



**SP ENERGY  
NETWORKS**

## **The Kendoon to Tongland 132kV Reinforcement Project**

**Environmental Impact Assessment Report (EIAR):  
Main Text, Figures, Visualisations and Appendices**

August 2020

# **The Kendoon to Tongland 132kV Reinforcement Project**

## **Environmental Impact Assessment Report**

**Prepared by LUC  
on behalf of  
SP Energy Networks**

**August 2020**



## Preface

This Environmental Impact Assessment Report (EIA Report) has been prepared by LUC in support of proposals by SP Energy Networks (SPEN) to modernise and reinforce the 132 kilovolts (kV) electricity transmission network between Kendoon and Tongland in Dumfries and Galloway, including the decommissioning and removal of the existing N and R routes. The project is referred to as 'the KTR Project'.

The EIA Report has been provided in support of five applications submitted by SPEN to the Scottish Government Energy Consents Unit (ECU) seeking consent under section 37 of the Electricity Act 1989 ('section 37 consent') for the overhead lines comprised in the KTR Project, as well as the applications seeking directions that planning permission be deemed to be granted under section 57 (2) of the Town and Country Planning (Scotland) Act 1997 for the overhead lines, ancillary works and the removal of N and R routes ("deemed planning permission").

The five connections forming part of the KTR Project are detailed below:

- A new 132kV double circuit steel tower overhead line, of approximately 10.1km in length between Polquhanity (approximately 3km north of the existing Kendoon substation) and Glenlee substation, via the existing Kendoon substation (P-G via K). The application for this connection also includes the removal of the N route towers between Polquhanity and Kendoon, and part of R route between Kendoon and Glenlee.
- A new 132kV single circuit wood pole overhead line, of approximately 2.6km in length, between Carsfad and Kendoon (C-K).
- A new 132kV single circuit wood pole overhead line, of approximately 1.6km in length, between Earlstoun and Glenlee (E-G).
- A new 132kV double circuit steel tower overhead line deviation of the existing BG route, at Glenlee substation approximately 1.2km in length (BG Deviation).
- A new 132kV double circuit steel tower overhead line, of approximately 32.3km in length, between Glenlee and Tongland (G-T). The application for this connection also includes the removal of the R route towers between Glenlee and Tongland.

The EIA Report comprises six volumes as well as a standalone Non-technical Summary (NTS):

- Volume 1: Main text;
- Volume 2: Figures;
- Volume 3: Appendices; and
- Volume 4-6: Visualisations.

In light of the current public health advice relating to the Covid-19 outbreak, parts of the EIA Regulations were amended on 24th April 2020 by The Electricity Works (Miscellaneous Temporary Modifications) (Coronavirus) (Scotland) Regulations 2020 to temporarily relax the requirements to place hardcopies of EIA Reports in the public domain during statutory application consultation periods and to make copies available electronically. On this basis, at the time of submission of the applications, hard copies are not available in public viewing locations in accordance with the Regulations.

An electronic copy (via USB) of the EIA Report documents can be obtained free of charge, and hard copies of the EIA Report may be purchased for £800, by contacting SPEN using the contact details set out below:

- Dedicated freephone number: 0800 157 7353
- Dedicated project email address: [dgsr@communityrelations.co.uk](mailto:dgsr@communityrelations.co.uk)
- Freepost address: FREEPOST SPEN DGSR

Representations to the applications may be submitted via the ECU portal at [www.energyconsents.scot/Register.aspx](http://www.energyconsents.scot/Register.aspx), by email to the Scottish Government, Energy Consents Unit mailbox at [representations@gov.scot](mailto:representations@gov.scot), or by post to the Scottish Government, Energy Consents Unit, 4th Floor, 5 Atlantic Quay, 150 Broomielaw, Glasgow, G2 8LU, identifying the proposal and specifying the grounds for representation.

