Orkney-Caithness 220kV HVAC Subsea Link

August 2023





TRANSMISSION



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Who we are

We are SSEN Transmission, the trading name for Scottish Hydro Electric Transmission. We are responsible for the electricity transmission network in the north of Scotland, maintaining and investing in the high voltage 132kV, 220kV, 275kV and 400kV electricity transmission network.



Our network consists of underground and subsea cables, overhead lines on wooden poles or steel towers, and electricity substations. It extends over a quarter of the UK's land mass, crossing some of its most challenging terrain.

Our first priority is to provide a safe and reliable supply of electricity to our communities. We do this by taking the electricity from generators and transporting it at high voltages over long distances through our transmission network for onwards distribution to homes and businesses in villages, towns and cities.

Our operating area is home to vast renewable energy resources and this is being harnessed by wind, hydro and marine generation. Working closely with National Grid, the GB transmission System Operator, we also enable these electricity generators to connect to the transmission system by providing their connections and allowing the electricity they generate to be transported to areas of demand across the country.

Scotland's transmission network has a strategic role to play in supporting delivery of the UK and Scotland's Net Zero targets. We're already a mass exporter of renewable energy, with around two thirds of power generated in our network area exported to demand centres further south. By 2050, the north of Scotland is expected to need 40GW of low carbon energy capacity to support net zero delivery. For context, we currently have around 8GW of renewable generation connected in the north of Scotland.

As a natural monopoly, we are closely regulated by the GB energy regulator, Ofgem, who determines how much revenue we are allowed to earn for constructing, maintaining and renovating our transmission network in the north of Scotland. These costs are shared between all those using the transmission system, including generation developers and electricity consumers. Following a minority stake sale which completed in November 2022, we are now owned 75% by SSE plc and 25% by Ontario Teachers' Pension Plan Board.

As a stakeholder-led business, SSEN Transmission is committed to inclusive stakeholder engagement, and we conduct this at an 'Advanced' level as assessed by AccountAbility, the international consulting and standards firm.





The Pathway to 2030 **Holistic Network Design**

In July 2022, National Grid, the Electricity System Operator (ESO), published the Pathway to 2030 Holistic Network Design, setting out the blueprint for the onshore and offshore electricity transmission network infrastructure required to enable the forecast growth in renewable electricity across Great Britain, including UK and Scottish Governments' 2030 offshore wind targets of 50GW and 11GW respectively.

MAIN NORTH OF SCOTLAND ELECTRICITY **TRANSMISSION NETWORK IN 2030**

Inflight Investments

- Argyll 275kV strategy
 Fort Augustus to Skye 132kV upgrade
 Orkney 220kV AC subsea link

Pathway to 2030 Investments

- Beaulv to Loch Buidhe to Spittal 400kV
- 3. Beauly to Denny 400kV prating (with SPT)

- Peterhead to Drax 2GW HVDC subsea link Eastern Green Link 2 (with NGET)
- Peterhead to South Humber 2GW HVDC link Eastern Green Link 4 (with NGET)
- 8. Western Isles 1.8GW HVDC link

Public Consultation to Inform Project Development

All new reinforcements remain subject to detailed consultation and environmental assessments to help inform route and technology options

More detail on these projects, Including how to sign up for updates, will be made available on SSEN Transmission's website www.ssen-transmission.co.uk

New Infrastructure (Routes shown here are for illustrative purposes)

Upgrade/Replacement of Existing Infrastructure

Existing Network



Project need

SSEN Transmission welcomed the publication by Ofgem in which the energy regulator has given its final approval of need for long awaited and much needed plans to provide a subsea electricity transmission link to Orkney.

The Orkney Islands are home to some of the world's greatest resources of renewable electricity, from established onshore wind, to emerging marine technologies, where Orkney is at the forefront of global developments in marine energy generation. The Orkney transmission link will enable the connection of up to 220MW of new renewable electricity and consists of a new substation at Finstown in Orkney, and around 53km of subsea cable, connecting to a new substation at Dounreay in Caithness. All planning consents are in place for the point-to-point connection, with work underway to plan the on-island infrastructure required to connect and transport Orkney renewable generators to Finstown substation before onward transmission to demand centres in the north of Scotland and beyond.





Project overview



Overview

The project scope is to design and install a High Voltage AC transmission system between Finstown in Orkney and Dounreay in Caithness, capable of transmitting no less than 220MW of power. This transmission system is to be composed of the following components:

- Finstown (Orkney) Substation – A new build substation, designed as the connection point to the grid for local generators around Orkney. The substation will transform the voltage to 220kV for transmission of this power to the UK mainland. This Substation will also provide a grid connection point for local power distribution.
- An onshore underground High Voltage AC Cable, approximately 14km in length, connecting the Finstown Substation to the Subsea Cable Landfall point, terminating at Warebeth on the West Coast of the Orkney Mainland.
- A Subsea High Voltage AC Cable, approximately 53km in length, connecting the landfall at Warebeth, to Dounreay on the Caithness coast of the UK mainland, then a short underground cable section to the Dounreay Substation.
- Dounreay West Substation

 A new build substation to facilitate connection to the national grid.
 This will step up the voltage to 275kV for the connection into the existing infrastructure at the current Dounreay Substation, where there will also be some modification work.

In 2019 Public Consultations took place in both Orkney and Reay on the Mainland where community members had the opportunity to hear about the project and give feedback to the project team.



Infrastructure

Why are subsea cables important?

