did not increase the capacity of the Kintore, Fetteresso, Alyth and Kincardine circuit, as the OHL would only operate at the lower rating between the two conductors (Totara).

Our construction works across the East Coast 400kV upgrade began in May 2021. The current status of the works is outlined below in **Delivery Strategy.**

HNDFUE and Beyond 2030 - tCSNP2

NESO published its *Holistic Network Design for Offshore Wind* and *Networks Options Assessment 7 Refresh* (together the transitional Centralised Network Plan, or tCSNP1) in July 2022 to recommend a single, integrated approach that supports large scale delivery of electricity from offshore wind, to where it is needed across Great Britain, having regard to the UK Government's ambition for 50GW of offshore wind

[8] SSEN Transmission -RIIO-T2 Business Plan - East Coast 400kV Incremental Upgrade Engineering Justification Paper T2BP-EJP-001

by 2030. In July 2022, NESO published the methodology for the *Holistic Network Design Follow-Up Exercise* (HNDFUE) and explored six offshore coordinated network designs. All six designs showed a high degree of consistency for the generators located in the north of Scotland where most of them connect via radial connections. NESO conducted a light touch assessment of these options during the HNDFUE process to determine whether each design was economic and efficient.

Following the UK Government's Transmission Acceleration Action Plan[9], NESO sought to build on tCSNP1 and requested that we submit proposals for projects for consideration in their recommendations for the design of a network plan that would accommodate the additional 21 GW of offshore wind directly as a result of the ScotWind leasing round. NESO provided us with System Requirement Form which indicated the level of boundary transfer that is forecast to be required.

We developed high-level options to meet these required transfers and undertook an iterative strategic optioneering approach. Our assessment of which projects to submit to NESO for consideration accounted for a number of factors influencing our initial option concepts. We selected a set of the best performing options to be submitted to NESO. As part of these submissions, we proposed a project to upgrade and/or rebuild the circuits and equipment between Longside, Peterhead, Persely, Kintore, Fetteresso, Alyth and Kincardine, and increase the capacity of the network to accommodate system requirements. This project was titled **PKUP Final**, and it comprised of three interlinked projects.

Project	NOA Code	Description
Peterhead to Kintore Upgrade	**PKUP**	Establish new 400kV substation at Persley tee; install two new 400/132kV 240MVA SGTs and install two power flow control devices at Persley tee substation. Install an additional 1200MVA 400/275kV SGT at Peterhead substation for network security purposes. Construct new feeder bays at Peterhead and Kintore 400kV substations as part of enabling works to facilitate remote end connections of PKUP 400kV OHL.
Peterhead to Longside 400kV Upgrade	**LPUP**	Rebuild a short section (~11km) of 400kV Overhead Line between Peterhead and Longside (Peterhead 2) with triple Araucaria conductor, including associated diversion works.
Kintore to Kincardine Reconductoring	**KKRE**	Reconductor 30% of the Kintore – Fetteresso – Alyth – Kincardine 400kV double circuit OHL that is due to be strung with twin Totara as part of RIIO-T2 project ECUP with triple Upas (the RIIO-T2 project ECUP will reconductor the other 70% of the line.

In *Beyond 2030: A national blueprint for a decarbonised electricity system in Great Britain* published on 19 March 24 (the second transitional Centralised Strategic Network Plan, or "*tCSNP2*"[10]), NESO accepted the need for PKUP Final and signalled that the East Coast 400kV route will need further upgrading for the purposes of the Peterhead - Persley – Kintore - Kincardine 400kV Upgrade (ref: NOA code PKUP).

[9] Electricity networks: transmission acceleration action plan

[10] The tCSNP2 is the NESO's plan for a coordinated onshore and offshore network design that can facilitate the connection of up to 86GW of offshore wind generation in support of the government's Net Zero obligations under the sixth Carbon Budget

PKUP

Description: Upgrade and/or rebuild the circuits and equipment between Longside (Peterhead 2), Peterhead, Persley, Kintore, Fetteresso, Alyth, and Kincardine

Type of work: Existing network upgrade

Maturity Level: 3 - Design/development and consenting

Purpose: Enables the connection of offshore wind generation in the region and the transfer of power associated with it

Rationale: This option helps with the transfer of power from the connection of significant amounts of offshore wind in the region while reducing the impact on the environment and communities by upgrading and reusing large amounts of infrastructure. This project is also currently required to enable the development of a robust and reliable offshore network connection and will be reappraised in the detailed design stage

Figure 2: North of Scotland: PKUP – Beyond 2030 / Regional Blueprint (NESO)

NESO identified PKUP Final as necessary to increase the capacity of the planned Peterhead to Longside (Peterhead 2) 400kV double circuit with a higher capacity 400kV double circuit; upgrade the existing Peterhead-Persley-Kintore 275kV double circuit to 400kV including a new substation along its route; and install a higher capacity conductor on sections of the existing Kintore-Alyth-Kincardine 400kV double circuit.

NESO explained "*…this option helps with the transfer of power from the connection of significant amounts of offshore wind in the region while reducing the impact on the environment and communities by upgrading and reusing large amounts of infrastructure. This project is also currently required to enable the development of a robust and reliable offshore network connection…*".

