Scottish & Southern Electricity Networks

TRANSMISSION

The Pathway to 2030

Building the energy system of the future will require a significant acceleration of work over the next few years. In partnership with the UK and Scottish governments, we're committed to meeting our obligation of connecting new, renewable energy to where it's needed by 2030.

Achieving Net Zero

By 2030, both the UK and Scottish governments are targeting a big expansion in offshore wind generation of 50GW and 11GW respectively. The Scottish Government has also set ambitious targets for an additional 12GW of onshore wind by 2030.

Across Great Britain, including the north of Scotland, there needs to be a significant increase in the capacity of the onshore electricity transmission infrastructure to deliver these 2030 targets and a pathway to net zero.

Securing our energy future

And it's not just about net zero. It's also about building a homegrown energy system, so that geopolitical turmoil around the world doesn't severely impact the UK and push up energy prices.

The UK Government's British Energy Security Strategy further underlines the need for this infrastructure, setting out plans to accelerate homegrown power for greater energy independence. The strategy aims to reduce the UK's dependence on and price exposure to global gas wholesale markets through the deployment of homegrown low carbon electricity generation supported by robust electricity network infrastructure.

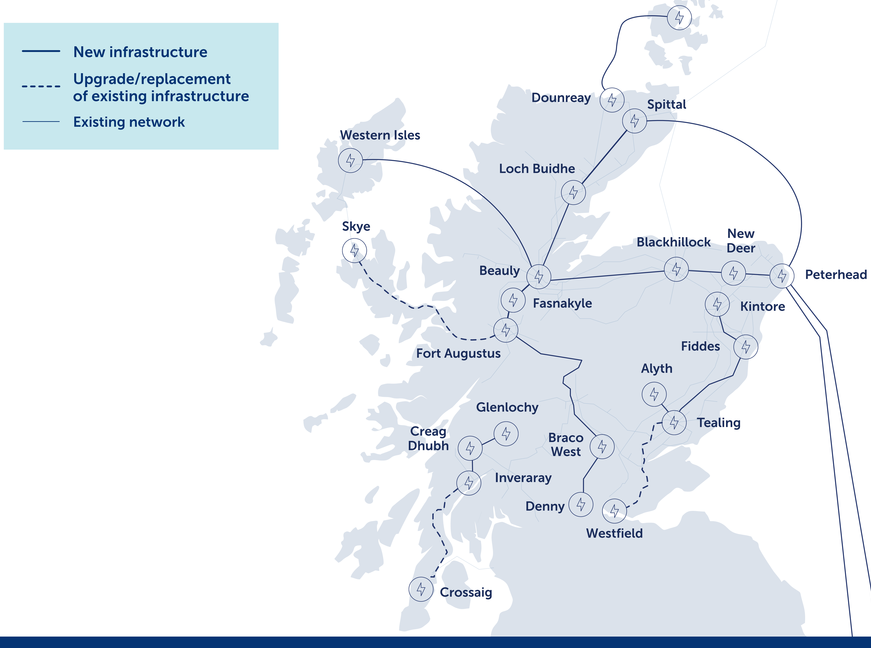
Meeting our 2030 targets

In July 2022, National Grid, the Electricity System Operator (ESO), published the Pathway to 2030 Holistic Network Design (HND). This set out the blueprint for the onshore and offshore transmission infrastructure that's required to support the forecasted growth in the UK's renewable electricity. It's an ambitious plan that will help the UK achieve net zero.

Our 2030 targets are the first step on the transition to net zero. The UK Government has a target to decarbonise our electricity system by 2035 and fully decarbonise our economy by becoming net zero by 2050, with the Scottish Government committing to net zero five years earlier, by 2045.

Future network investment requirements

To achieve these targets, further investment in new low carbon electricity generation and the enabling electricity transmission network infrastructure will be required. The next stage of strategic network planning across Great Britain is underway and we expect the independent Electricity System Operator, National Grid ESO, to publish details of this in March this year. It is expected this will include a combination of new onshore and offshore network requirements.



