



Peterhead Net Zero 2030 Developments

Public Consultation Event

17th April 2023



Scottish & Southern
Electricity Networks

TRANSMISSION

Who we are

We are Scottish and Southern Electricity Networks Transmission (SSEN Transmission), operating under licence as Scottish Hydro Electric Transmission Plc (SHE Transmission) for the transmission of electricity in the north of Scotland.



In total we maintain about 5,000km of overhead lines and underground cables – easily enough to stretch across the Atlantic from John O’Groats all the way to Boston in the USA.

Our network crosses some of the UK’s most challenging terrain including circuits that are buried under the seabed, are located over 750m above sea level and up to 250km long.

The landscape and environment that contribute to the challenges we face also give the area a rich resource for renewable energy generation. There is a high demand to connect from new wind, hydro and marine generators which rely on Scottish and Southern Electricity Networks to provide a physical link between the new sources of power and electricity users.

Scottish and Southern Electricity Networks is delivering a major programme of investment to ensure that the network is ready to meet the needs of our customers in the future.

Our responsibilities

We have a licence for the transmission of electricity in the north of Scotland and we are closely regulated by the energy regulator Ofgem.

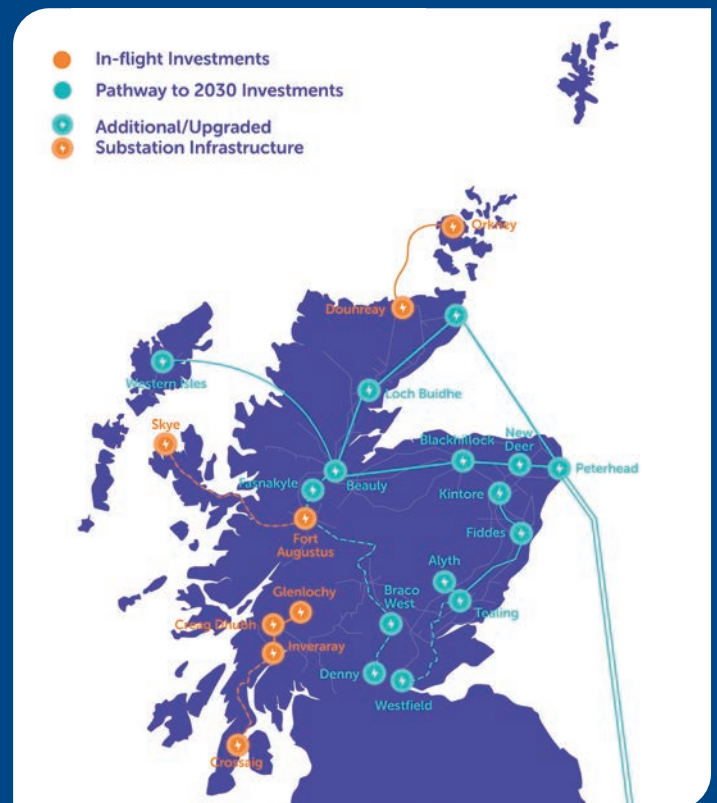
Our licence stipulates that we must develop and maintain an efficient, co-ordinated and economical system of electricity transmission.

What is the difference between transmission and distribution?

Electricity Transmission is the transportation of electricity from generating plants to where it is required at centres of demand. The Electricity Transmission network, or grid, transports electricity at very high voltages through overhead lines, underground cables and subsea cables. Our transmission network connects large scale generation, primarily renewables, to central and southern Scotland and the rest of Great Britain. It also helps secure supply by providing reliable connection to the wider network of generation plans.

The Electricity Distribution network is connected into the Transmission network but the voltage is lowered by transformers at electricity substations, and the power is then distributed to homes and businesses through overhead lines or underground cables.

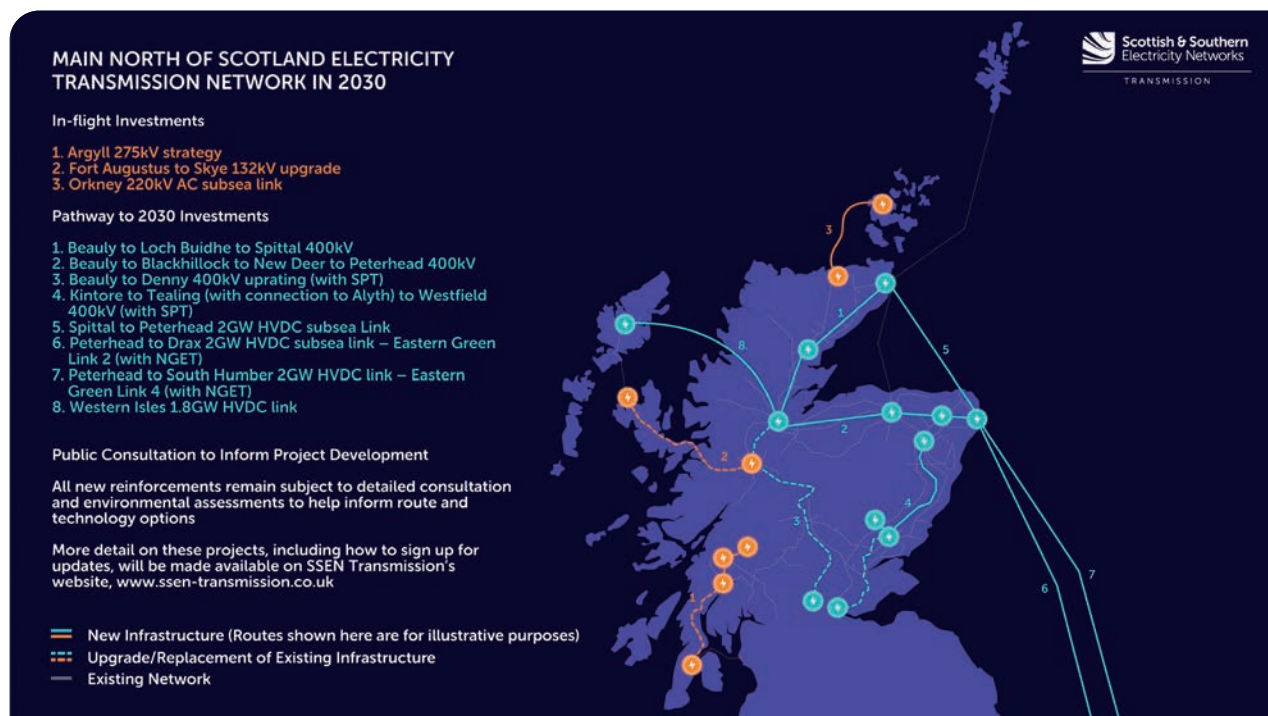
Overview of transmission projects



The Pathway to 2030 Holistic Network Design

Achieving Net Zero

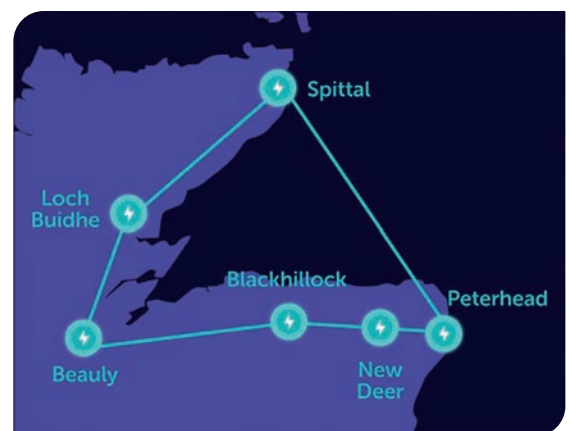
In July 2022, National Grid Electricity System Operator (NGESO), who are responsible for making sure that the electricity flows across the UK's system, balancing supply and demand at all times, set out how the transmission network needs to develop to accommodate the growth in renewable electricity across Great Britain. This also included the UK and Scottish Government's 2030 offshore wind targets of 50GW and 11GW. For the north of Scotland, this needs over £7 billion of investment in the transmission network to deliver the 2030 targets and help the country on its pathway to net zero and greater energy independence.



What does this mean for the North and North East of Scotland specifically?

Extensive studies informing the ESO's Pathway to 2030 Holistic Network Design confirmed the need to reinforce the onshore corridors between Beaully and Peterhead, Beaully and Spittal and an offshore subsea cable between Spittal and Peterhead.

Providing a 400kV overhead line and 525kV subsea cable connection between these sites provides the significant capacity required to take power from large scale onshore and offshore renewable generation (mainly wind farms) to the north east mainland of Scotland. From there, it will be transported to demand centres in England via subsea High-Voltage Direct Current (HVDC) links. To enable these new connections, new 400kV substations are also required at key locations as shown on the map above. At Spittal, Beaully and Peterhead, high voltage Alternating Current/ Direct Current (AC/DC) converter stations are also required to convert AC electricity to DC (and vice versa), from offshore subsea connections from the Western Isles, between Spittal and Peterhead and England. These 'hub' areas will also allow offshore and onshore renewable generation to connect to the reinforced electricity network. As such, these projects have been highlighted as critical to enable the delivery of the UK and Scottish Governments 2030 net zero targets, with a requirement for accelerated development and delivery.