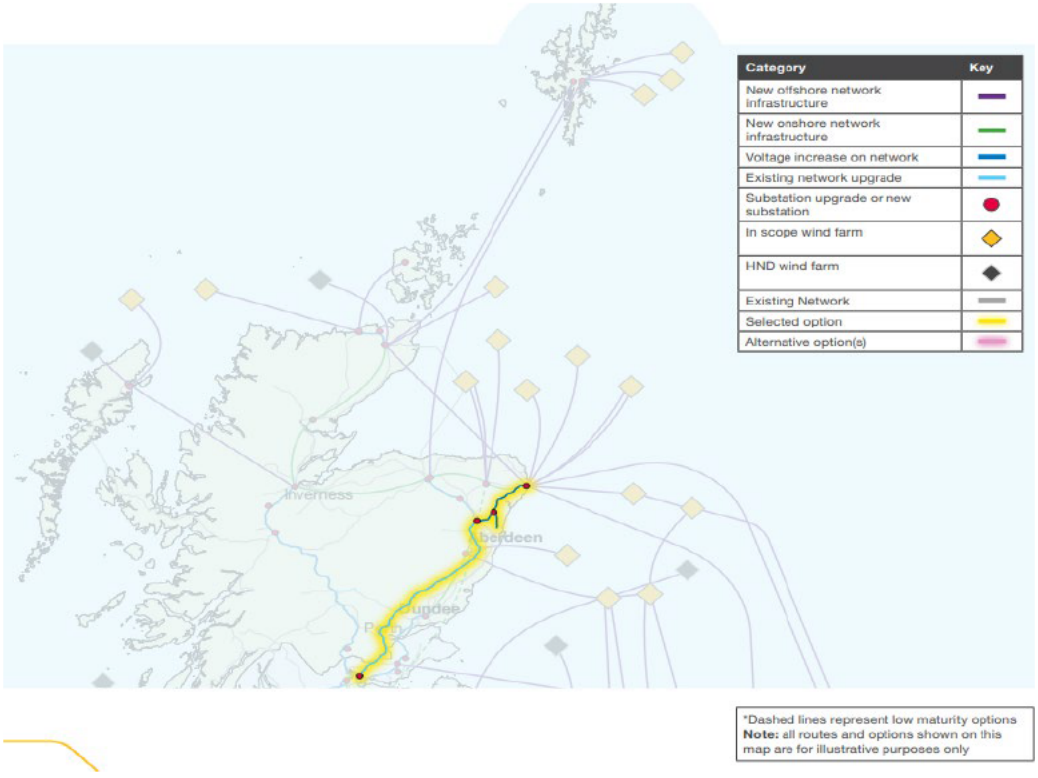

Figure 3: North of Scotland: PKUP – Beyond 2030 / Regional Blueprint (NESO)

Our Options Assessment

We originally considered a range of options as part of our proposals for PKUP Final to NESO for tCSNP2. This included a scheme named AKRE which proposed to reconductor the existing Alyth – Kincardine 400kV double circuit overhead line route with a high temperature low sag conductor.

In January 2024, we amended the scope of PKUP Final following engagement with NESO during the NOA Committee stage of the tCSNP2 where it was indicated that AKRE was not performing strongly. Our internal analysis determined that the technical specification of KKRE with **triple Upas** conductor performed comparably but at a much lower cost and was achievable on the existing infrastructure.

The original driver for using a higher specification conductor, with an increased capacity, across 70% of the Kintore, Fetteresso, Alyth and Kincardine OHL as part of ECUP was to reduce noise disruption. However, we identified an opportunity to increase the capacity of the entire Kintore, Fetteresso, Alyth and Kincardine OHL by upgrading the technical specification of the remaining 30% of the OHL (from Tortara to triple upas). This would allow the Kintore, Fetteresso, Alyth and Kincardine OHL able to operate at the higher rating and increased capacity provided by the higher specification triple upas conductor. This project was titled **KKRE.**

Following the outcome of our assessment, working with NESO, we withdrew AKRE from the tCSNP2 assessment process and proposed KKRE as part of PKUP Final. NESO granted PKUP Final a "proceed critical" signal in tCSNP2.

Following the NESO's proceed critical signal for PKUP, we conducted an analysis and assessment considering the options of how to deliver KKRE. We considered operational efficiencies, timing, cost and consumer value as the key criteria

Option	Outcome	Description	Delivery Date
Do Nothing	**Not considered**	The original scope of ECUP is in the process of being delivered through our Large Capital Project Framework. Do Nothing is not a feasible consideration.	N/A
Option(s) incorporating the original (baseline funded) scope	**East Coast 400kV Enhanced Upgrade** **KKRE** at a future date by 2033 Considered and **Rejected**	The projects delivering ECUP have, in some areas, progressed sufficiently that work already complete would have to be revisited to deliver an enhanced scope. The cost would increase. We would be making investment decisions to incur cost and changes of scope without regulatory approval on allowances, as well as delaying the delivery of a PCD within our licence and the associated regulatory and reputational risk. We would be encountering an additional regulatory burden and incurring further indirect costs, planning and operational challenges. We would require to re-engage a range of stakeholders and interested parties, in some cases revisiting landowners to undertake further work. However, we concluded that as KKRE is **necessary,** the only relevant consideration is when the work is completed. While we assessed that we could avoid additional challenges and risk, and there was some consumer value in delivering on the original scope, ultimately the consumer	KKRE **2033** Blackhillock PSTs **2030**

		value delivering KKRE far exceeded the counterfactual. Conclusion – as delivering ECUP by 2026 would not deliver KKRE, we would need to begin replacing 30% of the recently installed OHL after circa 1 year. **Rejected**.	
Preferred solution	**East Coast 400kV Enhanced Upgrade** Immediately **Progressed**	We assessed that the most cost effective, and efficient approach that would have the most consumer value, would be to utilise our existing projects delivering ECUP and enhance their scope to deliver KKRE. This would maximise the existing infrastructure we have currently in place and make use of our existing operational frameworks. This option also allows us to benefit from the current Section 37 approvals already in place for the project. This approach also has a community and environmental benefit as we are minimising our impact by completing KKRE as part of an existing programme of works and avoiding having to return in the near future for further works. This approach would also avoid outage challenges towards 2030 and beyond. We would reconductor 30% of the Kintore – Fetteresso – Alyth – Kincardine 400kV double circuit OHL that is due to be strung with twin Totara with triple Upas as part of our existing works. While this could lead to some complexity with cost negotiations and forecasting for allowances due to the interlinkages between past works and ongoing projects, this could be mitigated through constructive engagement with Ofgem. Conclusion – **Progressed**.	KKRE **2027** Blackhillock PSTs **2030**

Technical Summary

ECUP aims to address the thermal and voltage network constraints that limit the North to South transfer of power across B4. The project reinsulates and reconductors 170km of OHL between Kintore, Fetteresso, Alyth and Kincardine, and undertakes the necessary 400kV substation upgrade works at Kintore, Fetteresso, and Alyth substations. Additionally, PSTs would be installed at Blackhillock to provide a degree of control over West to East power flows.

