

Shetland Standby Solution – Gremista Grid Supply Point

September 2021



Scottish & Southern
Electricity Networks

Who We Are and What We Do

We're Scottish and Southern Electricity Networks (SSEN) Distribution, the electricity Distribution Network Operator (DNO) responsible for delivering power to 3.8 million homes and businesses across the north of Scotland and central southern England.

We serve some of the UK's most remote communities, who receive their vital power supply via more than 100 undersea cables and remote island generators.

Our two networks cover the greatest land mass of any of the UK's DNOs, covering 80 local authority areas and 75,000km² of extremely diverse terrain.

Our 130,000km of overhead lines and underground cables, and 106,000 substations, are managed by more than 3,500 direct employees and many more contractors and support workers.

The electricity distribution network in the north of Scotland covers a quarter of the UK landmass, powering over 780,000 homes and businesses across 13 local authority areas. Our licence area stretches northwards from Loch Lomond and Dundee up to Orkney and the Shetland Islands. As the way we live our lives changes, we're committed to consistently investing and innovating to improve network resilience and futureproof power supplies for changing demands, from rolling out large-scale electric vehicle charging schemes to supporting small community generation projects.

Over **3.8 million** homes and businesses served by our networks

Over **3,500** employees across the country

More than **770,000** customers on our Priority Services Register

130,000km of overhead lines and underground cables

106,000 substations

100+ subsea cables powering island communities



Keeping the power flowing for our customers on Shetland

History

Shetland is not connected to the main GB electricity network - this means that the islands rely entirely on local sources of generation for their power, and the supply and demand of electricity must be balanced locally.

As the Distribution Network Operator for the north of Scotland, we own and operate the 33kilovolt (kV) and 11kV networks on Shetland, which are made up of approximately 1,650km of overhead lines and underground cables operating at distribution voltages (33kV and below). Thirteen subsea cables connect the smaller islands to the main island.

There are no overhead lines or underground cables operating at transmission voltages (132kV and above) on Shetland.

During the introduction of the British Electricity Trading and Transmission Arrangements (BETTA) of 2005, it was formally agreed that we would also administer electricity generation as well as network operation on Shetland, although we had been fulfilling this role for some time before this. This means that, as we are responsible for balancing the islands' supply and demand, we are also the System Operator (SO) on Shetland.

Existing arrangements

Most of Shetland's electricity is currently supplied by two fossil-fuel power stations, with the remainder being supplied by wind generators.

Shetland's main electricity generation sources are:
Lerwick Power Station (LPS) - a 72.8MW diesel-fired station that provides around 50% of Shetland's electricity on an annual basis.

We've recently invested in Lerwick Power Station, by installing a new engine and 8MW battery to supplement the existing station, and to further increase the amount of renewable generation which can be accommodated on the network.

The station was built in 1953 and is approaching the end of its scheduled full-duty operational life, however the station is still very much a part of our future plans, as you can read about in the "Standby Operations" section on page 06.

Sullom Voe Terminal (SVT) Power Station
An independently owned gas-fired power station, which meets around 30% of Shetland's demand.

The station's primary purpose is to supply electricity to the Sullom Voe gas terminal, but it also provides power to the Shetland system through a contractual arrangement.

Renewables
A number of small independent and community-based renewable generators, including wind and tidal, which currently contribute around 20% of the islands' electricity supply.

Most of these generators are managed by the Shetland Active Network Management (ANM) system, which originated in an innovative trial project developed by SSEN in partnership with third parties called the Northern Isles New Energy Solution (NINES).

The ANM aims to increase renewable generation output and reduce reliance on fossil fuels on the island network, taking advantage of the above average wind conditions that Shetland experiences.

Standby arrangements

While the transmission system will supply Shetland's demand needs for the vast majority of the time, a standby solution is also required to ensure homes and businesses continue to receive the power they need during transmission system outages.

We have been reviewing options for a reliable, innovative and cost-effective backup solution to support the security of supply to Shetland once the islands are connected to the mainland GB electricity system via SSEN Transmission's 600MW HVDC transmission link.

In June, we confirmed our intention to transition Lerwick Power Station into standby operation mode when Shetland is connected to the mainland electricity system in November 2024. After extensive technical and commercial analysis of options available, we submitted our proposal on back-up arrangements to Ofgem in December 2020. Following subsequent engagement with the regulator, we've included our proposals as part of our business plan for the RIIO-ED2 price control period.