Project need and overview

Project need

Extensive system studies completed to inform the ESO's 'Pathway to 2030 Holistic Network Design' confirmed the requirement to develop a second 400kV HVAC (High Voltage Alternating Current) substation and a second 132kV HVAC substation at Peterhead. Furthermore, to facilitate the power transmission from new generators in the north of Scotland to the demand centres in England, a HVDC (High Voltage Direct Current) link is required between Peterhead and South Humber.

This doubles the export capacity of the existing scheme already in development between Peterhead and Yorkshire. This further link is also interconnected with the HVDC link between Spittal and Peterhead, resulting in a DC network to allow for the high capacity of onshore and offshore connections required to deliver 2030 targets. The aim of the collective development of these projects is to collocate within a single site to help minimise the impact to the local community.

Project overview

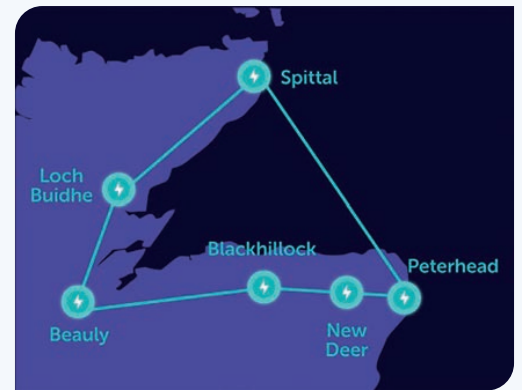
Peterhead 2 400kV substation: A second 400kV substation is required in the Peterhead area to support offshore and onshore electricity generation connections as well as onshore and offshore transmission infrastructure in the area. The substation, similar to the first 400kV substation, due to be commissioned in 2023, will be based on an enclosed Gas Insulated Switchgear (GIS) solution. An overhead line (OHL) connection will be required between the proposed second 400kV substation and the existing 400kV substation that is currently under construction. The OHL between the two 400kV substations will be consulted on later in 2023.

Peterhead 2 132kV substation: A second 132kV substation is required in the Peterhead area to support further future generation and storage connections from third party developers. The substation, similar to the existing 132kV substation will be based on an enclosed Gas Insulated Switchgear (GIS).

Spittal to Peterhead HVDC link: A 2GW bi-pole, 525kV HVDC link between Spittal, Caithness and Peterhead. This enables the efficient high volume power transmission from generators in the far north of Scotland to the network at Peterhead for further transmission to demand centres as appropriate. This project element consists of two HVDC converter stations, one at each end of the link with approximately, 220km of subsea and underground DC cable route along with the associated AC cable to the connecting substations. Consultation for the land and marine cables and the converter at Spittal will be held independently.

Peterhead to South Humber HVDC link: A 2GW bi-pole, 525kV HVDC link between Peterhead and South Humber, England. This enables the efficient high volume power transmission from generators in the north east of Scotland to demand centres in the south of the UK. This project element consists of two HVDC converter stations, one at each end of the link with approximately, 640km of subsea and underground DC cable route along with the associated AC cable to the connecting substations. Consultation for the land and marine cables, along with the converter in England will be held independently.

HVDC switching station: Due to the high number of DC links, and the potential need to support future DC customer connections, system studies have informed the need for a DC switching station at Peterhead. This project's ultimate aim is to deliver a interoperable 525kV Direct Current switching station (DCSS) which is required to facilitate the co-ordinated connection of offshore links and wind farms. This would reduce the required footprint for future DC connections and deliver a material net benefit to the community, environment, and consumers. The project also provides the opportunity to unlock the potential for full HVDC network interoperability.



What we are consulting on

At SSEN Transmission, we are committed to delivering a robust and transparent consultation process underpinned by inclusion and accessibility. As a stakeholder led business, we understand the importance of involving communities and key stakeholders throughout each stage of our development process.

During this consultation, we are presenting our approach to developing the projects listed above. Our consultation includes technology options, environmental considerations, site selection, the routing process and maps which aim to give stakeholders and community members a better visual representation of the work on the projects to date.

This period of engagement in the development phase is vital in shaping our proposals and to do this effectively, we need to capture feedback from stakeholders, harness local knowledge to identify key risks and explore potential community benefit opportunities.

We have undertaken early engagement with the local community at a public event in January 2023, presenting a high-level overview of this project.

If you require additional support to submit your views, please contact our Community Liaison Manager Dav Lynch who will happily assist you.

What we're consulting on today

This consultation is part of the stage 2 site selection in accordance with SSEN Transmission's site selection process. Desktop surveys, site walkovers and early analysis have enabled us to identify our preferred technology and probable sites within our study area. We held our initial consultation during our stage 1 site selection phase to introduce the project to the community and incorporate the community's feedback into our stage 2 site selection scoring. We are now consulting on our preferred site for the new 132kV substation, 400kV substation, HVDC converter stations and DC switching station, which are to be located close to the existing 400kV Peterhead substation.

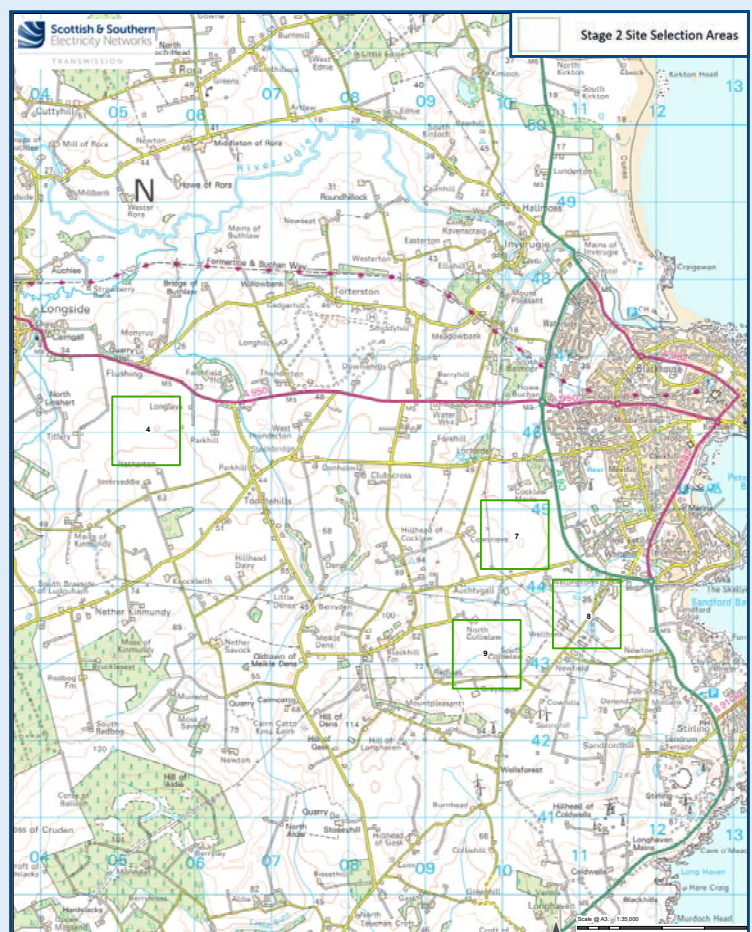
We are also sharing information at our April 2023 consultation event regarding our Beauly- Blackhillock-New Deer-Peterhead 400kV OHL project which will tie into the new Peterhead 400kV Substation. However, this scheme has its own consultation process – further information is provided within a separate consultation pack.

Similarly we are presenting information in relation to proposed underground cable routes for the HVDC projects, these cable route consultations will be held separately, later in the year.

Who we're consulting with

We are keen to hear your feedback regarding our preferred site and preferred overhead line route and if there are further considerations you believe need to be taken into account during the next stage of the development process.

We are keen to hear feedback from a broad range of stakeholders including but not limited to local residents, landowners, businesses, non-statutory consultees and statutory consultees such as local authorities, NatureScot, SEPA, Historic Environment Scotland.



Working with landowners

We recognise landowners and occupiers as key stakeholders in the development of our projects and are committed to consultation and engagement with all parties likely to have an interest in our proposals.

Due to the size and scale of the projects, we have not been able to identify and contact all landowners/occupiers at this stage that may be affected, but we will endeavour to contact all who are directly impacted as soon as we can.

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

We 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 transmission infrastructure and associated works, we will be required to secure the appropriate land rights from landowners and occupiers in order that appropriate consents can be sought from Scottish Ministers. Our land managers will endeavour to reach a voluntary agreement with landowners and occupiers, however, as a statutory undertaker, we may require to underpin voluntary discussions with an application to Scottish Ministers for a Necessary Wayleave or Compulsory Purchase Order.

Ultimately this is to ensure nationally significant infrastructure projects are delivered on time and in line with our licence obligations. We also have a duty to protect the interests of the UK bill payer. Statutory powers are not used lightly as we aim to work with landowners and occupiers to secure the necessary land rights voluntarily.

All potentially affected landowners and occupiers have the opportunity to provide feedback at our in person consultation events and by submitting a feedback form.