# Main Text

## Contents

- 1** Introduction
- 2** The Routeing Process and Design Strategy
- 3** Approach to the EIA
- 4** Development Description
- 5** Felling, Construction, Operational Maintenance and Decommissioning
- 6** Planning Policy Context
- 7** Landscape and Visual Amenity
- 8** Forestry
- 9** Geology, Hydrology, Hydrogeology, Water Resources and Peat
- 10** Ecology
- 11** Ornithology
- 12** Cultural Heritage
- 13** Traffic and Transport
- 14** Noise
- 15** Socio-economics, Tourism and Recreation
- 16** Other Issues
- 17** Assessment of Intra-Connection and Intra-KTR Effects
- 18** Summary of Likely Significant Effects

# Figures

## Chapter 1: Introduction

Figure 1.1: The KTR Project Location

Figure 1.2: Electricity Transmission System in South-West Scotland (embedded in chapter)

Figure 1.3: The Five Connections of the KTR Project

## Chapter 2: The Routeing Process and Design Strategy

Figure 2.1: Example of the KTR Project Routeing Stages (embedded in chapter)

Figure 2.2: Preferred Corridors

Figure 2.3: Proposed Routes

Figure 2.4: Process for Design of Overhead Line Alignment (embedded in chapter)

Figure 2.5a: Component Parts of 132kV Steel Lattice Tower (L7)

Figure 2.5b: Component Parts of 132kV Steel Lattice Tower (L4)

Figure 2.5c: Component Parts of 132kV 'Trident' Design Wood Pole

## Chapter 3 Approach to the EIA

Figure 3.1: Developments Included in the Cumulative Assessment

## Chapter 4: Project Description

Figure 4.1: KTR Project

Figure 4.2: Polquhanity to Glenlee (via Kendoon) Connection and Removal of N and R Route (north)

Figure 4.3: Carsfad to Kendoon connection

Figure 4.4: Earlstoun to Glenlee connection

Figure 4.5: BG Route Deviation connection

Figure 4.6: Glenlee to Tongland and Removal of R Route (south)

Figure 4.7: KTR Project

Figure 4.8a: Kendoon Substation Works

Figure 4.8b: Construction Requirements at Kendoon Substation

Figure 4.9: Carsfad Substation Works

Figure 4.10: Tongland Substation Works

Figure 4.11: Typical 132kV and 11kV Underground Cable Trench

Figure 4.12: Undergrounding of Existing 11kV OHL

## Chapter 5: Felling, Construction and Operational Maintenance

Figure 5.1: Forestry Clearance Requirements

Figure 5.2: Forestry Felling

Figure 5.3: Quarry and Construction Compound Locations

Figure 5.4: Typical Construction Compound

Figure 5.5: Overview of Access Points

Figure 5.6: SUDS Mitigation for access tracks

## Chapter 7: Landscape and Visual Amenity

Figure 7.1: Landscape and Visual Impact Assessment (LVIA) Study Area

Figure 7.2: Topography within Study Areas

Figure 7.3: Aerial Imagery

Figure 7.4: N Route and R Route (North) Zone of Theoretical Visibility (ZTV) – Bare Earth

Figure 7.5.1 to 7.5.2: N Route and R Route (North) P-G Via K, C-K and E-G Comparative Zone of Theoretical Visibility (ZTV) – Bare Earth

Figure 7.5.3 to 7.5.6: R Route (North) G-T and BG Deviation Comparative Zone of Theoretical Visibility (ZTV) – Bare Earth

Figure 7.6: Designated Landscapes and Protected Areas

Figure 7.7: Landscapes Character Types (LCTs) and Designated Landscapes

Figure 7.8: Local Landscape Areas (LLAs) and Designated Landscapes

Figure 7.9: Landscape Character Types (LCTs), Designated Landscapes and Zone of Theoretical Visibility (ZTV) – Bare Earth

Figure 7.10: Viewpoint Locations and Promoted Routes

Figure 7.11: KTR Project Zone of Theoretical Visibility (ZTV) and Viewpoint Locations – Bare Earth

Figure 7.12: KTR Project Zone of Theoretical Visibility (ZTV) and Residential Properties – Bare Earth

Figure 7.13: Polquhanity to Glenlee via Kendoon (P-G via K) Zone of Theoretical Visibility (ZTV) – Bare Earth

Figure 7.14: Carsfad to Kendoon (C-K) Zone of Theoretical Visibility (ZTV) – Bare Earth

Figure 7.15: Earlstoun to Glenlee (E-G) Zone of Theoretical Visibility (ZTV) – Bare Earth

Figure 7.16: BG Route Deviation (B-G) Zone of Theoretical Visibility (ZTV) – Bare Earth