These proposals incorporate:

The **use of Lerwick Power Station in standby operation mode** from November 2024 until 2035 following successful commissioning of the transmission link and the new Grid Supply Point connecting the transmission and distribution systems at Gremista. The installation of innovative interruption avoidance equipment by November 2024 to provide continued security of supply to homes and businesses on the islands in the event of outages on the transmission link.

This interruption avoidance equipment will ensure continued security of supply for the 30-60 minute window when the back-up power station is started in accordance with all relevant codes and standards. The technology to be used will be determined by a procurement exercise this year and is anticipated to comprise of fast response and energy storage equipment and services in addition to network stability equipment.

Please note - this Consultation is only about the Planning Application for the new Grid Supply Point (GSP) to be constructed at Gremista, and we'll consult separately on any relevant Planning Applications for the interruption avoidance equipment.

Standby arrangements – FAQ

Can you summarise the need for standby arrangements?

The standby arrangements are being designed to ensure security of supply continues to be met during transmission system outages. These outages fall into two categories:

Unplanned: these refer to faults on the land based transmission equipment, or subsea cable faults and the duration of standby running will depend on the location and nature of the fault. The standby arrangements are designed to be capable of running for the duration of 'worst case' faults.

Planned: these outages are for scheduled maintenance of the transmission HVDC system and standby arrangements are expected to run for four days a year during the summer period in a 'normal' outage year, to allow for planned maintenance of the transmission HVDC system. The planned maintenance regime also projects that the standby arrangements will be required to run for two weeks every seven years, and for three months every 20 years.

What about carbon emissions during these standby periods?

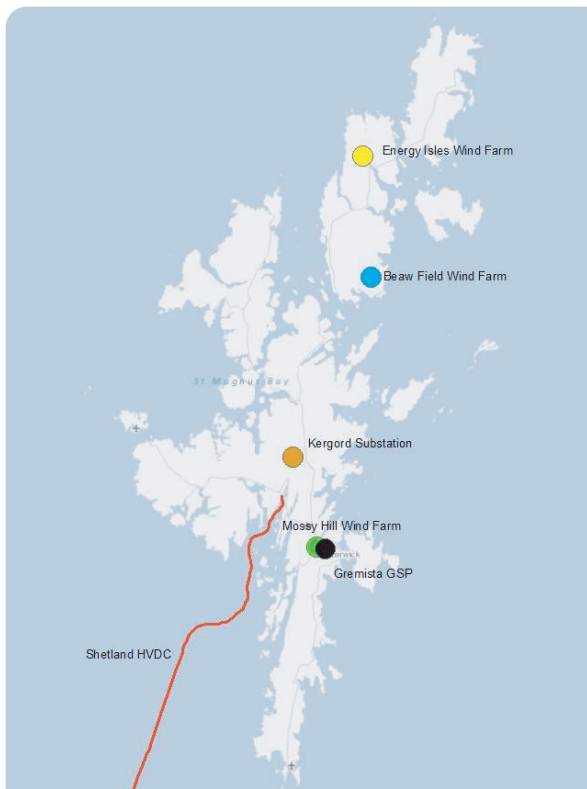
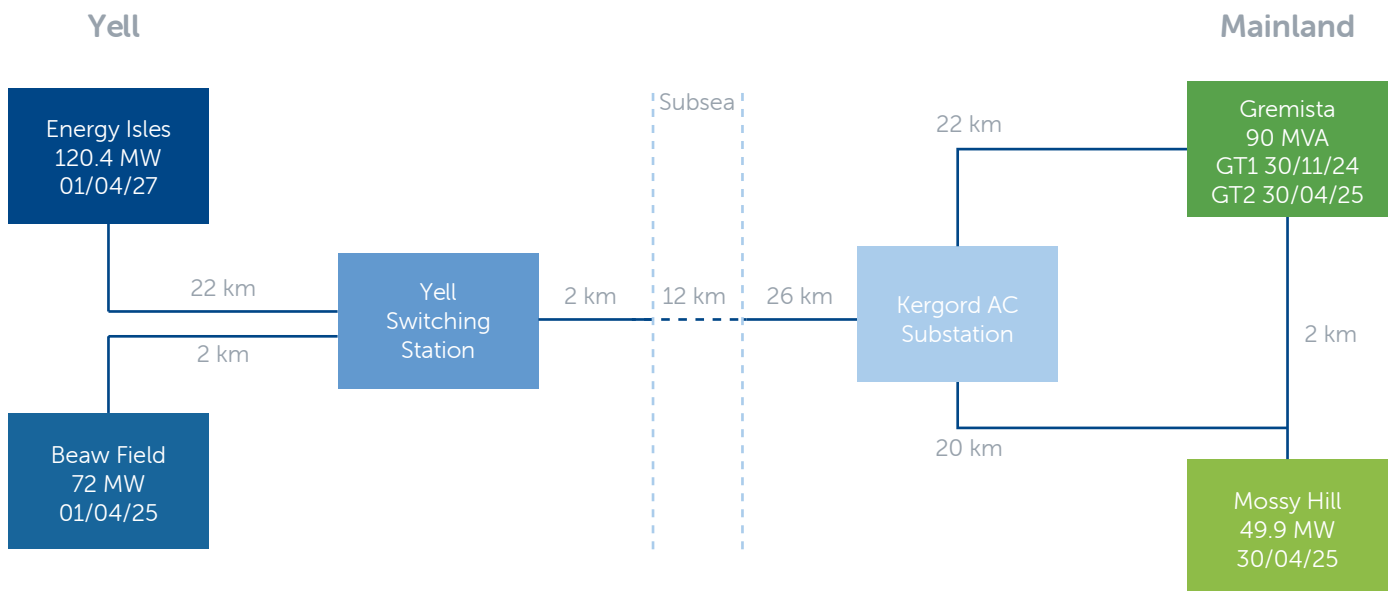
We estimate a c.97% reduction of carbon emissions from Lerwick Power Station based on a normal outage year of the HVDC system, which is a planned outage of four days during the summer period for maintenance. The 97% reduction also includes test running the station on a monthly basis.