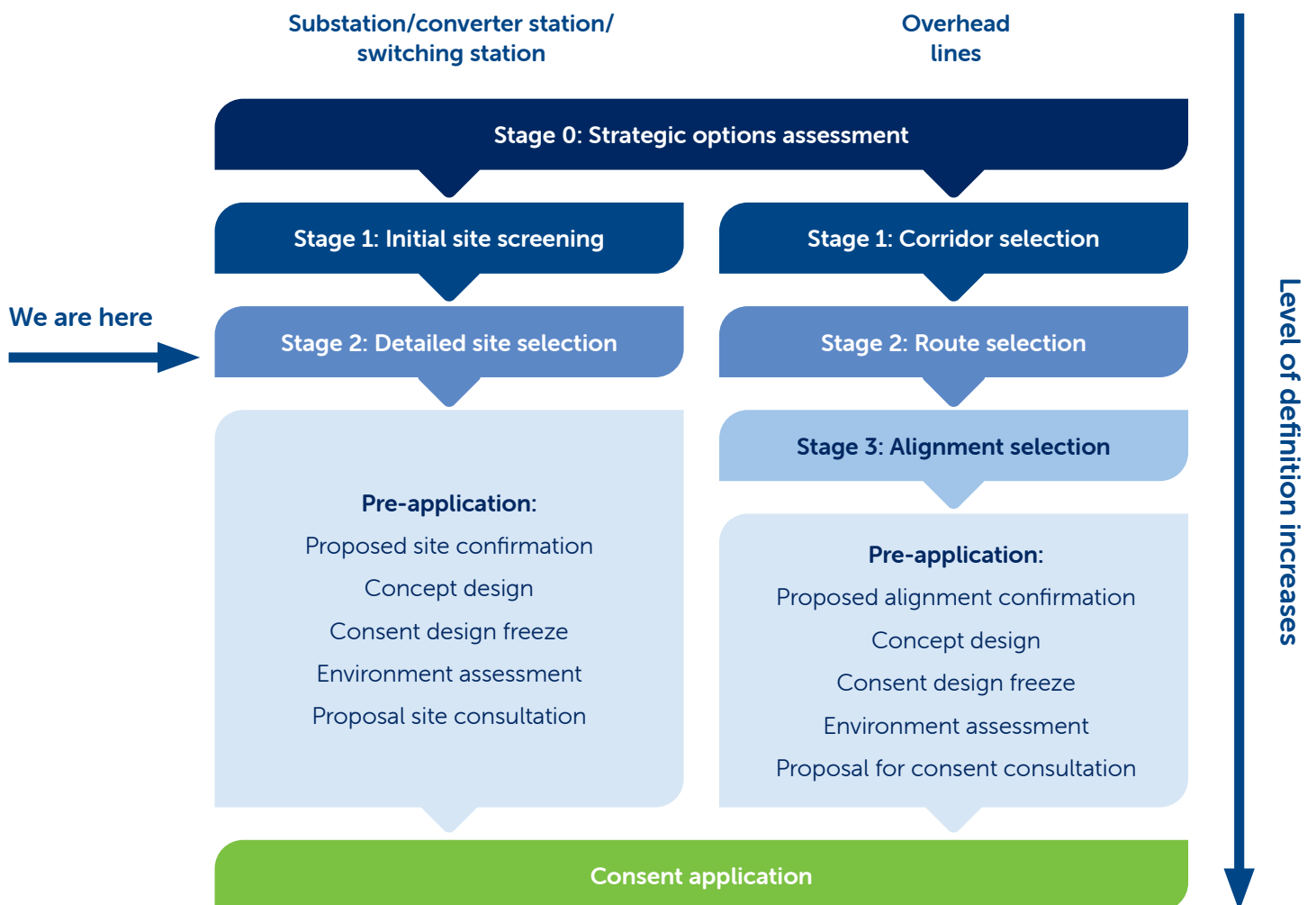
We would encourage all those with an interest to submit their views through this consultation.

Contact details for the dedicated project land managers can be found on the relevant webpages: www.ssen-transmission.co.uk/projects/project-map/peterhead-net-zero-2030-developments



Our optioneering process

We follow formal internal guidance to enable us to consistently and rigorously select sites for new substations, switching stations and converter stations. Each process has a number of key stages, each increasing in detail and definition and bringing technical, environmental and cost considerations together in a way which seeks the best balance in accordance with our Transmission Network Operator's Licence and the Electricity Act 1989.



Stage 2 – Detailed site selection – current project stage

This stage seeks to identify a preferred site from shortlisted options, that minimise (where practicable) physical, environmental and amenity constraints, are likely to be acceptable to stakeholders and are viable (taking into account engineering and environmental requirements).

The connections into new and existing assets forms a crucial part of this assessment to reduce the need for additional new infrastructure.

Both the process and our preferred options are then presented to the public and statutory stakeholders for consultation. Comments on our process are critical in ensuring the preferred options are the best to be taken forward to planning. Comments are taken on board and modifications may be made to ensure comments have been accommodated where practicable. These will be presented during further pre-application consultation events to the public and statutory stakeholders.

The planning process

The outcome of the optioneering processes will be developments for which consents under the respective planning regime will be sought.

Overhead lines

These require an application for consent under section 37 of the Electricity Act 1989 to be submitted to the Scottish Ministers via the Energy Consents Unit (ECU).

Substations, converter stations and DCSS

These require an application for planning permission to be submitted to the relevant Local Planning Authority (Aberdeenshire Council) under the Town and Country Planning (Scotland) Act 1997.

The substation, converter stations and DCSS applications will identify the proposed development, including:

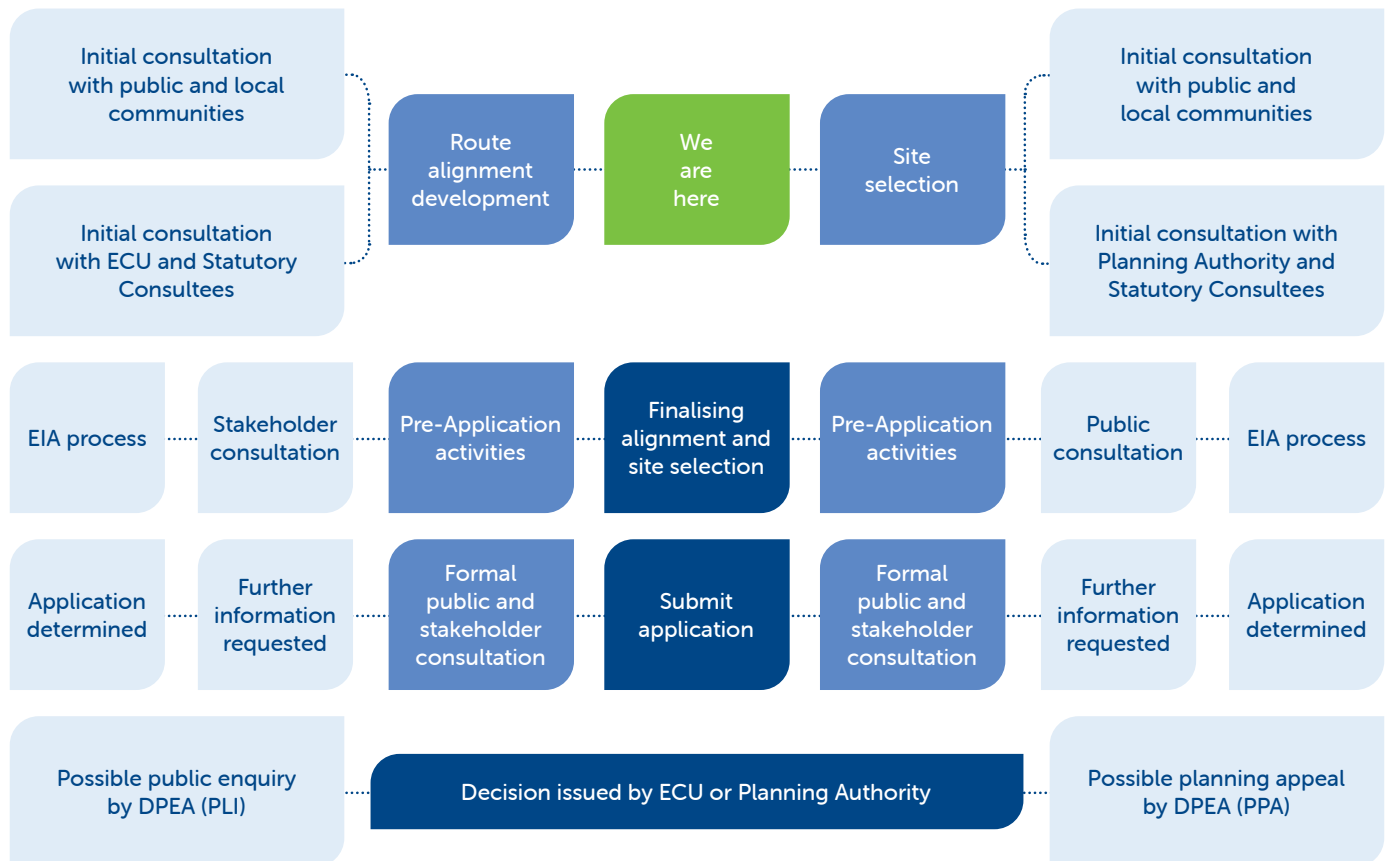
- Site boundary clearly shown in red (the Red Line Boundary) including any permanent and temporary access routes and junctions onto public highways.
- The proposed development in relation to the site boundary with dimensions of all permanent and temporary works including structures, buildings, perimeter fencing, drainage features, key electrical equipment, construction compounds and laydown areas.