Figure 7.17: Glenlee to Tongland (G-T) Zone of Theoretical Visibility (ZTV) – Bare Earth

Figure 7.18: KTR Project and Operational Overhead Lines and Wind Farms Cumulative Zones of Theoretical Visibility (CZTV) – Bare Earth

Figure 7.19: KTR Project and Operational and Consented Overhead Lines and Wind Farms Cumulative Zones of Theoretical Visibility (CZTV) – Bare Earth

Figure 7.20: KTR Project and Operational, Consented and Proposed Overhead Lines and Wind Farms Cumulative Zones of Theoretical Visibility (CZTV) – Bare Earth

Figure 7.21: VP1 Layby on A713 near Polquhanity

Figure 7.22: VP2 Dundee at access to Polmaddy

Figure 7.23: VP3 Polmaddy settlement

Figure 7.24: VP4 Footbridge access to Kendoon

Figure 7.25: VP5 B7000 west of Glenhoul Hill

Figure 7.26: VP6 Layby on A713 near Knocknalling Wood

Figure 7.27: VP7 Southern Upland Way near Waterside Hill

Figure 7.28: VP8 Southern Upland Way near St John's Town of Dalry

Figure 7.29: VP9 Mulloch Hill

Figure 7.30: VP10 A762 north of Glenlee

Figure 7.31: VP11 Unclassified road (U3S) south-west of Glenlee

Figure 7.32: VP12 Core Path 516 south-west of Glenlee

Figure 7.33: VP13 A712 west of Balmaclellan

Figure 7.34: VP14 A712, The Queen's Way  
Figure 7.35: VP15 A762 west of Loch Ken  
Figure 7.36: VP16 Core path near Tannoch Flow  
Figure 7.37: VP17 The Otter Pool  
Figure 7.38: VP18 Core Path 177 near Bennan Moss  
Figure 7.39: VP19 Promoted viewpoint near Parton/Airds House  
Figure 7.40: VP20 Raiders' Road, north of Stroan Loch  
Figure 7.41: VP21 Mosssdale  
Figure 7.42: VP22 Core Path 485 Mosssdale to Gatehouse Station Railway Walk  
Figure 7.43: VP23 Stroan Viaduct  
Figure 7.44: VP24 A762 east of Woodhall Loch  
Figure 7.45: VP25 A713 near Parton Mill Bridge  
Figure 7.46: VP26 Kennick Burn picnic area  
Figure 7.47: VP27 B795 east of Laurieston  
Figure 7.48: VP28 A762 south of Laurieston  
Figure 7.49: VP29 Barstobrick Hill (Neilson's Monument)  
Figure 7.50: VP30 A75 at junction with unclassified road  
Figure 7.51: VP31 Unclassified road (U43S) near Argrennan Mains  
Figure 7.52: VP32 A711 north of Tongland substation

### **Chapter 8: Forestry**

Figure 8.1: Ancient Woodland Inventory (AWI) and Native Woodland Survey of Scotland (NWSS)  
Figure 8.2: Existing Forestry Cover  
Figure 8.3: Felling Required from Removal of N and R Routes

### **Chapter 9: Geology, Hydrology, Hydrogeology, Water Resources and Peat**

Figure 9.1: Hydrological Setting  
Figure 9.2: Hydrological Features  
Figure 9.3: Scottish Soil Map  
Figure 9.4: SNH Carbon and Peatland Map 2016  
Figure 9.5: Superficial Geology  
Figure 9.6: Solid Geology  
Figure 9.7: Peat Survey Results

### **Chapter 10: Ecology**

Figure 10.1: Ecology Study Area  
Figure 10.2: Biodiversity Sites  
Figure 10.3: Phase 1 Habitats  
Figure 10.4: Terrestrial Protected Species

Figure 10.5: Aquatic Protected Species  
Figure 10.6: Bats  
Figure 10.7: Anabat Survey Results

### **Chapter 11: Ornithology**

Figure 11.1: Ornithology Survey Area, Vantage Points and Designated Sites  
Figure 11.2: Goose and Swan Flight Activity  
Figure 11.3: Greenland White Fronted Goose Flight Activity  
Figure 11.4: Black Grouse Survey Results  
Figure 11.5: Raptor Flight Activity  
Figure 11.6: Wader Breeding Territories  
Figure 11.7: Carcass Search Results