To further reduce the use of hydrocarbons during any extended outages, we're expecting to utilise the existing 8MW battery and new low carbon interruption avoidance equipment and services, as well accommodating the operation of distributed generation. Our procurement process for interruption avoidance is technology neutral, and more information on specific technologies and arrangements will be confirmed early 2022.

Do these arrangements also apply if there is no wind, or the transmission-connected wind farms are not generating?

The Shetland standby solution will only be required to run when the transmission network is on an outage. It will not be required to run if there is little wind and transmission-connected wind farms are not generating, because at these times the Shetland system will instead be supplied by the transmission system bringing power from GB, which has a lower carbon intensity than the current Shetland level.

Planned 132kV Transmission Infrastructure



User	Type	Site
Gremista Grid Supply Point (GSP)	Demand Distribution (SHEPD)	90 MVA GT
Mossy Hill Windfarm	Onshore Wind (Peel)	49.9 MW
Beaw Field Windfarm	Onshore Wind (Peel)	72 MW
Energy Isles Windfarm	Onshore Wind (Stratkraft)	120.4 MW

Our Grid Supply Point project and the enduring Shetland supply solution

Electricity is currently distributed on Shetland via our 33kV distribution network.

Once the Shetland Islands are connected to mainland GB via the new High Voltage Direct Current (HVDC) subsea cable and the new onshore 132kV network currently under construction by SSEN Transmission, the distribution and transmission networks will need to be connected at a new substation – this is what is known as a Grid Supply Point (GSP).

We are working jointly with SSEN Transmission to develop and construct the new GSP. Land close to the existing Lerwick Power Station has been identified as a suitable location and initial surveys and designs have been completed.