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About the project

The Beauly–Blackhillock–New Deer–Peterhead 400kV project

The extensive studies completed to inform the ESO's Pathway to 2030 Holistic Network Design confirmed the requirement to reinforce the onshore corridor from Beauly to Blackhillock to New Deer and on to Peterhead. Providing a 400kV connection between these sites enables the significant power transfer capability needed to take power from large scale onshore and offshore renewable generation connecting on the west—from the Western Isles (via a 1.8GW subsea (HVDC link) and from connections north of Beauly via the Beauly to Loch Buidhe to Spittal 400kV overhead line)—to the east at Peterhead and then offshore via two subsea HVDC links to transport power to demand centres in England. A separate HVDC link from Spittal to Peterhead has also been confirmed as required to deliver 2030 targets.
The connection points into Blackhillock and New Deer are needed to pick up power from additional large scale onshore and offshore low carbon renewable generation required to connect into the north-east of Scotland for onward transportation to demand centres.

The Spittal to Peterhead 2GW HVDC subsea link was an offshore solution proposed by SSEN Transmission for significant west to east power transfer, and the Holistic Network Design identified the need for both this offshore solution as well as the Beauly–Blackhillock–New Deer–Peterhead 400kV onshore reinforcement project.

To fully utilise offshore subsea links requires the onshore network to also be strengthened and onshore overhead line reinforcement is the most economically efficient solution for bulk power transfer compared to HVAC and HVDC cable solutions as well as subsea HVDC links.

The Beauly–Blackhillock–New Deer –Peterhead project has therefore been highlighted as critical to enable the delivery of the UK and Scottish Governments targets, with a requirement for accelerated development and delivery to meet these targets in line with a required in service date of 2030.

Project elements

There are key connection points across this span that can be used to help describe the project elements as follows:

Beauly–Blackhillock: Construct a new 400kV connection, between Beauly and Blackhillock substations. At Beauly and Blackhillock,additional infrastructure will be required to facilitate this connection.

Blackhillock–New Deer: Construct a new 400kV connection from Blackhillock substation to New Deer.

New Deer–Peterhead: This project features two new underground cables connecting at Errochty. It will also require the dismantle and removal of the existing Tummel substation. The existing Errochty intertrip scheme shall also be amended.

Additional infrastructure requirements - substations

Based on the requirements outlined in the ESO's Pathway to 2030 Holistic Network Design, we have developed proposals to reinforce the onshore corridor between Beauly and Peterhead, via Blackhillock and New Deer. To facilitate this connection, and others as part of the wider strategy, new additional 400kV substations and associated infrastructure is required at these four locations.

The 400kV substation projects form part of the ScotWind enabling Transmission Owner Reinforcement Instructions (TORIs), enabling renewable energy generation in the North-East to connect to the Transmission network. Due to the criticality of these works, there is a requirement for accelerated development and delivery to meet the 2030 connection dates. It has been agreed that the most efficient way to progress each of the interfacing Beauly–Blackhillock–New Deer–Peterhead projects, was to hold separate consultation events for both the substations and overhead line (OHL) projects.

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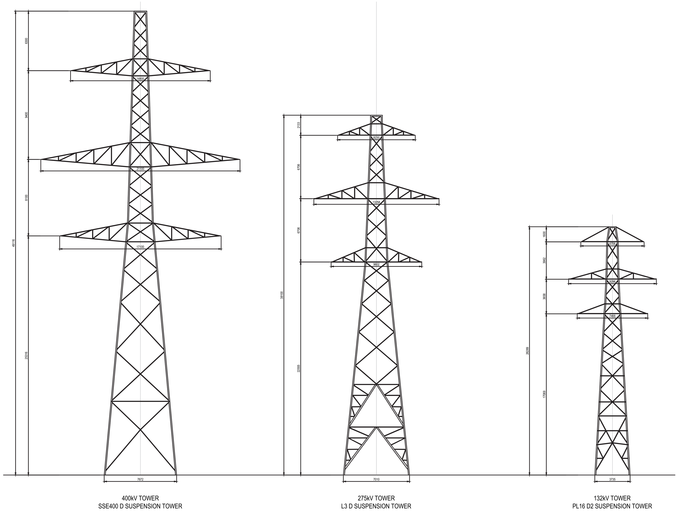
Our preferred technology

400kV double circuit overhead line

Our preferred technology for the new 400kV link between Beauly, Blackhillock, New Deer and Peterhead is a new double circuit 400kV HVAC (High Voltage Alternating Current) over head line. The proposed overhead line would consist of steel lattice towers with an assumed average height of approximately 57m which would support six conductor bundles on six cross arms and an earth wire between the peaks for lightning protection. The height of the towers and distance between them will vary dependent on several factors such as altitude, climatic conditions and topography.