### **Chapter 12: Cultural Heritage**

Figure 12.1: Cultural Heritage Field Survey Area  
Figure 12.2: Cultural Heritage Assets within the Inner Study Area  
Figure 12.3: Cultural Heritage Assets within the Outer Study Areas and Cumulative Data  
Figure 12.4: Polquhanity to Glenlee (P-G) Zone of Theoretical Visibility and Cultural Heritage Assets within the Outer Study Area  
Figure 12.5: Carsfad to Kendoon (C-K) Zone of Theoretical Visibility and Cultural Heritage Assets within the Outer Study Area  
Figure 12.6: Earlstoun to Glenlee (E-G) Zone of Theoretical Visibility and Cultural Heritage Assets within the Outer Study Area  
Figure 12.7: BG Route Deviation (B-G) Zone of Theoretical Visibility and Cultural Heritage Assets within the Outer Study Area  
Figure 12.8: Glenlee to Tongland (G-T) Zone of Theoretical Visibility and Cultural Heritage Assets within the Outer Study Area  
Figure 12.9: Mackilston Cairn (MDG3865) – wireline visualisation  
Figure 12.10: Knocknalling NIDL – photomontage  
Figure 12.11: Earlstoun Castle (SM5391 / LB3624) – photomontage  
Figure 12.12: Dalry Mote (SM1117) – wireline visualisation  
Figure 12.13: Glenlee Park NIDL – wireline visualisation  
Figure 12.14: Slogarie NIDL – wireline visualisation  
Figure 12.15: Craig Hill Fort (SM2891) – wireline visualisation  
Figure 12.16: Edgerton Mote (SM1119) – photomontage  
Figure 12.17: Bargatton Farm Cairn (SM1002) – photomontage  
Figure 12.18: Park Stone Circle (SM1039) – wireline visualisation  
Figure 12.19: Threave Gardens GDL – wireline visualisation  
Figure 12.20: Gillfott Mote Settlement (MDG4102) – wireline visualisation  
Figure 12.21: Tongland Abbey (LB17124) – wireline visualisation

### **Chapter 13: Traffic and Transport**

Figure 13.1: Proposed Construction Access Routes

Figure 13.2: Existing Recreational Routes

### **Chapter 14: Noise**

Figure 14.1: Noise Assessment Locations

### **Chapter 15: Socioeconomics, Tourism and Recreation**

Figure 15.1: Socio-economic Study Areas

Figure 15.2: Tourism Study Area and Businesses Survey Search Area

### **Chapter 16: Other Issues**

Figure 16.1: Dust Sensitive Receptors

### **Chapter 17: Assessment of Intra-Connection and Intra-KTR Effects**

Figure 17.1: Intra-connection Effects

Figure 17.2: Inter-KTR Effects

Figure 17.3: Properties Assessed for Potential 'Intra-Connection' and 'Intra-KTR' Effects

### **Chapter 18: Summary of Likely Significant Effects**

Figure 18.1.1: Summary of Likely Significant Residual Effects During Construction Polquhanity to Glenlee via Kendoon

Figure 18.1.2: Summary of Likely Significant Residual Effects During Operation Polquhanity to Glenlee via Kendoon

Figure 18.2.1: Summary of Likely Significant Residual Effects During Construction Carsfad to Kendoon

Figure 18.3.1: Summary of Likely Significant Residual Effects During Construction Earlstoun to Glenlee

Figure 18.4.1: Summary of Likely Significant Residual Effects During Construction BG Route Deviation

Figure 18.4.2: Summary of Likely Significant Residual Effects During Operation BG Route Deviation

Figure 18.5.1: Summary of Likely Significant Residual Effects During Construction Glenlee to Tongland

Figure 18.5.2: Summary of Likely Significant Residual Effects During Operation Glenlee to Tongland

## Appendices

Appendix 1.1: Statement of Expertise

Appendix 3.1 Summary of the KTR Project Scoping Opinion

Appendix 5.1: Forest Design Concept - Approach to Mitigation and Enhancement

Appendix 5.2: Embedded and Additional Mitigation and Monitoring Measures

Appendix 5.3: Example Toolbox Talk (title TBC)