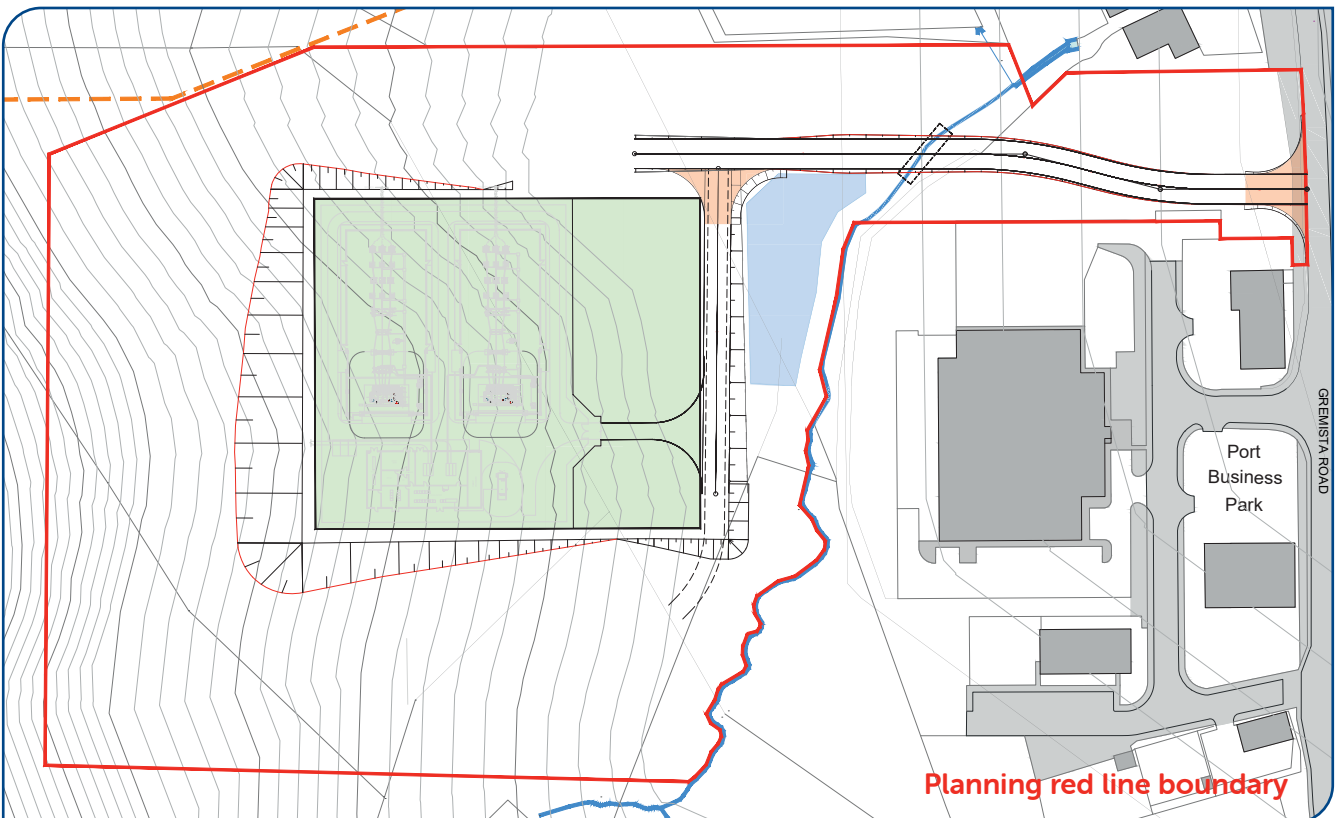
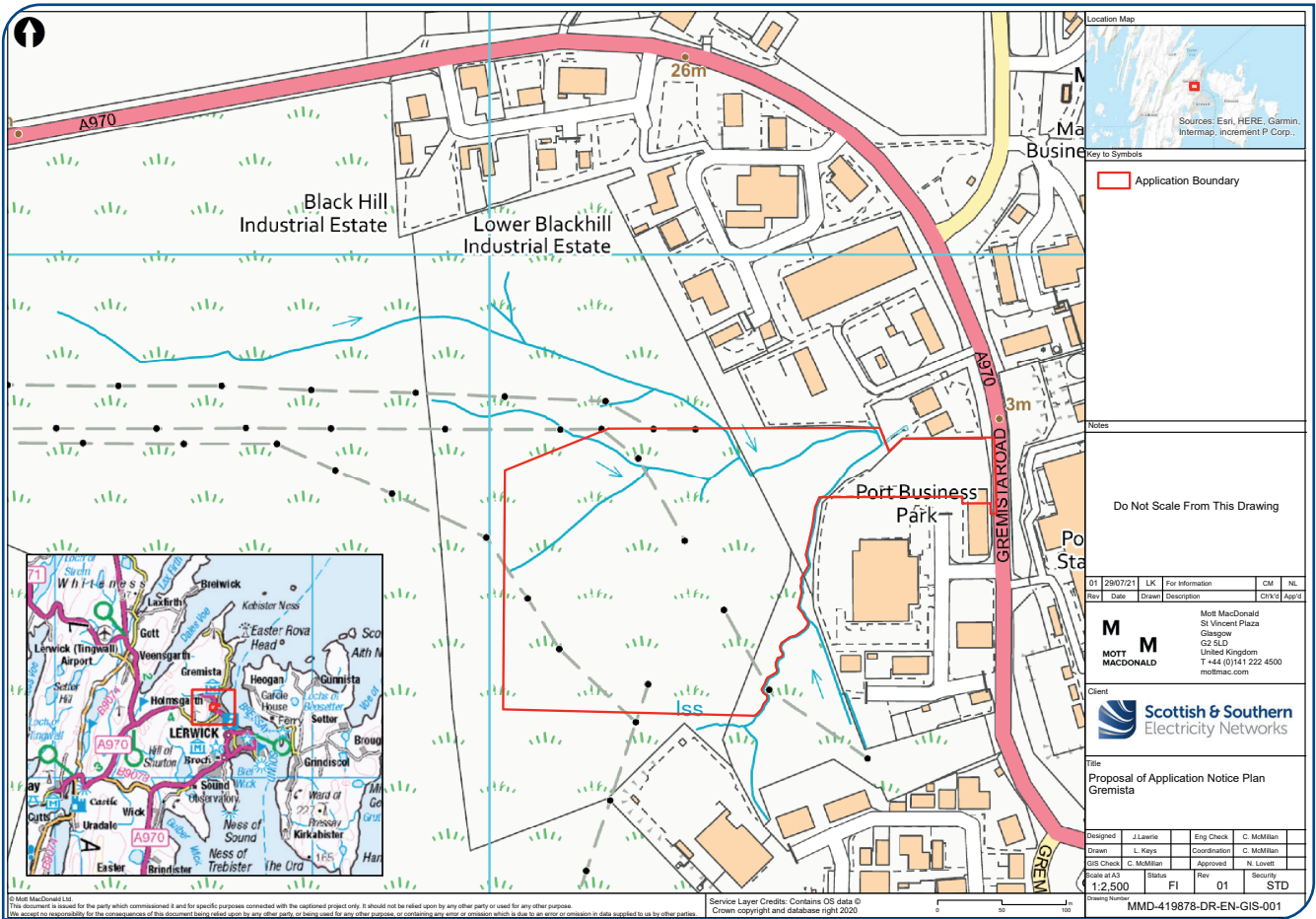
Site selection