Subsea electricity transmission cables are important critical infrastructure that carry power from areas where power is generated to areas of higher demand where the power is consumed.

The proposed subsea HVAC cable for the Orkney Transmission project will be approximately 53km in length, linking the landing sites on Warebeth on Orkney and Dounreay on the Caithness coast. The subsea HVAC cable shall be a single three core cable.

This cable will be installed within the currently licenced marine cable corridor. This corridor is 200m wide to allow for further route refinement as detailed engineering progresses.

Where feasible, the offshore cables will be buried in the seabed to protect them. In areas where burial is not feasible, the cable will be protected using rock berms placed on top of the cables or an external cable protection system.





Onshore cable and landfall

Cable landfalls, or landing points, are the locations where our subsea cables come ashore.

Where possible, subsea cables are buried under the seabed to protect the cable from damage. When bringing the cable ashore for Orkney, horizontal directional drilling (HDD) will be used to drill and install ducts underground through the shoreline. The cable is then pulled through the ducts and terminated onshore.

From this termination the onshore cable will be installed from this landfall to the new Finstown Substation.

This onshore cabling will all be installed underground.

What is a HVAC substation?

An Alternating Current (AC) substation is a modern component in the UK's energy network energy network.

It is used to switch generators, equipment, and circuits or lines in and out of a system. It also is used to change AC voltages from one level to another.

Substation requirements

A substation requires a large area of level ground. All equipment would be contained within large, metal cladded, climate-controlled buildings, with other smaller auxiliary buildings adjacent. All of the finished building designs are subject to approval with the local planning authority.

The buildings would typically consist of steel cladding with a pitched roof. The colour of the buildings are subject to approval with the local planning authority. Landscaping around the substation will be sculpted to flow with the natural landscaping of the surrounding hills to minimise visual impact on the area.



Project timeline







Working with landowners and occupiers

SSEN Transmission recognises landowners and occupiers as key stakeholders in the development of our projects and is committed to consultation and engagement with all parties likely to have an interest in our proposals.

We have been working to identify landowners and occupiers who are affected by our preferred route. The majority of landowners and occupiers have received communication from SSEN Transmission Land Team informing them of the project and the next steps.

As the project design develops, we will work with landowners and occupiers to mitigate the impact of our infrastructure on their properties. Our team of dedicated land managers will be on hand to answer queries and address concerns throughout.

SSEN Transmission will be required to carry out various engineering and environmental surveys to inform the design process. Consent will be sought from affected landowners and occupiers in advance for these surveys. Once we have finalised the design of the underground cable infrastructure and associated works, we will be required to secure the appropriate land rights from the relevant parties for all infrastructure.

Our land managers will endeavour to reach a voluntary agreement with each party, however, in the event that agreement cannot be achieved, we would look to utilise our statutory powers under the Electricity Act 1989.

Our statutory powers are used as a last resort and we aim to work with landowners and occupiers in order to secure the necessary land rights voluntarily.





Biodiversity net gain

We recognise that we have significant interaction with the environment through the activities we undertake in Scotland as we seek to develop and improve the transmission network. With this work comes a legal responsibility to design and build our projects in a manner which protects the natural and built environment.

We are committed to protecting and enhancing the environment by minimising the potential impacts from our construction and operational activities on biodiversity.

To this end, we have committed to no net loss of biodiversity in non irreplaceable habitats for all of our projects gaining consent from 2020 onwards, and net gain of biodiversity on all projects gaining consent from 2025.

This means that during the development, construction and operation of our projects, we will leave the environment no worse than when we found it, and where possible make it even better, leaving a positive environmental legacy at all of our SSEN Transmission sites. As this project progresses through the development process, we will actively seek ways to avoid and minimise impacts on biodiversity, through careful routing design to avoid areas of highest biodiversity value.

Where avoidance is not possible, our impacts are mitigated for through the implementation of habitat creation and restoration efforts.

These can be achieved within the boundary of the development site, or by providing support to local groups involved with habitat restoration or creation projects, within the locale of the development site.

Please let us know if you have ideas for biodiversity improvement projects in your local area that SSEN Transmission could get involved with. Contact details for the Community Liaison Manager can be found at the back of this booklet. Below are an example of projects we have previously been a part of.

Thurso South Substation

Creation of approximately ten hectares of pollinator habitat to support the rare endemic great yellow bumble bee and contribute to wider conversation efforts for this species.

A collaboration with the Bumblebee Conservation Trust facilitated research on forage availability for bumblebees, identifying the need for a diverse seed mix containing key flowering species to enhance early, main and late forage to support the full lifecycle of bumblebees.





Argyll Coast and Countryside Trust (ACT) Woodland Planting Collaboration:

Argyll's rainforest is a unique and rare habitat of ancient and native woodland. This collaboration with ACT will help deliver SSEN Transmission's compensatory tree planting commitments in Argyll while helping towards ACT's woodland planting ambitions, supporting its charitable objectives including biodiversity gain, healt and wellbeing improvement for local people, outdoor learning opportunities and climate change workshops.



Your Community Liaison Manager

Throughout the duration of our projects we aim to engage with communities and all interested parties. If you have any questions or wish to discuss any part of the project further please contact your Community Liaison Manager on the details below.

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Community Liaison Manager



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Additional information

Information will also be made available via the project web page and social media channels:

Project website:

ssen-transmission.co.uk/projects/project-map/orkney

Find us on Facebook: SSEN Community

Follow us on Twitter: @ssetransmission

Notes



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