Appendix 5.4: Construction and Decommissioning Environmental Management Plan

Appendix 7.1: LVIA Assessment Methodology

Appendix 7.2: ZTV Mapping and Visualisation Methodology

Appendix 7.3: Summary of Consultation and Viewpoint Selection

Appendix 7.4: Landscape Baseline

Appendix 7.5: Visual Baseline

Appendix 9.1 Watercourse Crossings

Appendix 9.2: Catchment Areas Draining to Access Tracks and Initial Sustainable Drainage Systems (SUDS) Sizing

Appendix 9.3: Private Water Supply Assessment

Appendix 9.4: Peat Survey Report

Appendix 9.5: Outline Peat Management Plan

Appendix 9.6: Peat Landslide and Hazard Risk Assessment

Appendix 9.7: Groundwater Dependent Terrestrial Ecosystem (GWDTE) Assessment

Appendix 10.1: Desk Study and Legal Context

Appendix 10.2: Phase 1 Habitat and NVC Survey Report

Appendix 10.3: Protected Species Survey Report

Appendix 10.4: **Confidential** Badger Survey Report

Appendix 10.5: Fish Survey Report

Appendix 11.1: Ornithology Technical Report

Appendix 11.2: Ornithology Collision Risk

Appendix 11.3: **Confidential** Ornithology Report

Appendix 11.4: Ornithology Shadow Appropriate Assessment

Appendix 12.1: Cultural Heritage Viewpoints

Appendix 12.2: Cultural Heritage Assets within the Inner Study Area

Appendix 12.3: Polquhanity to Glenlee (via Kendoon): Inner Study Area - Predicted Direct Effects

Appendix 12.4: Carsfad to Kendoon: Inner Study Area – Predicted Direct Effects

Appendix 12.5: Earlstoun to Glenlee: Inner Study Area – Predicted Direct Effects

Appendix 12.6: BG Deviation: Inner Study Area – Predicted Direct Effects

Appendix 12.7: Glenlee to Tongland: Inner Study Area – Predicted Direct Effects

Appendix 12.8: Characterisation of the Setting of Heritage Assets within Outer Study Area

Appendix 12.9: Detailed Setting Assessment of Key Heritage Assets within Outer Study Area

Appendix 12.10: Polquhanity to Glenlee (via Kendoon): Assessment of Effect on the Setting of Key Heritage Assets within Outer Study Area

Appendix 12.11: Carsfad to Kendoon (132kV Wood Poles): Assessment of Effect on the Setting of Key Heritage Assets within Outer Study Area

Appendix 12.12: Earlstoun to Glenlee (132kV Wood Poles): Assessment of Effect on the Setting of Key Heritage Assets within Outer Study Area

Appendix 12.13: BG Deviation (132kV Steel Lattice Towers): Assessment of Effect on the Setting of Key Heritage Assets within Outer Study Area

Appendix 12.14: Glenlee to Tongland (132kV Steel Lattice Towers): Assessment of Effect on the Setting of Key Heritage Assets within Outer Study Area

Appendix 12.15: A713 Old Polharrow Bridge: Photographic Survey and Watching Brief.

Appendix 13.1: Framework Construction Traffic Management Plan

Appendix 13.2: Construction Access Routes & Temporary Access Locations Review

Appendix 14.1: Baseline Operational Noise Survey

Appendix 15.1: Socio-economic, Tourism and Recreation Baseline

Appendix 16.1: Kendoon to Tongland 132kV Reinforcement Project Electric and Magnetic Fields Report



# Glossary

**Additional Mitigation:** Any process, activity or activity designed to avoid, reduce or remedy adverse environmental impacts likely to be caused by a development project which is identified following assessment (distinct from Embedded Mitigation below).

**Ancillary Development:** Refers to any development which is necessary to the construction or operation of the overhead line e.g. access tracks and quarries.

**Backclothing:** is a situation which occurs where the overhead line is seen from a particular viewpoint against a solid backdrop.

**Circuit:** a combination of conductors (commonly three conductors) along which electricity is transmitted. Towers carry two circuits, wood poles carry one circuit.

**Conductors:** metallic wire strung from tower to tower or pole to pole, to carry electricity current.

**Construction and Decommissioning Environmental Management Plan (CDEMP):** A document management system with environmental procedures to monitor residual impacts of the construction and decommissioning phases of a development.