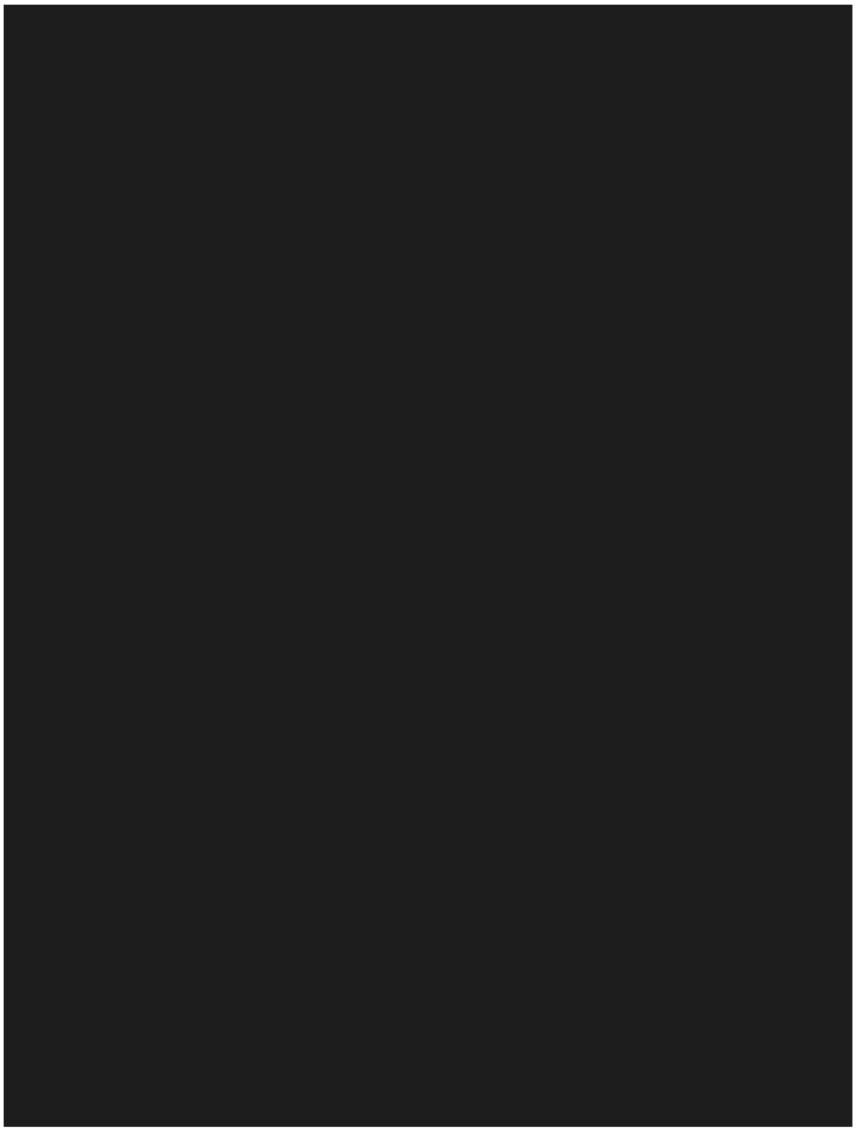

Figure 4: East Coast 400Kv Incremental Upgrade Single Line Diagram

East Coast 400Kv Enhanced Upgrade – KKRE

In enhancing the scope of ECUP[11] to deliver the scope of KKRE, we have reprogrammed works across the four of our projects. The key activities to be undertaken during the execution phase to enable East Coast 400kV Enhanced Upgrade include:

Project	Original Scope	Enhanced Scope
LT137 **East Coast 400kV OHL Upgrade**	Upgrade 170km of the re-profiled 275kV circuits (following the East Coast Onshore 275kV Upgrade) to 400kV operation between Kintore, Fetteresso and Alyth (established in the East Coast Onshore 275kV Upgrade) as far as the SHE Transmission/SPT border. The East Coast 400kV Upgrade works intended to reconductor approximately 70% of the Kintore to Kincardine overhead line with the triple Upas conductor configuration and the remaining circa 30% of the overhead line with a twin Totara conductor configuration.	Installation of 100% triple upas conductor and associated fittings along the OHL.
LT268 **Alyth 400kV Substation Upgrade**	Uprate the 275kV (built for 400kV operation) Gas Insulated Switchgear double busbar arrangement established at Alyth via the East Coast Onshore 275kV Upgrade for 400kV operation. Install two new 1200MVA 400/275kV SGTs to connect the existing 275kV OHL from Tealing Substation constructed for each of the two new 1200MVA SGTs to mitigate noise. Connect the 400kV OHLs from Fetteresso and Kincardine to the 400kV busbar via dedicated circuit breaker bays. Uprate the reactive compensation established at Alyth via the East Coast Onshore 275kV Upgrade for 400kV operation.	Triple upas compatibility at the substation inclusive of the towers and downlead arrangement, including the design and installation.
LT269 **Kintore 400kV Substation Upgrade**	Establish additional six bays and complete the construction of 10 bay 400kV AIS double busbar adjacent to the existing Kintore Substation. We committed to reduce the use of new GIS containing SF6 and, where technically feasible, encompassed this within the design. Project has chosen to use GE's g3 gas technology.	Triple upas compatibility at the substation inclusive of the towers and downlead arrangement, including the design and installation.
LT270 Fetteresso 400kV Substation Upgrade	Remove the existing 240MVA 275/132kV SGT and install two new 240MVA 400/132kV SGTs. Utilise existing 400kV equipment at Fetteresso substation to establish a 400kV double busbar; necessary to operate the existing substation and the OHLs from Kintore and Alyth at 400kV.	Triple upas compatibility at the substation inclusive of the towers and downlead arrangement, including the design and installation.
LT00026 Blackhillock	Installation of two PSTs at Blackhillock Substation on the 275kV double circuit OHL to Knocknagael. The PSTs will have a minimum rating of 920MVA and a nominal on-load angle range of +15/-15 degrees	No change in scope. Delivery Date extended to 2030 due to system requirement need The scope of Blackhillock is not affected by the East Coast 400Kv Enhanced Upgrade