To put into context the significant capacity a 400kV overhead line provides us when compared to lower voltage lines such as 275kV and 132kV a comparison has been done to show the equivalent number of overhead lines that would be required to provide the same capacity.

400kV tower overhead line	275kV tower overhead lines	275kV tower overhead lines	132kV wood pole overhead lines
1	3	9	32



Key benefits

1. Easier to cross challenging terrain like glens, hills, rivers, lochs, railways, roads and other utilities.

2. Quicker, easier and cheaper to identify and repair faults compared to underground cable.

3. Can travel long distances with no requirement of additional equipment/ expansion of substations to aid in network stability.

4. Significantly lower cost option when compared to underground cables.

5. Substantial capacity in terms of ability to transfer power.

6. Possible to upgrade in the future to extend life of asset and increase capacity where as cables require significant works to replace and increase capacity.

The figure above compares a standard height 400kV tower with the types of towers currently used on the existing 275kV and 132kV over head lines between Beauly and Blackhillock. It should be noted that these are what is termed standard height towers with no extensions to allow for a fair comparison however the heights for all the towers along these routes will vary compared to the values shown above to ensure that our statutory clearances are met.

It should also be noted that where new 132kV and 275kV towers are installed, these older tower types are no longer used and have been replaced by larger towers due to technical challenges with these historical designs.

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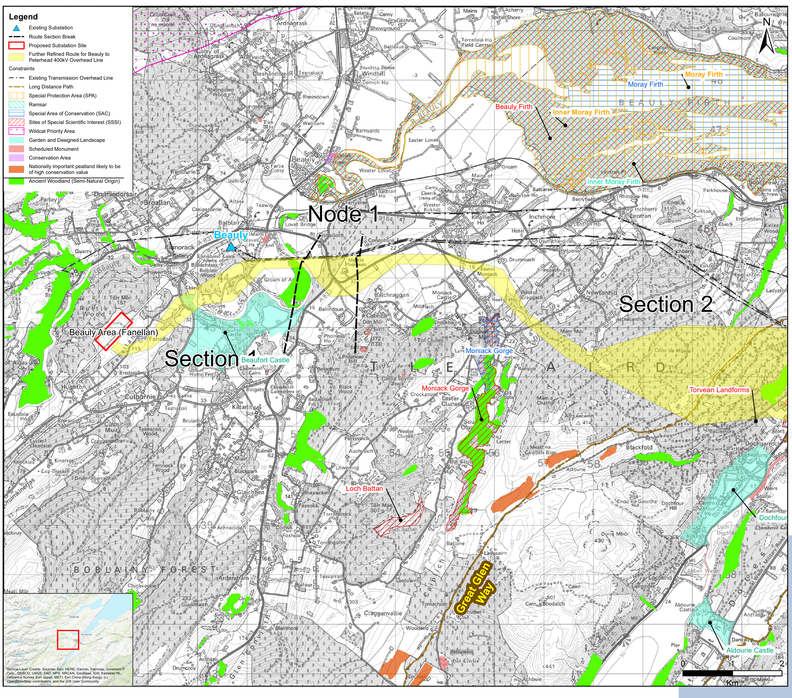
Sections 1 and 2

This map illustrates some of the key constraints within Sections 1 and 2 of our refined route.

Some of the key environmental constraints within or close to the refined route in this section include Beaufort Castle Garden and Designed Landscape and irreplaceable ancient woodland of semi-natural origin at Croiche Wood and Dunain Hill, as well as significant areas of forestry across the Aird. There are also a number of residential properties within or in close proximity to the refined route.

As part of the ongoing alignment appraisal process, potential alignment options will be systematically considered against each of these key constraints, as well as other constraints within the project area, to identify an alignment for the overhead line which achieves the best balance between environmental, technical and economic considerations. The outcome of these assessments will be presented later in the year for further consultation.