These large scale projects may be subject to Environmental Impact Assessment (EIA) requirements under both Planning regimes. This requires any application to be supported by a formal EIA Report together with robust consultation and mitigation proposals.

Should the proposed development be deemed non-EIA (due to its scale or potential environmental impacts), a voluntary Environmental Appraisal will be produced by SSEN Transmission to support the application.

Section 37 application for OHLs (>132kV) —submitted to Energy Consents Unit (ECU)

Planning application for substations and converter stations—submitted to Planning Authority



Overview of the site selection process

SSEN Transmission has developed and implemented a formal process for the selection of sites for new developments. The main aim of the process is to provide a consistent approach to the selection of new development sites, underpinned by our statutory obligations to:

'Develop and maintain an efficient, coordinated and economical electricity transmission system in its licensed area' and in so doing, to 'have regards to the desirability of preserving the natural beauty, of conserving flora, fauna and geological and physiological features of special interest and protecting sites, buildings and objects of architectural, historic or archaeological interest; and do what we reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects' (Electricity Act 1989, Section 9 (2) a and b).'

Our site selection process ensures the design, consenting, construction and operation of the development is done in a manner that is technically feasible and financially viable whilst, on balance, causes the least disturbance during construction and operation to the environment and the people who live, work and use it for recreation.

Key stages

For most new development projects, the site selection process follows three principal stages, each iterative and increasing in detail and resolution, bringing cost, technical and environmental considerations together in a way which seeks the best balance at both stages. This staged process leads to the identification of a proposed site, which will be taken forward for planning.

The key site selection stages are:

Stage 0 – Strategic options assessment

We follow formal internal guidance to enable us to consistently and rigorously select sites for new substations, switching stations and converter stations. Each process has several key stages, each increasing in detail and definition and bringing technical, environmental and cost considerations together in a way which seeks the best balance in accordance with our Transmission Network Operator's Licence and the Electricity Act 1989.

The following requirements were identified as essential for the new site:

- Proximity to the existing 400kV network to minimise the amount of new overhead lines or cabling required to connect to the network.
- Large enough to accommodate the proposed individual or joint substation/converter station footprints, together with associated landscaping, contractor compounds, access and new connection routes.
- Additional space for future expansion.
- In areas which do not contain environmental designations and minimise impacts on local environmental receptors.
- Enable connection routes for the proposed new 400kV overhead lines and HVDC cables.

Stage 1 – Initial site screening

13 feasible site options were identified within a 10km search radius of the existing Peterhead 275kV substation using publicly available data and multi criteria analysis (MCA) to provide high level constraints information.

Assessment of the 13 options were undertaken against the key requirements and using the Red, Amber, Green (RAG) matrix from our site Selection Guidance. This resulted in 9 of the 13 options being discounted from further assessment based on environmental and technical considerations. Options 4, 7,8 and 9 were taken forward to Stage 2.

Stage 2 – Detailed site selection

Further appraisal and comparison of the shortlisted options have been undertaken based on the RAG matrix criteria within our site Selection Guidance. Further details of the Stage 2 process can be found on the next page.

Stage 2 – Detailed site selection

The objective of this stage is to further assess the identified sites and select a preferred site which we can take forward to the Consenting process. The 4 shortlisted site options (4, 7, 8 and 9) were taken forward into the Stage 2 site selection process. These were the sites the project team presented at the consultation event in January 2023.

Following the stage 1 consultation, site 9 was discounted due to engineering issues with connectivity to existing HVAC OHL and constraints surrounding existing underground utilities.

Sites 4, 7 and 8 were reviewed based on the Red, Amber and Green (RAG) matrix criteria within our site Selection Guidance.

The project team also explored merging sites 7 and 8 together due to space and layout constraints, considering that as an alternative option.

Below details some of the technical (Engineering) and environmental considerations considered for each of the sites.

The RAG table on the following page shows only those criteria which scored differently across the site options.

The following criteria scored the same across all site options: construction access, operation and maintenance, existing circuits/networks, interface with SSEN Distribution and generation, Distribution Network Operators (DNO) connections, unique hazards, topography, elevation, carbon footprint, Sulfur hexafluoride gas (SF₆), natural heritage designations, protected species, habitats, cultural heritage designations, and landscape designations.

Environmental

Natural heritage: sites 4 and 7 present lower risks of impacts on ornithology and geology/hydrology than site 8 and site 7 and 8 combined. The latter two sites have a higher risk of compromising the quality and quantity of groundwater in relation to Groundwater Dependant Terrestrial Ecosystems.

Cultural heritage: No direct impacts are predicted from any of the options on any cultural heritage assets. There is however, the potential for indirect impacts from site 7 and site 7 and 8 (combined) on the Category C Listed Cocklaw Mains (LB16391), which is located within 50m of the sites. For this reason, site 4 and site 8 are considered lower risk options.

Landscape: With the exception of site 4, all sites received a green RAG rating for landscape character. Site 4 has been allocated an amber RAG rating on the basis of the degree of change that it would potentially bring to a very open rural area. However, there appears to be sufficient land available to undertake substantial mitigation and with careful design this RAG rating could be reduced.

Visual: site 8 would have the lowest potential impact from a visual amenity character perspective, this is because it has few close sensitive receptors. Site 4 is located in a very extensive agricultural landscape with few residential properties in the vicinity and would be the second preference from a visual perspective.

Land use: site 7 is considered the lowest risk. The other options are considered higher risk due to the impacts on agricultural land.

Planning: site 8 and the combined site 7 and 8 are considered higher risk than site 4 and site 7, as the former sites contain multiple allocations within the site area.

Engineering

Future development possibilities: site 4 is partly constrained but gives the best future development possibilities, this is reflected by a green RAG rating. All other options are constrained and have a red RAG rating.

Footprint requirement: site 4 is the only option that can support the construction of the Peterhead Hub and has sufficient area onsite to accommodate compounds and construction laydown, welfare, etc. Consequently, site 4 is the preferred option with respect to footprint requirements.

Hazards: Although there is a high-pressure gas mains present on site 4, it does not interfere with the proposed site layout or construction, so the site has a green RAG rating. The other options are rated amber, as they would require the undergrounding of existing transmission infrastructure.

Ground conditions: Site 4 is expected to be less constrained with respect to the extraction of bedrock.

Environmental conditions: The environmental conditions at site 4 are considered the lowest risk, as it is further from the coast (lower risk from salt pollution), outside the 1:1000-year flood zone, on land with no sign of previous contamination (this also applies to site 7) and is considered lower risk from a noise perspective.

Stage 2 – RAG assessment

Flushing/Longside (site 4):

This site has no designations or recreational use identified on it. It has favourable topography with good accessibility from A950. Though it is within 500m to 1000m of existing residential properties and approximately 40% is an Agricultural Land Classification (ALC) of 3.1, the agricultural use of the land does however give great opportunity for screening and visual mitigation as well as improving the biodiversity net gain within the area.

Cowsrieve (site 7):

This site has no designations on it and is within close proximity for both AC and DC connectivity. It has good access to the A90. However, as the site is on a gently rising land, it will have high impact on the potential visual receptors in the area as it is less than 300m to a large housing development on the western edge of Peterhead and from the bypass. The site will also be highly visible on the horizon and critically, there is insufficient space to incorporate landscape mitigations.