Initially SSEN Transmission and SSEN Distribution focused on the LPS site as the intended location for the GSP. After detailed analysis, considering SHE Transmission's requirements for the site in terms of scale and other pre-requisites, this option was determined not to be feasible, and alternative land options were identified for assessment.

SSEN Transmission and SSEN Distribution reviewed alternative land options in detail, brought in consultants to carry out site walk overs and carry out civil engineering desktop assessments, reviewed Local Development Plans, engaged with land owners and other stakeholders including Shetland Islands Council, and held site selection workshops to assess all relevant aspects of the identified areas. After several months of following this process, the preferred site was selected. The GSP will consist of three buildings within a 85m by 105m (approximately) fenced area with associated access roads leading to a new junction onto the A970 just to the north of the existing Ocean Kinetics building.

The GSP is projected to be completed by November 2024 and at this point we will make a contribution to SSEN Transmission towards the transmission system costs, based on the provision of supply to the distribution system.

A site location plan and a red line boundary is shown in the figures overleaf.





3D visualisation of the proposed development and existing buildings (looking North)



3D visualisation of the proposed development and existing buildings (looking South)

Project Timeline

29 July 2021

Proposal of Application Notice (PAN) issued

September 2021

Public consultation events

October 2021

Site investigation and detailed design

November 2021

Submit full planning application

Q1/Q2 2022

Second public consultation

April 2022 (TBC)

Planning consent received

June 2022 (TBC)

Commence initial site preparation

March 2023

Substation construction commences

November 2024

GSP completed, and Shetland distribution system begins to be supplied by the transmission system after a short period to fully commission the standby solution.

Notes

Have your say on our proposals

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:

Q1 Has the requirement for the project been clearly explained?

Yes No Unsure

Q2 Have we explained the need for the proposed Gremista Grid Supply Point site adequately?

Yes No Unsure

Q3 Are there any additional factors, or environmental features, that you consider important and should be brought to the attention of the project team?

Q4 Following review of the provided information, how would you describe your understanding of the Gremista Grid Supply Point Project?

Excellent Good Average Poor

Q5 Do you have any other comments about the Gremista Grid Supply Point?



Q6 And finally, from your experience to date, can you rate the quality of the consultation undertaken on the Gremista Grid Supply Point Project?

1 2 3 4 5 6 7 8 9 10

Please use space below to provide further comments:

Full name

Address

Telephone

Email

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

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

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

Please submit your completed form by one of the methods below

Email: shetland.New.Energy.Solution@sse.com.

Post: Shetland New Energy Solutions, Lerwick Power Station, Gremista, Shetland ZE1 0PS

Online: www.ssen.co.uk/shetlandenergy

Download: Feedback forms and all the information from this consultation will also be available to download from the project website

We will be seeking feedback from members of the public and Statutory Bodies until **19 October 2021**.

All received feedback will be assessed and the proposed options adapted where necessary.

Find out more about SSEN Distribution

Project website www.ssen.co.uk/shetlandenergy

Twitter: [www.twitter.com/ssencommunity](https://twitter.com/ssencommunity)

Facebook: www.facebook.com/ssencommunity

LinkedIn: www.linkedin.com/company/ssencommunity

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