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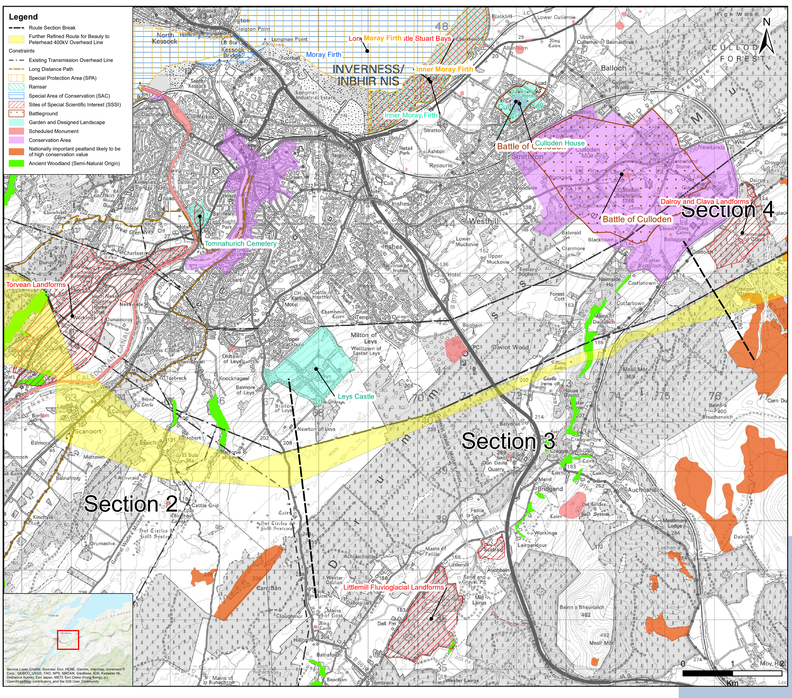
Sections 2 and 3

This map illustrates some of the key constraints within Sections 2 and 3 of our refined route.

Some of the key environmental constraints within or close to the refined route in this section include Torvean Landforms Site of Special Scientific Interest (SSSI), the crossing of the Caledonian Canal Scheduled Monument, Leys Castle Garden and Designed Landscape, and Culloden Battleground and Conservation Area. There are also areas of irreplaceable ancient woodland of semi-natural origin and a number of residential properties within or in close proximity to the refined route.

As part of the ongoing alignment appraisal process, potential alignment options will be systematically considered against each of these key constraints, as well as other constraints within the project area, to identify an alignment for the overhead line which achieves the best balance between environmental, technical and economic considerations. The outcome of these assessments will be presented later in the year for further consultation.



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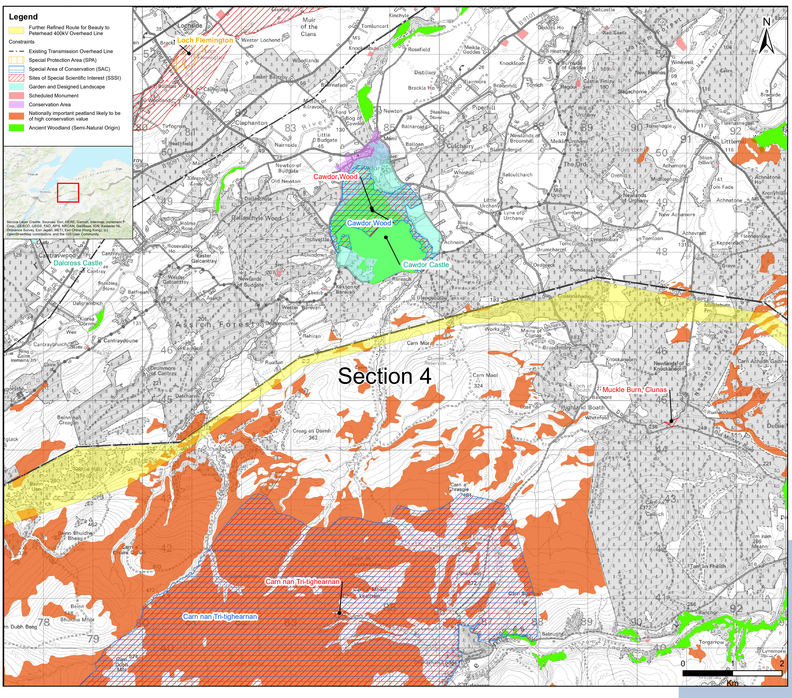
Section 4

This map illustrates some of the key constraints within Section 4 of our refined route.

The main environmental constraints within the refined route in this section include areas of irreplaceable peatland habitat and commercial forestry. There are also a number of residential properties within or in close proximity to the refined route.

As part of the ongoing alignment appraisal process, potential alignment options will be systematically considered against each of these key constraints, as well as other constraints within the project area, to identify an alignment for the overhead line which achieves the best balance between environmental, technical and economic considerations. The outcome of these assessments will be presented later in the year for further consultation.



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