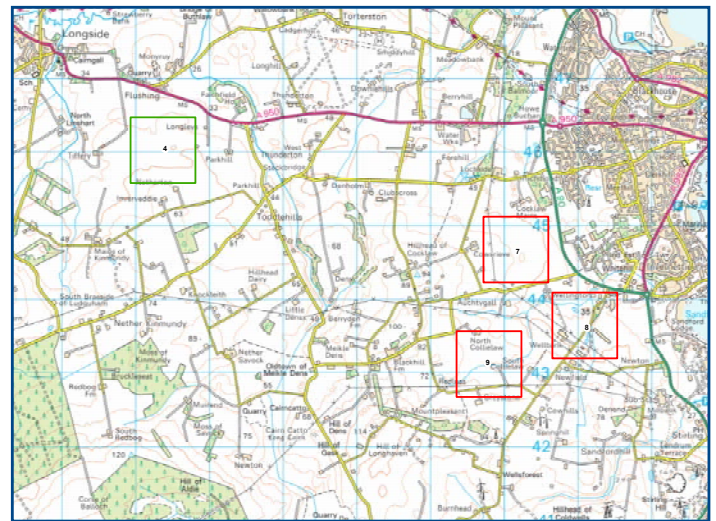
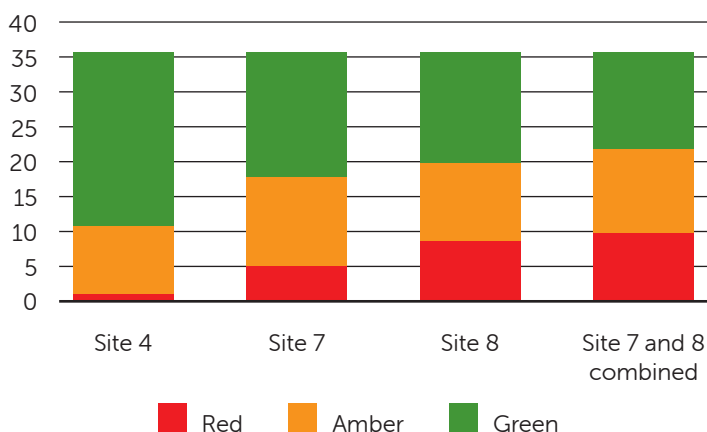
Wellbank – Buchan Way (site 8):

This site has no designations on it. It occupies a relatively low lying and partially developed area on the south of Peterhead with good access to A90 and existing AC and DC connections. However, approximately 80% of the site is located within an ALC of 3.1 and the remainder within 3.2. The site also has constraints on Planning and policy implications relating to protected land: playing fields and commercial allocation, with potential for contaminated land within the site. Inquiry with Scottish Water and SEPA informed a potential high impact on hydrological receptors including nearby watercourses and the underlying Good status groundwater body. There is insufficient space onsite to accommodate all elements of the proposed development

Sites 7 and 8 combined:

This site has no designations on it. Though this option is favourable for construction access and operation and maintenance access as mentioned under site 7 and 8, it is unable to support the hub approach as it has insufficient space for plant and/or construction of it. There is also potential contamination issues as stated under Wellbank – Buchan Way (site 8).

Stage 2 RAG overview



Category	Site 4	Site 7	Site 8	Site 7 and 8 (combined)
Engineering				
Access and connectivity:				
Future development possibilities	G	R	R	R
Footprint requirements:				
Technology	G	A	A	A
Adjacent land use	G	G	A	A
Space availability	G	R	R	R
Hazards:				
Existing hazards	G	A	A	A
Ground conditions:				
Geology	G	A	A	A
Environmental conditions:				
Salt pollution	A	R	R	R
Flooding	G	A	A	A
Contaminated land	G	G	R	R
Noise	A	R	R	R

Environmental/consent				
Natural heritage:				
Ornithology	G	G	A	A
Hydrology/geology	A	A	R	R
Cultural heritage:				
Cultural heritage assets	G	A	G	A
Landscape and visual:				
Landscape character	A	G	G	G
Visual	A	R	G	R
Land use:				
Agriculture	R	A	R	R
Recreation	G	A	A	A
Planning:				
Policy	A	A	R	R
Proposals	G	G	A	A

Stage 2 – Preferred site

Under environmental considerations:

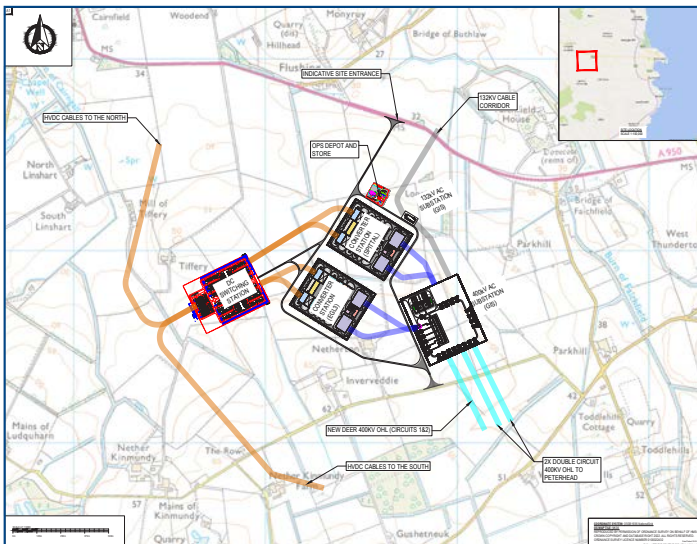
- Site 4 emerged the preferred environmental choice after the Stage 2 RAG Assessment.
- Site 7 as second choice. However, there are large visual concerns with site 7 due to insufficient space to incorporate landscape mitigation and biodiversity net gain (BNG) enhancements.
- Site 8 emerged the 3rd choice due to presence of a watercourse on it. It also has greater potential to impact on ornithology and for conflict with local development policy/proposals.
- Combining sites 7 and 8 together is the least preferred option as this combines the anticipated impacts of each site individually, even though it provides a greater footprint for landscape mitigation and BNG.

Site 4 is the preferred environmental choice on the basis of fewer environmental constraints being identified but equally importantly the space available for landscape mitigation and BNG enhancement.

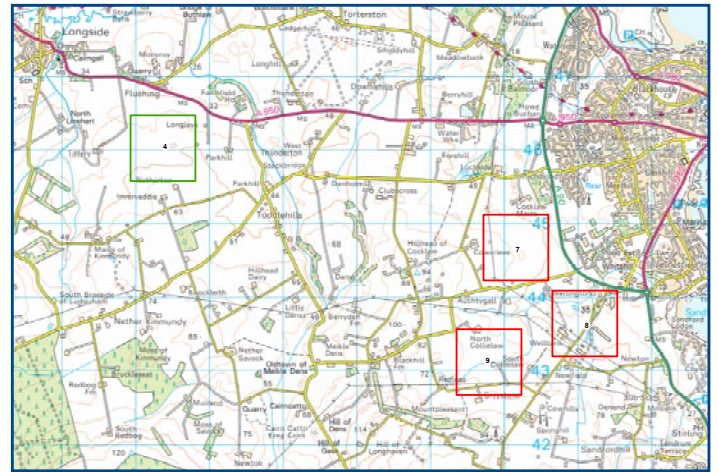
Under engineering assessment:

The preferred option is site 4 from connection, future expansion and connectivity aspects. Option 7 and 8 were also closely balanced from access aspect, but future expansion would be challenging. Therefore, taking these factors into consideration, the overall preferred site is Option 4.

Taking environmental and technical factors into consideration our overall preferred site is site 4.



*Above layout for indicative purposes only and not to scale.



The preferred site location is shown on the green box on the map on the top right of this page, with an indicative potential layout shown below.

Feedback from our site selection consultation event held in January 2023 is considered as part of the site selection process.

This included comments and queries relating primarily (but not limited to) visual impacts, noise from the site and traffic along the A950. These will be considered as part of the environmental impact assessment (EIA) process for the hub.

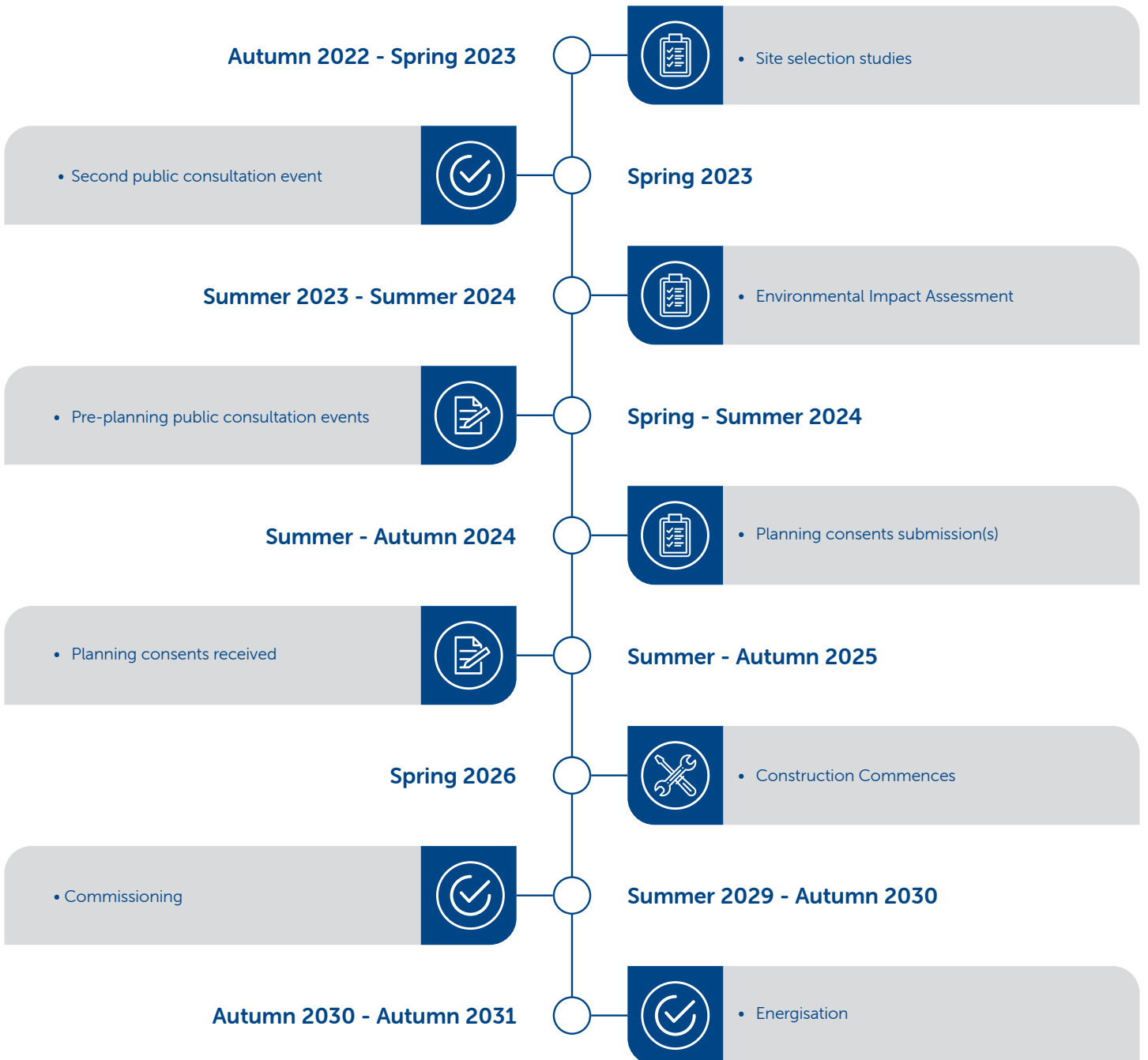
The layout and space requirements at site 4 are being developed to accommodate visual mitigation requirements such as landscaping.