[11] SSEN Transmission -RIIO-T2 Business Plan - East Coast 400kV Incremental Upgrade Engineering Justification Paper T2BP-EJP-001

Technical Assessment – OHL – Triple Upas

During the development of ECUP, we identified triple Upas as having the best overall performance out of three conductor configurations to addressing the noise considerations arising from the utilisation of Totara across the Kintore, Fetteresso, Alyth and Kincardine OHL. We considered it performed well in key aspects including

- **Power Transfer**: The higher line rating will allow more power transfer, and this will be with lower losses as upas has the lowest average losses out of the three bundles.
- **Noise Disruption**: Triple Upas will have the lowest noise of the three and will allow the upgrade to 400kV to be done with minimal disturbance to the public.

We selected three conductor configurations for a technical assessment - triple Upas, twin Totara, and twin Rubus. Each conductor satisfied the requirements of having 400kV capacity and being suitable for use on a line of L8 towers and were specifically appropriate for consideration as they would be the best electrical performance without requiring any major upgrades to the L8 towers/foundation. Heavier conductors such as Araucaria would give better electrical performance, however, this would make the project unfeasible since major structural improvements would be required on the OHL route, which would increase the cost and take longer for the project to complete.

We selected triple Upas as the best overall conductor configurations for the purposes of increasing the conductor specification of 70% of the Kintore, Fetteresso, Alyth and Kincardine OHL. Triple Upas did perform comparatively less well against the other two technical options in clearance to the ground, requiring a greater clearance than the other configurations, however, with the L8 towers in question this drawback can be sufficiently mitigated. On this basis, we considered the criteria where triple Upas surpasses the other two considerations to hold greater weight. While we acknowledged that triple Upas as the most expensive option, we were satisfied that the benefits, including lower transmission losses. Further, our assessment determined that the increased cost of the triple Upas tapers off after installation.

In our development of KKRE, we selected triple Upas as the most effective and appropriate conductor specification to reconductor the remaining 30% of the Kintore, Fetteresso, Alyth and Kincardine, resulting in the entire Kintore, Fetteresso, Alyth and Kincardine OHL being reconductored with the same conductor (triple upas).

Delivery Strategy

The East Coast 400kV Upgrade project is governed by our Large Capital Projects framework and has passed Gate 3.

Large Capital Project Framework

We recognise the criticality of all major investment projects being governed, developed, approved, and executed in a consistent and effective manner whilst achieving safe, sustainable, and timely execution. Our financial governance threshold for Large Capital Projects is a project investment value greater than £10 million (nominal). The East Coast 400kV Upgrade project is being developed and executed in accordance with the principles of our Large Capital Projects Governance Framework manual (MA-COR-LCP-001) and our Gate Keeping Procedure (PR-COR-LCP-020). A stage and gate procedure structure governs the entire lifecycle of the project, undergoing five stages to completion as illustrated within Figure 5 below.

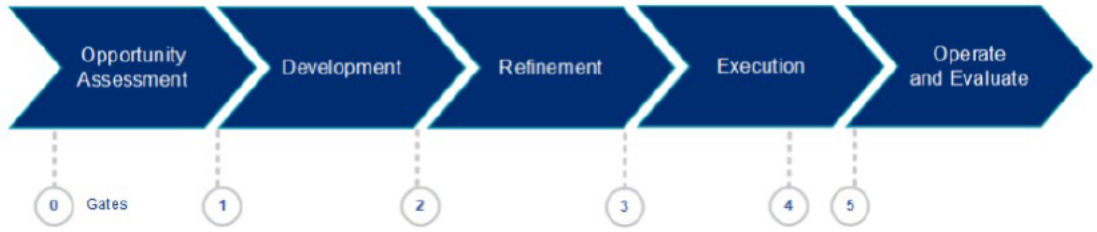

Figure 5 – LCP Governance Framework

The process is phased with six gates (0-5) at appropriate decision points, with clear consistent deliverables for each gate. This section will focus on the specific Procurement and Commercial deliverables contained therein.

This submission is based on the position as of July 2025. The delivery programme will continue to be developed as works progress on each project respectively.

Governance Framework

ECUP is at the Execution Phase of the Large Capital Project Framework. East Coast 400kV Enhanced Upgrade will continue within the Execution Phase and will progress to Gate 4.

The East Coast 400kV Enhanced Upgrade will take advantage of the existing governance arrangements already established for the East Coast 400kV Upgrade and will be incorporated within and integrated into the well-established governance framework. This includes the Project Review Boards (PRBs) in place. We will utilise our appropriate Project, Construction Management and Engineering teams already in place and fulfil our duties and legal responsibilities as both the Client and Principal Designer. This approach benefits from existing internal and external interface management, particularly with the technical nature of the work and the close links to other works being carried out on the same site. We will utilise the existing interface management plan which ensures effective management of interfaces relating to construction, safety, health, wellbeing, environmental, and quality.

Procurement Strategy

[redacted]

[redacted]

Current Status

Following the early engagement with Ofgem, and to maximise consumer value, we instructed the Principal Contractors to cease ongoing development and procurement of works that would be detrimental to the cost effective and timeous delivery of the East Coast 400kV Enhanced Upgrade. We have instructed each Principal Contractor to carry out the necessary design works and procurement activities for Triple Upas. We expect that the necessary works across the three substations will continue through 2026.