**Construction Method Statement (CMS):** a description of how the work will be carried out safely.

**Cumulative Effects:** effects on the environment which are caused by the combined result of past, current and future developments (see **Chapter 3: Approach to the EIA** for a fuller description of cumulative effects in relation to the KTR Project).

**Earth Wire:** a wire erected above the topmost conductor at the tower peak or under slung on certain types of wood pole. These are used for protection against lightning strikes but can also contain fibre optic cores for communication purposes.

**Ecological Clerk of Works (ECoW):** provides advice about ecological and environmental issues during the construction of a development.

**Electric and Magnetic Fields (EMF):** Their sources are the charged fundamental particles of matter and are associated with use of electrical power and various forms of natural and man-made lighting (i.e. high voltage power transmission equipment is a source of EMF)

**Embedded Mitigation:** environmental mitigation measures that are incorporated into the project design and are intended to prevent, reduce or remedy any significant adverse effects.

**Environmental Impact Assessment (EIA):** a formal process used to identify, predict and assess the likely environmental effects of a proposed development.

**EIA Report:** A report that includes such information that is reasonably required to assess the environmental effects of a development.

**Design Freeze:** A method used during design development stage to mitigate the risks associated with change. This organises and compiles the design process, control changes and force the completion of design stages on time.

**Holford Rules:** accepted guidance for routeing overhead lines in the UK.

**Infrastructure Location Allowance (ILA):** Ensures that final positions of the project infrastructure and associated works are not varied to a such a degree as to cause an increase in the significance of likely environmental effects.

**Insulators:** articulated strings made either of glass or polymeric compound. These are required to prevent electric current crossing to a tower or pole body.

**Kilovolt (kV):** 1,000 volts.

**Magnitude of Effect:** The degree and extent to which the project changes the environment.

**Non-Technical Summary (NTS):** A summary of the EIA Report in 'non-technical language'.

**Overhead Line (OHL):** an electric line installed above ground usually supported by lattice steel towers or wooden poles.

**Principal Contractor:** a contractor appointed by the client to control the construction phase of any project involving more than one contractor.

**Residual Effects:** Those effects of a development following implementation of any relevant mitigation proposals.

**Route Alignment:** the alignment of the route which forms the basis of the application for Section 37 consent. This is arrived at through detailed environmental impact assessment (EIA), discussions with landowners and technical ground surveys.

**Route Options:** a number of routes connecting two substations or node points (in some cases, there may only be one route option).

**Scoping:** An initial stage of the EIA in determining the nature and potential scale of environmental impacts arising from a proposed development and assessing what further studies are required to establish their significance.

**Scoping Opinion:** A written statement of the opinion of the relevant planning authority as to the information to be provided in the EIA Report which specifically requires a local planning authority to respond or consult with consultees within a statutory period.

**Span:** the section of overhead line between two towers or two wood poles.

**SPEN:** ScottishPower Energy Networks, responsible for the development, operation and maintenance of electricity transmission in Central and Southern Scotland on behalf of the transmission license holder for this area, ScottishPower Transmission (SPT).

**Statutory Consultees:** Groups or bodies that by law, must be consulted as part of the planning application process for EIA development (i.e. the planning authority, Scottish Natural Heritage, the Scottish Environment Protection Agency and Historic Environment Scotland).

**Study Area:** the area within which route options can be identified between the required points of connection (substations or node points on the existing network).

**Substation:** this controls the flow and voltage of power by means of transformers and switchgear, with facilities for control, fault protection and communications.

**Sustainable Drainage Systems (SuDS):** are a collection of water management practices that aim to align modern drainage systems with natural water processes.

**The National Grid:** The electricity transmission network system operator of Great Britain.

**Underground Cable:** an electric line installed below ground within a cable trench.

**Volts:** the international system unit of electric potential and electromotive force.

**Wayleave:** is a legally binding agreement between a land or property owner and a licence holder the power to install their electricity lines and associated equipment on, over or under private land to keep the electricity line there and to have access to that land for the purposes of inspecting, maintain, repairing or removing the line or equipment.

**Windthrow:** the uprooting and overthrowing of trees by wind.