Next steps

Further engineering and environmental studies will now be undertaken on site 4 and the design will be developed further.

We aim to ensure the preferred site and design reflects the views of local stakeholders and are therefore keen to receive feedback regarding the preferred site.

Project timeline



HVAC Substation

Based on the requirements outlined in the NGENO's Pathway to 2030 Holistic Network Design, new 400kV and 132kV HVAC substations are required in the Peterhead area to support further future generation and storage connections.



What is an HVAC substation?

An essential component in the UK's energy network, substations connect sources of generation, such as wind farms and power stations. They connect overhead and underground cable lines and can also connect nearby utility systems. The purpose of a substation is managing the electricity flowing within the network, this can include connection and disconnection of certain circuits to direct the flow of energy, step-up or step-down voltage transformation from 132kV up to 275kV or 400kV down to 275kV for example, manage the frequency of the electricity and increase efficiency and reliability of the power supply.

Gas Insulated Switchgear substation (GIS)

A GIS substation is an installation constructed with switchgear which relies on gaseous reliant components which allows the operation and safety clearances to be reduced when compared to AIS (Air Insulated Switchgear Substation). Unlike AIS substations, GIS substations have reduced footprint, usually less than half the area.

Substation functions

Substations are required to maintain an efficient and healthy energy network, as such the substation will monitor and report back to operators on statistics and events to provide live information on our network. This allows for the following functions:

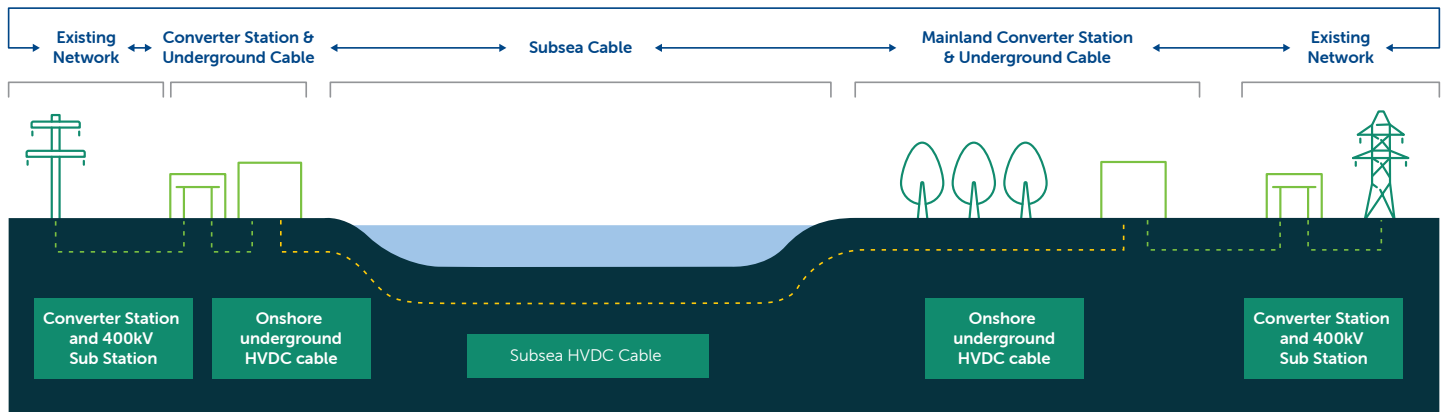
- Fault monitoring and identification which allows for isolation to protect the network and allow repairs
- Allow for redirection and disconnection of energy for demand/maintenance
- Provide data such as voltage, current and power flow to allow for efficient running and future predictions

Substations allow the UK to expand to the country's growing energy demands. With increased demand, we require more resilience and security in our energy network due to situations such as extreme weather conditions, which can threaten the operation of the network. With new hardware and software advancements we need to ensure that our network is better prepared when situations arise.

HVDC Converter Station

What is a converter station?

This is a site which converts Direct Current (DC) to Alternating Current (AC) or AC to DC. AC is how our houses and businesses use electricity from the grid. HVDC is a well-established technology that allows the efficient transmission of large quantities of electricity across long distances, with much reduced electrical losses compared with AC. It also introduces greater flexibility and resilience in the operation of the network and the management of variable outputs from renewable generation. A converter station needs to connect to a substation or switching station to access the AC network.



Converter station requirements

A Converter station requires a large area of generally level ground. Approximately 290m x 325m. Most of the equipment would be contained within a large metal clad, climate controlled building, with other smaller auxiliary buildings adjacent.

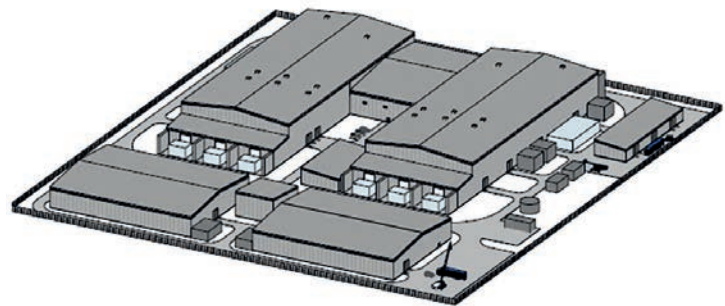
The buildings would typically consist of suitably coloured steel cladding with a pitched roof.

The proposed rating of the subsea links requires the main building to be taller than the other buildings being proposed.

This is due to the clearance distance required between the high voltage equipment and the buildings' structure.

All of the finished building designs are subject to approval with The Aberdeenshire Council.

Converter stations need to be located as close to the AC transmission network as is practicable to minimise additional infrastructure and improve network operation.



Indicative conceptual design for 2GW 525kV Bipole converter station



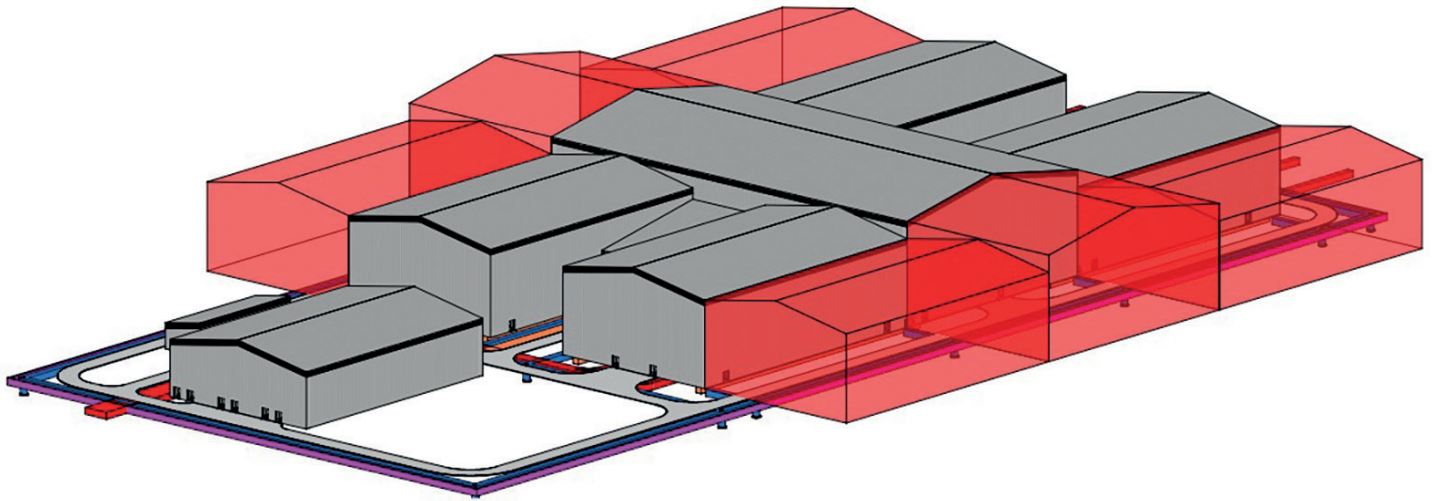
The 320kV DC 1200MW Blackhilllock HVDC converter station

DC Switching Station

What is a DC Switching station?