Project	Description
LT137 East Coast 400kV OHL Upgrade	All twin Totara installation halted. Triple Upas materials have been ordered, the Principal Contractor is proceeding with installing 100% triple Upas along the route.
LT268 Alyth 400kV Substation Upgrade	Part A works and some early procurement ongoing - Part B work to commence onsite early 2026.
LT269 Kintore 400kV Substation Upgrade	Principal Contractor instructed to carry out tower loading design checks, which are almost complete, and to procure the required triple Upas materials, which are due for delivery later this year ahead of the planned works in 2026.
LT270 Fetteresso 400kV Substation Upgrade	Principal Contractor stopped work on all twin Totara design and has been instructed to complete a re-design of the OHL elements and certain substation elements required to facilitate the triple Upas downlead installation. This will include additional construction works. Principal Contractor stooped all procurement of twin Totara, now required to complete additional design checks and steel strengthening, along with triple Upas procurement.
LT026 Blackhillock	The system requirement for the Blackhillock PSTs is not needed currently. Rescheduled delivery of these assets until system need - 2030

An overview of the plan for delivery of the East Coast 400kV Enhanced Upgrade can be found in **Appendix A: Delivery Plan.**

The system need for the Blackhillock PSTs will not be realised until 2030. We have rescheduled the energisation of these assets to **2030**. Our delivery plan for the East Coast 400kV Enhanced Upgrade is not affected directly by these challenges.

Stakeholder Engagement

Our assessment is that enhancing the scope of ECUP will have a **neutral** effect in the short term across local communities in the east coast of Scotland as the works will rely on existing stakeholder engagement infrastructure already in place for ECUP. For example, we established a dedicated project website for ECUP where we publish regular, more specific updates regarding the latest news and timelines relating to the individual projects works.[12] Our Community Liaison Managers continue to act as points of contact for communities throughout the project, allowing opportunities to raise questions.

We expect to engage with landowners to reconductor the 43 towers where twin Totara has already been installed and completed. We are satisfied in our decision to halt twin Totara works at this time and enhance the scope to 100% triple Upas. As a counterfactual, if we deliver on the existing scope of ECUP (rather that the enhanced scope), we will have to revisit 166 towers to deliver KKRE.

In the long term, our assessment is that the East Coast 400kV Enhanced Upgrade will have a marginal net positive effect as it will reduce our interventions across the East Coast. We are delivering the KKRE as part of an ongoing project that is passed Gate 3.

Whole System Considerations

The reinforcement spans our licence area and SPT's licence area. We have only presented our transmission works and we will continue to coordinate with SPT to ensure these works are effectively and efficiently delivered. Coordination with SPT is managed by project-level meetings focussing on construction and outage interfaces and at scheme-level to coordinate the energisation of ECUP from Kintore to Kincardine.

We have discussed the East Coast 400kV Enhanced Upgrade with SPT, including our proposed technical specifications and project delivery timelines. We are satisfied that the technical scope of East Coast 400kV Enhanced Upgrade is compatible with SPT's licence area and we do not expect any negative effect, either from an operational or timing perspective on SPT's East Coast Onshore Upgrade.

[12] East Coast 400kV Upgrade

Project Cost Summary and Breakdown

We are seeking to recover all efficiently incurred costs related to the enhancing of ECUP to KKRE by delivering the East Coast 400Kv Enhanced Upgrade.

T2 Baseline – ECUP PCD

The estimated cost of ECUP was [redacted] to be spent during the RIIO-T2 period.

ECUP formed part of a scheme of four projects submitted as one cost in our RIIO-2 Business Plan, alongside Blackhillock PSTs.[13] The Scheme Expenditure Profile in our RIIO-T2 Business Plan did not separate the profile between each of the four projects (OHL, Alyth, Kintore and Fetteresso), rather we provided a *pro rata* rate allocation of the overall East Coast Onshore 400kV upgrade. Ofgem established our efficient allowances for ECUP as one cost in its Final Determinations, including the four projects (OHL, Alyth, Kintore and Fetteresso) and Blackhillock PSTs.

Cost Estimate - East Coast 400Kv Enhanced Upgrade

We have provided the cost estimates for the East Coast 400Kv Enhanced Upgrade cost profile (see tables below Table A1) on a project by project (rather than pro rata) basis resulting in a total cost profile increase of [redacted]

Category	Enhanced Scope Net Increase (Nominal)	SSENT Indicative Estimate Tolerance
LT000137 – East Coast 400kV OHL Upgrade	[redacted]	[redacted]
LT000268 – Alyth 400kV Substation Upgrade	[redacted]	[redacted]
LT000269 – Kintore 400kV Substation Upgrade	[redacted]	[redacted]
LT000270 – Fetteresso 400kV Substation Upgrade	[redacted]	[redacted]
LT026 Blackhillock	[redacted]	[redacted]
Total	[redacted]	[redacted]

Table A1 East Coast 400kV Enhanced Upgrade – Net Increase

The expenditure set out within this submission includes current expenditure and further expenditure through to completion of the four projects (OHL, Alyth, Kintore and Fetteresso). The estimate includes all construction costs which have been developed and approved in full compliance with our LCP Governance Manual. We have provided an estimate of the breakdown in costs in Table A3 and an explanation of the make-up of these costs below.

[13] RIIO-T2 Transmission East Coast Onshore 400kV Upgrade Cost and Efficiency Paper T2BP-EST-0051

Please note: This submission and cost summary does not include any increase to the cost profile of Blackhillock PSTs. The works at Blackhillock do not form part of the increased cost profile of the East Coast 400Kv Enhanced Upgrade. This application is seeking the incremental increase of our costs for delivering KKRE.

Cost Breakdown	LT000026	LT000137	LT000268	LT000269	LT000270	Total	% of Project Costs
Project Management	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Regulatory and Consent	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Engineering	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Equipment Procurement	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Construction – Main &Ancillary Contracts	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Commissioning and Operations	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Risk and Contingency	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Other Direct Costs	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Table A2 – Class 3 Estimate Breakdown (Nominal Prices)

Cost Justification - East Coast 400Kv Enhanced Upgrade

Project Management

We will incur Project Management costs of [redacted]. These costs are formed of two categories

- **Staff Costs**: we calculated our staff costs using staff hours and RIIO-T2 day rates converted to hourly figures.
- **Third Party Agreements:** costs of non-SSE staff on fixed term or ongoing contracts supporting the project management of the programme.

We have provided a breakdown of these costs in the accompanying cost template.