A modern component in the UK's energy network, switching stations facilitate the option to connect and disconnect DC transmission lines or other components such as generation to and from the system through a series of switches providing redundancy in the network. The switching station will provide redundancy in the network by allowing connections to the northern and southern elements of the UK network while providing uninterrupted connections for maintenance and similar works.

Concept of a 4 bay DC Switching station with provisional expansion to 8 bay.



Switching Station requirements

A switching station requires a large area of level ground similar to that required for a HVDC converter station.

All equipment would be contained within a large metal clad, climate-controlled building, with other smaller auxiliary buildings adjacent.

The buildings would typically consist of suitably coloured steel cladding with a pitched roof.

All of the finished building designs are subject to approval with The Aberdeenshire Council.

Switching stations are located along the DC transmission network between converters to provide the facilities described above.

Eastern Green Link Underground Cable Routing

Land cables

Landfall

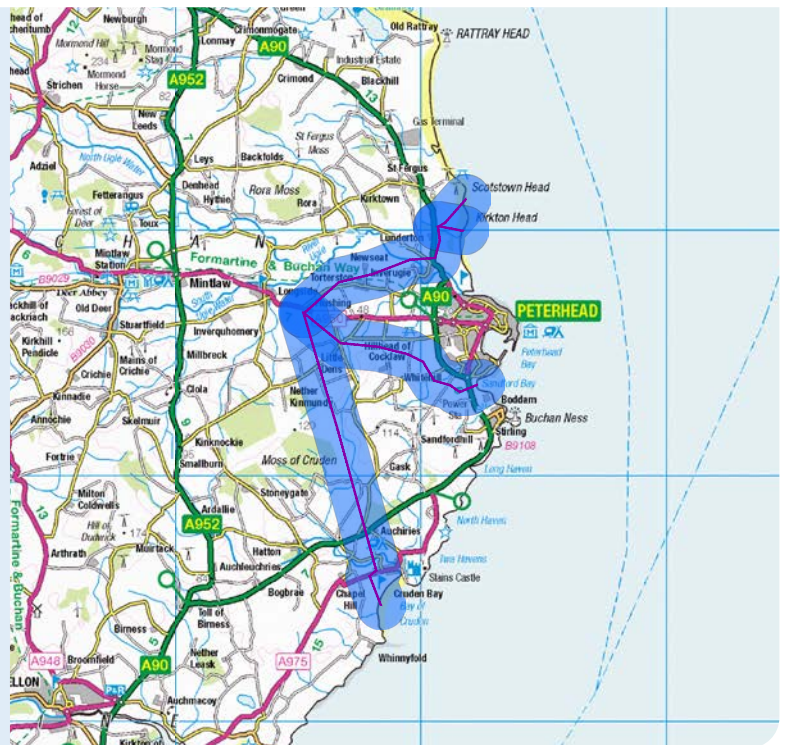
The project is in the process of considering multiple landfalls along the Aberdeenshire coastline, taking consideration of both the marine and terrestrial environments and engineering challenges.

There are currently three remaining options which will be presented for public consultation at future consultation events.

The remaining areas for these landfalls are shown on the accompanying map along with indicative cable route corridors.

The 1km corridors will be refined further following selection of the preferred landfall and HVDC Converter and HVDC Switching Station sites.

Discussions with affected parties will be held once the preferred corridor has been identified.



Corridor options:

identification and appraisal

Selection of Preferred Corridor

Selection of Proposed Corridor

Route options:

Identification and Appraisal

Selection of Preferred Route

Stage 1 and 2

Cable routing process

Like the site selection the cable routing undergoes stages of development as a preferred route is identified through assessment.

For the majority of new projects, the approach follows four principal stages, each iterative and increasing in detail and resolution, bringing cost, technical, land and environmental considerations together in a way which seeks the best balance at each stage. This staged process, will lead to the eventual identification of an indicative proposed alignment.

The principal routing stages are:

- **Stage 0:** Routing Strategy Development;
- **Stage 1:** Corridor Selection;
- **Stage 2:** Route Selection; and
- **Stage 3:** Alignment Selection.

For certain projects, such as those of a smaller scale, Stage 1 may not be necessary due to earlier strategic decisions made in the 'Pre-routing activities'. As a result it may be possible to begin routing consideration at Stage 2. Stage 0 will always be required in order to set out the routing strategy for each project.

Throughout the guidance clear lines of responsibility and levels of required input from each of the SSEN Transmission departments (Environment, Engineering, Development, Land, Communities, System Planning, and Legal) have been identified.

Spittal to Peterhead underground cable routing

Land Cables

Landfall South

The project is in the process of considering multiple landfalls along the Morayshire and Aberdeenshire coastlines, taking consideration of both the marine and terrestrial environments and engineering challenges.

There are currently three remaining options which will be presented for public consultation at future consultation events. The remaining areas for these landfalls are shown on the accompanying map along with indicative cable route corridors. The corridors will be refined further following selection of the preferred landfall, HVDC Converter and HVDC Switching Station sites.

Discussions with affected parties will be held once the preferred corridor has been identified.



Marine cables

Like the onshore cables, a large portion of the marine cable route will be determined by the conclusion of the landfall assessment. The Moray Firth is an increasingly busy place and contains a large amount of infrastructure assets. It also has many geotechnical and environmental constraints including marine archaeology and MPAs (Marine Protected Areas).

Each of these must be carefully considered when considering the route corridor and the final route.

At this stage, the project has identified various offshore cable corridors for survey. These are being refined using all available information. We are aware that our project can impact on other users of the sea.

Separate consultations for marine cable routing corridors are being planned at present to share this information in depth.

Details of these consultations will be made available as soon as possible.



Other projects in the Peterhead area

Projects in development

Beauly - Blackhillock - New Deer - Peterhead

This project has been identified as key to connecting the growth in onshore and offshore renewables across the north of Scotland.

A 400kV overhead line connection, alongside new substations is needed to connect new renewable power sources and transport it from source to areas of demand across the country.

Please refer to the separate consultation information pack for further information.

Eastern HVDC link (Eastern Green Link 2)

To support the ongoing growth of renewable generation in the area, SSEN Transmission propose to install a 2GW subsea High Voltage Direct Current (HVDC) link from Peterhead to Drax in Yorkshire.

This will assist with reducing congestion on the onshore transmission network, by allowing the flow of energy via this subsea cable. This project is being jointly developed with National Grid Electricity Transmission and is currently progressing through the procurement and development stages.

Peterhead 275kV Substation refurbishment

Due to asset condition, there is a requirement to replace Super Grid Transformers SGT1 and SGT2 at Peterhead 275/132kV substation.

Two new buildings will be created to house the new SGTs within a new compound to the southwest of the existing substation.

Projects in construction

Peterhead 400kV substation

Construction on our Peterhead 400kV substation commenced at the start of 2021 following our Principal Contractor completing their site set up in November 2020. The substation is required to facilitate the incoming North Connect HVDC Interconnector from Norway, but subsequently this will take in a connection from works included as part of the North East 400kV Reinforcements and provide a connecting point for the proposed Eastern Green Link 2. In 2022 we have erected two new 400kV overhead line steel lattice towers which will connect New Deer and the new 400kV Peterhead substation, the installation of two Super Grid Transformers (SGTs) will act as a bridge between the new and existing 275kV substation, with two 275kV underground cable circuits.



400kV substation at Peterhead



Super grid transformer

Connection projects

As the transmission license holder in the north of Scotland, we have a duty under Section 9 of the Electricity Act 1989 to facilitate competition in the generation and supply of electricity. We have obligations to offer non-discriminatory terms for connection to the transmission system, both for new generation and for new sources of electricity demand.

As part of achieving Net Zero Targets and subject to planning consent, we have the obligation to connect the following contracted developments to the transmission network:

Alcemi battery storage facilities

This project is construction and wider reinforcement works for connection of two 500MW battery storage facilities in Peterhead. Overall, the project is still in the development stage with design optioneering as well as associated environmental and engineering design works ongoing. For more information on Alcemi developments please visit their website: www.alcemi.info/index.html

Salamander offshore wind farm

This project will enable the connection of Salamander wind farm to the transmission network. Overall, the project is in the early development stages with design optioneering as well as associated environmental and engineering design works ongoing. For more information on Salamander offshore developments please visit their website: www.salamanderfloatingwind.com

Central North Sea electrification

This project will enable the connection of the Central North Sea Electrification (CNSE) project, to support the decarbonisation of offshore oil and gas platforms with a demand of 300MW, into the transmission network at Peterhead. The project is in the early development stages with design optioneering as well as associated environmental and engineering design having just commenced.