The East Coast 400kV Enhanced Upgrade is a complex programme, consisting of four interlinked projects (and a fifth at LT26 Blackhillock). Our project management activities include management and coordination of the work packages covering stakeholder management, interfaces, communications, risk management, regulatory reporting, coordinating internally with engineering to ensure contractor compliance with design specifications and standards, management of network interfaces, commissioning, and integration. We manage our responsibilities and legal duties in accordance with the Construction, Design and Management Regulations 2015.

When comparing these Project Management costs against projects in T2 and T3, it demonstrates that the [redacted] is reasonable.

Regulatory and Consent

We will incur Regulatory and Consent costs of [redacted].

The East Coast 400kV Enhanced Upgrade utilises the existing regulatory and consents already in place for ECUP resulting in [redacted] of the project cost. The Regulatory and Consent costs are formed of five categories.

- **Planning, consents and licences** – costs and fees related to working in local authority areas of Aberdeenshire, Angus, Perth and Kinross and Clackmannanshire; and licences across Network Rail assets and the highway and trunk road network.
- **Leases, wayleaves and servitudes** - costs include the necessary wayleaves and compensation [crops are damaged etc] resulting from return visits to landowners.
- **Onshore environmental** – costs include Environment Clerk of Works.
- **Public Relations** – costs include community engagement activities including preparation of materials, hall hire and general event costs.
- **Land agents and legal** – costs include land agents, land purchase costs and legal support.

Engineering and Equipment Procurement

We have incurred Engineering and Equipment Procurement costs as [redacted] and [redacted] respectively.

Construction & Operations

We will incur Construction & Operations costs of [redacted].

We varied the scope of our existing contracts with each of our Principal Contractors to accommodate the enhanced scope necessary to deliver KKRE. This has ensured alignment with the ongoing work on ECUP.

We reprogrammed works across the four of our projects. The key additional activities to be undertaken during the execution phase to enable East Coast 400kV Enhanced Upgrade include:

<u>LT000137 – East Coast 400kV OHL Upgrade</u>

Balfour Beatty: cost - [redacted]

- Additional work extending completion date from October 2025 to 2027.
- Installing the remaining 30% with triple Upas conductor and associated fittings along the OHL, including replacing some of the already installed Totara conductor and purchase of triple Upas conductor and fittings.
- Replacing 6no. pull sections already installed with twin Totara (between 43 towers).
- Additional 39no. foundation upgrades - required due to increased tower loading.
- Additional 34no. tonne worth of steelwork to upgrade the towers - required due to increased tower loading.
- Additional access requirements to accommodate the above works.

LT000268 – Alyth 400kV Substation Upgrade

Siemens: Cost [redacted]

- Rescheduling of works to account for the enhanced scope. Additional works for triple Upas compatibility at the Alyth 400kV substation inclusive of the towers and downlead arrangement, including the design and installation.

LT000269 – Kintore 400kV Substation Upgrade

Omexom: Cost [redacted]

- Rescheduling of works to account for the enhanced scope. Additional works for triple Upas compatibility at the Kintore 400kV substation inclusive of the towers and downlead arrangement, including the design and installation.

LT000270 – Fetteresso 400kV Substation Upgrade

Kirby and Omexom: Cost - [redacted]

- Rescheduling of works to account for the enhanced scope. Additional works for triple Upas compatibility at the Fetteresso substation inclusive of the towers and downlead arrangement, including the design and installation.

The Construction and Operation costs result from exercising a mechanism within each of the contracts with our Principal Contactors – a compensation event. We notified our Principal Contractors of the change in scope of the ECUP programme for KKRE and received quotations for the increase in cost resulting from the change in scope for the East Coast 400kV Enhanced Upgrade. We have conducted robust scrutiny of the quotations from our Principal Contractors, including line by line analysis on quantity and cost. This scrutiny has resulted in extended negotiations and challenge on the costs from the Principal Contractors to ensure we have secured the most efficient cost for the East Coast 400kV Enhanced Upgrade

We have performed our own internal benchmarking and performed cross-checks on the efficiency of the Construction & Operations costs and whether they represent consumer value.

Cross Check

We conducted an internal comparison assessing the Construction & Operations costs against a counterfactual of completing ECUP and reconductoring the remaining 30% of the OHL line in 2030. This was a useful cross-check of whether the East Coast 400kV Enhanced Upgrade Construction & Operations costs are efficient. Our assessment showed that completing KKRE in 2030 could result in a 41% increase in Construction & Operations costs. This assessment does have some limitations e.g. its underpinning methodology was not developed independently; diversity of the information sources and the comparison does not account for external factors like supply chain constraints. However, the assessment has provided a useful cross-check of whether the East Coast 400kV Enhanced Upgrade Construction & Operations costs represent consumer value. in the absence of independent benchmarking.

Risk and Contingency

We have calculated Risk and Contingency costs of [redacted]

We have provided an allocation of [redacted] for Risk and Contingency. This allocation aligns with Ofgem's view of the appropriate level of risk and contingency in re-opener applications[14].

The East Coast 400kV Enhanced Upgrade is a unique programme of work expanding on an existing programme (ECUP) already under construction, and in some cases nearing completion. While the programme of works will encounter emerging risks, we are satisfied that an allocation of [redacted] is appropriate due to the existing risk mitigation framework we have in place, summarised below.

Risk Governance

The East Coast 400kV Enhanced Upgrade project will continue to manage risk in accordance with ISO31000, the International Standard on Risk Management, and the main principles outlined in our LCP Governance Manual.

We have existing Project Management Plans incorporating our Risk Management Plans for the East Coast 400kV Enhanced Upgrade, setting out our approach and processes we use to manage risk (both threats and opportunities) over the lifetime of any project. This includes the key risks (threats and opportunities) faced by the project. The Project is using KERIS, the SSEN LCP Risk Management Information System (RMIS) to manage risk.

KERIS acts as the central repository for all project risks (both threats and opportunities) enabling users to create, access and evaluate risks, conduct impact assessments, and track mitigating risk actions through to successful closure. All risks and actions are assigned to specific owners, who are then accountable for updating the KERIS system.

Risk owners can simultaneously access the RMIS, which is an ongoing project activity designed to ensure that risk data is captured, kept up to date, and can be used to support project decision making. To supplement the ongoing updates to the RMIS, the East Coast 400kV Enhanced Upgrade project will continue to hold strategically timed risk workshops. These workshops are used to collectively review and challenge the Project Risk Register ahead of each key gate stage.

The East Coast 400kV Enhanced Upgrade will rely on the existing of the project risk register, which follows the principles of the LCP Governance Gated Process Manual. The risk register is a live document that evolves through continuous updates and contributions from the project team over the lifecycle.

The Project Manager reviews the project risks with:

- Updated reports detailing the status of Risks and Actions to highlight risks/ actions requiring attention; and
- Monthly reports, showing risk progress (new risks, opportunities, new actions, and closed items); risk gaps, usage, quality of the information being recorded and where the risk focus needs to be going forward for the Project.

[14] Decision on Statutory Consultation: licence modifications to give effect to decision on SPT's 2023 MSIP applications, Chapter 2, Paragraph 2.7

Key Risks - East Coast 400kV Enhanced Upgrade

Key Project Risks	Proposed Mitigation
ECUP Energisation The enhanced scope has affected the project original timelines and meet the current full energisation by 31 October 2026. This is due to additional work scope, increased programme duration and change of sequence of the works.	Work with wider ECUP portfolio and their contractors to refine and align overall timescales and project interfaces. Early design and procurement of additional equipment.
Outage Availability The enhanced scope requires additional works to be carried out in 2026 & 2027. Ongoing risk that outages are not granted or cancelled by NESO. This would impact the overall project planning timescales and may affect the energisation date.	Engagement with outage planning to review project programmes, utilising shared outages where practicable. We have developed a revised stage by stage plan that aligns with construction and equipment availability.
Resource The enhanced scope requires additional works and extended completion dates. Risk that contractors face challenges sufficiently resourcing projects beyond the original scope.	Continue to monitor contractor resource levels. Maintain accurate programme of works, ensuring contractors are aware of resource levels required to complete works.
Upas Conductor and Fittings Availability Due to the change in conductor selection, additional Upas conductor and associated fittings are required to complete OHL and substation tie-ins.	Discussions held with contractors on material availability prior to change being instructed. Early procurement of Upas materials instructed.
Impact to Future Projects and/or Network Outage Requirements The enhanced scope will require additional works to be carried out in 2026 & 2027. Risk that extended ECUP outage requirements impact on future schemes, such as ASTI, or other network outage requirements.	Engagement with future years outage planning to review ECUP programme against upcoming schemes and their outage requirements.

Regulatory Mechanisms

We have identified that Special Condition 3.6 (Net Zero Re-Opener) of our Electricity Transmission Licence is the suitable regulatory mechanism to give effect to the necessary modifications. This mechanism is designed to be adaptable to a wide range of potential developments and be effective in responding to a wide range of potential developments in RIIO-2, and allows Ofgem to trigger modifications to the outputs, delivery dates and allowances in the other special conditions of our Electricity Transmission Licence.

Context

In its *Decision on the regulatory funding and approval framework for onshore transitional Centralised Strategic Network Plan 2*[5] Ofgem introduced a regulatory approval and funding framework for the onshore electricity transmission projects that the NESO recommended in the tCSNP2. This decision determined that lower value projects were immediately eligible for full project funding either through the relevant RIIO-ET2 reopener mechanism or through the applicable RIIO-ET3 mechanism (either baseline or an uncertainty mechanism).

Ofgem accepted in its RIIO-2 Final Determinations that "*…it is critical that the price controls enable the gas and electricity networks to support the achievement of Net Zero targets. We recognise that Net Zero policy will not develop in five-year segments, aligned with our RIIO-2 timetable.*"[4] Ofgem provided a mechanism designed to increase or decrease allowed revenues, amend outputs and adjust delivery dates, in period where material changes occur that require significant adjustment to expenditure due to such circumstances. Ofgem established this mechanism to provide an increased level of adaptability into the RIIO-2 price control and provide a means to amend the price control in response to changes connected to the meeting of the Net Zero targets affecting the costs, delivery dates and outputs of network licensees.

Eligibility

The Net Zero Re-Opener establishes a set of five criteria that must be met. We are satisfied that each of these are met through enhancing the scope of ECUP. We have outlined our view on the five criteria below:

Criteria	Status
a Net Zero Development has occurred or is expected to occur	**Satisfied** The proceed critical signal from NESO for PKUP in tCSNP2 justifies the revision to the scope of ECUP to deliver the KKRE project. The tCSNP2 meets the definition of a Net Zero Development i.e. a change in circumstances related to the achievement of the Net Zero Carbon Targets that is new investment arising from the agreement of a Local Area Energy Plan or an equivalent arrangement has occurred or is expected to occur: • tCSNP2 is a plan developed by NESO, through a range of stakeholders including the network operators, Government, Ofgem local authorities which establishes the optimal long-term energy solutions for an area; and • the tCSNP2 was produced directly in the context of enabling energy systems with net zero carbon emissions.
the Net Zero Development has caused or is expected to cause the cost of Licensed Activity to increase or decrease during the Price Control Period;	**Satisfied** - If we revise the scope of the ECUP PCD project to deliver the KKRE aspects of PKUP, this will result in an increased cost as part of our licensed activities. While we are leveraging the existing ECUP project synergies, which we expect will result in an *overall* saving to consumers, delivering KKRE as part of the ECUP PCD will significantly increase what we need to spend to deliver the project. We expect to provide Ofgem with a cost benefit analysis comparing current scope and the proposed revised scope with suitable quantification of the constraint cost implications of both options and an Engineering Justification Paper for the revised scope as part of this process.

the effect of the Net Zero Development on the cost of Licensed Activity is not otherwise provided for in this licence	**Satisfied** - The cost of revising the ECUP PCD to deliver KKRE is not otherwise provided for in our Electricity Transmission Licence.
the effect of the Net Zero Development has not already been assessed under another Re-opener	**Satisfied** - The effect of revising the ECUP PCD to deliver KKRE has not already been assessed under another Re-Opener.
the effect, or estimated effect, of the Net Zero Development on the cost of Licensed Activity exceeds the Materiality Threshold	**Satisfied** - We intend to provide Ofgem with the necessary cost information as part of this process, but we can confirm at this stage the estimated effect of revising the scope of the ECUP PCD to deliver KKRE exceeds the Materiality Threshold i.e. exceeds £7million.