Kinmuck solar and battery energy storage

The project is for construction and wider reinforcement works required to facilitate connection of a combined 105MW solar and battery storage and battery connection into the Peterhead area. Overall, the project is still in opportunity assessment stage where we are looking at design options, overhead line alignment options, environmental impacts and the overall best configuration to connect the solar panels and battery onto the network.



Frequently asked questions

Some of the most frequently asked questions are outlined below.

Will there be any noise impacts from the substation?

Noise surveys will be carried out and a detailed noise impact assessment will be completed and included in an Environmental Appraisal. This will consider noise impacts from the substation, cumulative noise impacts as well as consideration of any mitigation required.

Are there any increased risks from flooding or drainage?

SEPA's National Flood Risk Assessment Flood Map does not identify the Preferred site as being within an area likely to experience river flooding. There is however an area of surface water flood risk identified within the north of the site, adjacent to the A950.

Surface water flood risk in relation to the construction and operation of the Proposed Developments will be considered during the Environmental Assessment stage.

A Construction Environment Management Plan (CEMP) will be developed in the pre-construction stage and SSEN Transmission General Environmental Management Plans will be applied, which include standard mitigation measures such as Sustainable Urban Drainage Systems (SuDS) in order to minimise the potential for impacts on surface water and groundwater during construction and operation.

Will the valuation of my property be impacted?

The introduction of new infrastructure onto property has varied effects on the property value and each case is considered on its individual merits within the statutory framework of the Electricity Act 1989 and the Land Compensation Act 1961. That is, SSEN Transmission are obliged to follow a legal framework, therefore effects on value of property need to be addressed on a case by case basis.



What about Electric and Magnetic Fields (EMFs)?

EMFs are considered as part of our Environmental Assessment process. We are obliged as part of our transmission licence obligations, to ensure that our assets operate within the limits as specified in guidance from the UK Government.

These limits are based on the advice of the Government's independent scientific advisers - Health Protection Scotland and Public Health England (formerly Health Protection Agency, Formerly NRPD) - who ensure the appropriate level of protection for the public from these fields. Health Protection Scotland and Public Health England are appointed by the Secretary of State to protect the public from dangers to health. These organisations conduct and review relevant research and ensure that the guidelines for limiting exposure are based on the most appropriate available scientific information.

Will there be any impacts to the local environment and wildlife?

SSEN Transmission have undertaken a number of desktop studies and will undertake numerous environmental surveys to ensure that the proposed works will have as little an impact on the local environment as possible. The project team are in contact with the appropriate regulatory bodies and are committed to ensuring that works adhere to applicable UK and Scottish regulations, as well as industry best practice.

Will access on the public road be maintained?

There is potential for travel disruption during construction, when we take delivery of key plant items or because of increased volumes of traffic on the local road network. Disruption will be minimised and typically controlled through an agreed Traffic Management Plan with Aberdeenshire Council as part of any consent conditions. SSEN Transmission aims to ensure that construction traffic uses the roads safely and that any inconvenience to the public is kept to a minimum whilst maintaining a safe environment for the workforce and other.

Have you agreed a land deal already?

SSEN land consultants have been discussing the viability of land purchase across all identified sites during site selection process. The site selection process, whilst considering environmental, landscape visual, consenting and engineering challenges must also consider the possibility of Compulsory Purchase (CPO) of land and property to satisfy the needs of a scheme.

CPO is a least preferred solution because it is time consuming, expensive and could give rise to unfavourable valuation principles derived by land tribunal decisions. SSEN has a duty to the UK bill payer to ensure they deliver schemes in the most cost effective way possible. As such, the site selection process calls for land managers to discuss whether or not identified landowners and occupiers would consider selling their land voluntarily. A willing grantor is positive in terms of site selection but wouldn't be the sole determining factor in the overall site selection process.

What happens now, how do I have my say?

We understand and recognise the value of the feedback provided by members of the public during all engagements and consultations. Without this valuable feedback, the project development team would be unable to progress projects and reach a balanced proposal.

We are keen to receive your views and comments in regards to the following questions:

- Have we adequately explained the need for this project?
- Do you feel sufficient information has been provided to enable you to understand what is being proposed and why?
- Are you satisfied that our approach taken to select our preferred site location has been adequately explained?
- Do you agree with our preferred site area, if not, why?
- Are there any factors, or environmental features, that you consider may have been overlooked during the preferred site selection process?
- Do you have any other comments or concerns in relation to the transmission infrastructure requirements or about the preferred site location?

Comments

Your views and comments can be provided to the project team by completing the feedback form or by writing to our Community Liaison Manager. All feedback received will be assessed and the proposed options adapted where necessary.

Feedback

We will be seeking feedback from members of the public on this exhibition until **19th May 2023**.

Feedback is welcomed throughout the development of the project. To provide comments on the proposal or to gain further information on the project, visit our virtual event or contact our Community Liaison Manager.

Feedback can be submitted online via the project website or via the project Community Liaison Manager:

Dav Lynch
Community Liaison Manager



dav.s.lynch@sse.com



M: +44(0)7918 404443



Grampain House,
200 Dunkeld Road, Perth,
PH1 3GH



Additional information

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

Project website:

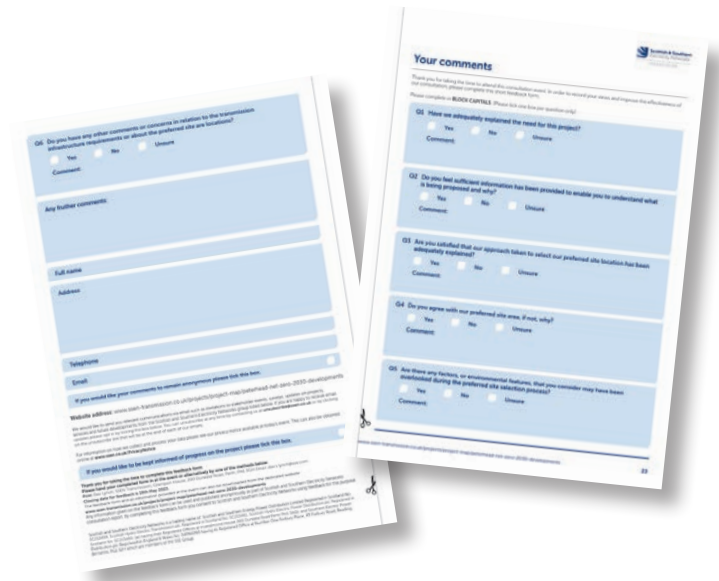
www.ssen-transmission.co.uk/projects/project-map/peterhead-net-zero-2030-developments

Find us on Facebook:

SSEN Community

Follow us on Twitter:

@assetransmission



Your comments

Thank you for taking the time to attend this consultation event. In order to record your views and improve the effectiveness of our consultation, please complete this short feedback form.

Please complete in **BLOCK CAPITALS**. (Please tick one box per question only)

Q1 Have we adequately explained the need for this project?

Yes No Unsure

Comment:

Q2 Do you feel sufficient information has been provided to enable you to understand what is being proposed and why?

Yes No Unsure

Comment:

Q3 Are you satisfied that our approach taken to select our preferred site location has been adequately explained?

Yes No Unsure

Comment:

Q4 Do you agree with our preferred site area, if not, why?

Yes No Unsure

Comment:

Q5 Are there any factors, or environmental features, that you consider may have been overlooked during the preferred site selection process?

Yes No Unsure

Comment:



Q6 Do you have any other comments or concerns in relation to the transmission infrastructure requirements or about the preferred site location?

Yes

No

Unsure

Comment:

Any further comments:

Full name

Address

Telephone

Email

If you would like your comments to remain anonymous please tick this box.

Website address: www.ssen-transmission.co.uk/projects/project-map/peterhead-net-zero-2030-developments

We would like to send you relevant communications via email such as invitations to stakeholder events, surveys, updates on projects, services and future developments from the Scottish and Southern Electricity Networks group listed below. If you are happy to receive email updates please opt in by ticking the box below. You can unsubscribe at any time by contacting us at unsubscribe@ssen.co.uk or by clicking on the unsubscribe link that will be at the end of each of our emails.

For information on how we collect and process your data please see our privacy notice available at today's event. This can also be obtained online at www.ssen.co.uk/PrivacyNotice

If you would like to be kept informed of progress on the project please tick this box.

Thank you for taking the time to complete this feedback form.

Please hand your completed form in at the event or alternatively by one of the methods below:

Post: Dav Lynch, SSEN Transmission, Grampain House, 200 Dunkeld Road, Perth, PH1 3GH Email: dav.s.lynch@sse.com

Closing date for feedback is 19th May 2023.

The feedback form and all information provided at the event can also be downloaded from the dedicated website:

www.ssen-transmission.co.uk/projects/project-map/peterhead-net-zero-2030-developments

Any information given on the feedback form can be used and published anonymously as part of Scottish and Southern Electricity Networks consultation report. By completing this feedback form you consent to Scottish and Southern Electricity Networks using feedback for this purpose.

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