Licence Modification - Options

The Net Zero Re-opener is a flexible mechanism designed to adjust allowed revenues, as well as amend outputs, during the period rather than waiting until the next price control review. The mechanism provides for establishing new PCDs within our licence relating to change in circumstances related to the achievement of Net Zero Carbon Targets; and/or adjusting the outputs, delivery dates and allowances of other PCDs within our licence.

We consider that the most effective adjustment to approach to reflect the East Coast 400kV Enhanced Upgrade would be to adjust the ECUP PCD within Appendix 1 of Special Condition 3.9 (Wider works Price Control Deliverable (WWt).

Adjustment	**Change** in Appendix 1
Output	Replace the Output Description with: *Completion of the East Coast 400kV Enhanced Upgrade, including upgrading of the overhead line works of reprofiling 275kV circuits to 400kV operation between Kintore, Fetteresso, Alyth and completion of substation works to allow Kintore, Fetteresso and Alyth substations to operate at 400kV and to deliver KKRE.* *At Blackhillock two phase shifting transformers with a minimum rating of 920MVA to be installed.*
Delivery Date	Replace the Delivery Date with: *March 2030*
Allowances (WWt)	Increase total allowances

We will continue to engage constructively with Ofgem regarding the most appropriate means of reflecting the East Coast 400kv Enhanced Upgrade within our Electricity Transmission Licence.

Appendix A: Delivery Plan

LT137 East Coast 400kV OHL Upgrade

2025	2026	2027	2028
Reconductoring XS, SY, YZ circuits with triple Upas conductor. Upgrade required tower steelwork for compatibility with additional loading. Upgrade of an additional 39no tower foundations for compatibility with additional loading. Access installation to enable the above works.	Continue reconductoring XS, SY, YZ circuits with triple Upas conductor, and upgrading the required tower steelwork. Continue with access installation to enable the above works.	Complete reconductoring of XS, SY, YZ circuits, and any required steelwork upgrade. Complete final access installations. Demobilisation of all construction works and removal of access installations.	

LT268 Alyth 400kV Substation Upgrade

2025	2026	2027	2028
Design works continue, along with preparation of transportation of transformers Procurement of lead equipment	Design works completed Movement of first Transformer and installation and commissioning at Alyth	Movement of second Transformer and installation and commissioning at Alyth	

LT269 Kintore 400kV Substation Upgrade

2025	2026	2027	2028
Continuing with the OHL tower design checks, along with the procurement of the triple Upas materials for XS circuit. Delivery and installation commence of GIS G^3 bays	Complete procurement of triple Upas materials for XS circuit. Commence and complete advanced outage works to erect T558R ahead of main circuit outage (required for the energisation of the new 400kV circuits). This advance works will derisk the main energisation outages. Advance works will include the installation of the OPGW into the new 400kC communications room. Energisation of GIS board in advance of first circuit energisation at 400kV	Commence and complete the second single circuit outage. Works will include the completion of AIS busbars, stage 1 and stage 2 commissioning.	

LT270 Fetteresso 400kV Substation Upgrade

2025	2026	2027	2028
Continuing and completing the OHL tower design and substation layout checks. Instructed to redesign with 3xUpas, along with the procurement of the triple Upas materials Design and staged Construction works ongoing for the main substation element of the works SGT manufacture and FAT	Design works completed and substation staged construction works ongoing with substation re-energised at 275kV. Re-commissioning and energisation of the first circuits at 400kV.	Re- commissioning and energisation of the final circuits at 400kV and new SGT energised. Full substation energised at 400kV SGT & bund removal (275/33kV).	

LT026 Blackhillock

2025	2026	2027	2028	2029	2030
Design review complete and PST order placed	Contractor appointed and early design commences to allow advance equipment to be ordered	Design works continue	Advanced construction works commence	PST arrives on site and installation commences Design works completed	Complete [] Installation and commissioning of new PST onto the network

Appendix B: Glossary of Terms

Acronym	Definition
AKRE	A proposal to NESO to reconductor the existing Alyth – Kincardine 400kV double circuit overhead line route with a high temperature low sag conductor, submitted as part of our first PKUP proposal.
B4	SSEN Transmission to SP Transmission boundary (shared by SSEN Transmission and SP Transmission)
ECUP	East Coast Onshore 400kV Upgrade
FES 2018	Future Energy Scenarios 2018, published by NESO[15]
GIS	Gas Insulated Switchgear
KKRE	Kintore and Kincardine Reconductoring
LPUP	Peterhead to Longside 400kV upgrade
LT137	Our project reference for East Coast 400kV OHL Upgrade
LT268	Our project reference for Alyth 400kV Substation Upgrade
LT269	Our project reference for Kintore 400kV Substation Upgrade
LT270	Our project reference for Fetteresso 400kV Substation Upgrade
NESO	National Energy System Operator
Net Zero Re-Opener	Special Condition 3.6
NOA	Network Options Assessment
OHL	Overhead Line

[15] Future Energy Scenarios 2018

PCD	Price Control Deliverable
PKUP	Peterhead-Persley-Kintore-Kincardine 400kV Upgrade
PKUP Final	Our final proposal to NESO in January 2024 on the scope of PKUP including the scope of KKRE and LPUP.
PSTs	Phase Shifting Transformers
ScotWind	Crown Estate Scotland's ScotWind seabed leasing auction
SGT	Super Grid Transformer
SPT	Scottish Power Transmission
tCSNP1	Holistic Network Design for Offshore Wind and Networks Options Assessment 7 Refresh published in July 2022. The NESO's transitional Centralised Strategic Network Plan.
tCSNP2	Beyond 2030: A national blueprint for a decarbonised electricity system in Great Britain published on 19 March 24. The NESO's second transitional Centralised Strategic Network Plan.