MSIP Re-opener Application – Branxton 400kV Substation		
Ofgem Scheme Reference/ Name of Scheme	SPT200168 / SPT200169 Branxton 400kV Substation	
Investment Category	Wider Works	
Primary Investment Driver	Connection of Eastern HVDC Link and customer-driven offshore wind generation	
Secondary Investment Driver	Preparation for the eventual closure of Torness Power Station and the rationalisation/ decommissioning of Torness 400kV Substation	
Licence Mechanism/ Activity	Special Condition 3.14 Medium Sized Investment Projects Re-opener and Price Control Deliverable/ Clause 3.14.6 (a) and (c)	
Materiality Threshold exceeded (£3.5m)	Yes, as a single project due to the threshold for activity 3.14.6 (a) and (c)	
PCD Primary Output	Installation of Branxton 400kV Substation and provision of connection to Eastern HVDC Link	
Total Project Cost (£m)	82.65	
Funding Allowance (£m)	To be confirmed	Requested
Output Delivery Year	2026/27	
Reporting Table	Annual RRP – PCD Table	
PCD Modification Process	Special Condition 3.14, Appendix 1	

Issue Date	Issue No	Amendment Details
31st January 2022	1	First issue of document.

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1. Abbreviations / Terminology

Table 1: Table of Abbreviations

Abbreviation	Term
AIS	Air Insulated Switchgear
BEIS	Department for Business, Energy & Industrial Strategy
CEC	Connection Entry Capacity
CfD	Contract for Difference
CION	Connection and Infrastructure Options Note
EISD	Earliest In Service Date
ESO	Electricity System Operator
FES	Future Energy Scenario
FNC	Final Needs Case
GIS	Gas Insulated Switchgear
GSP	Grid Supply Point
HVDC	High Voltage, Direct Current
INC	Initial Needs Case
ITT	Invitation to Tender
km	Kilometre
kV	Kilovolt
LC	Licence Condition
LOTI	Large Onshore Transmission Investment
LSpC	Licence Special Condition
MSIP	Medium Sized Investment Project
MW	Megawatt
NETS SQSS	National Electricity Transmission System Security and Quality of Supply Standard
NGET	National Grid Electricity Transmission
NGESO	National Grid Electricity System Operator
NOA	Network Options Assessment
OHL	Overhead Line
OTNR	Offshore Transmission Network Review
OFTO	Offshore Transmission Owner
PCD	Price Control Deliverable
RIIO	Revenue = Incentives + Innovation + Outputs
SGT	Supergrid Transformer
SHET	Scottish Hydro Electric Transmission
SPT	SP Transmission
SPEN	SP Energy Networks
SSER	SSE Renewables
STC	System Operator – Transmission Owner Code
VDUM	Volume Driver Uncertainty Mechanism

2. Reference Documents

Table 2: Table of Reference Documents

Document Reference	Title
SPEN-RIIO-T2_Business_Plan	SP Energy Networks RIIO T2 Business Plan 2021 - 2026
LOTI Final Needs Case	Eastern HVDC Link - Torness to Hawthorn Pit (E2DC) LOTI Final Needs Case, December 2021

3. Introduction

This MSIP Re-opener application sets out SP Transmission's plans to establish Branxton 400kV Substation, with works commencing in the RIIO-T2 period (April 2021 – March 2026) and commissioning programmed in 2026/27, during the RIIO-T3 period.

Branxton is a significant new 400kV substation development, utilising Gas Insulated Switchgear (GIS), on the eastern side of the SP Transmission (SPT) network, near Torness. Its purpose is to enable the timely and co-ordinated connection of the 2,000MW Eastern HVDC Link to the north east of England.

The works will also:

- Prepare the network for the connection of a significant amount of offshore wind generation from the North Sea at Branxton, including the 2,300MW contracted Berwick Bank Offshore Wind Farm development.
- Prepare the network for the closure of Torness Power Station, currently expected in RIIO-T3, and the subsequent rationalisation/ decommissioning of the Torness 400kV GIS; and
- Eliminate some of the thermal bottlenecks in the SPT network around Torness, which can impact both Scottish import and export capability.

It is proposed that Branxton 400kV Substation is constructed initially to provide:

- Two bays to the proposed Eastern HVDC Link (note the capital expenditure associated with the two Eastern HVDC Link bays forms part of the Eastern HVDC Link LOTI Final Needs Case submission and is not included in this MSIP Re-Opener application);
- Six circuits to Crystal Rig, Eccles, Strathaven and Torness 400kV Substations; and
- Future capability for the connection of a further six bays to Berwick Bank Offshore Wind Farm.

The final number of bays to facilitate the Berwick Bank Offshore Wind Farm, and other potential offshore connections, is subject to change. Discussion with the Berwick Bank Offshore Wind Farm developer is ongoing, alongside the BEIS and Ofgem led Offshore Transmission Network Review (OTNR) project. Due to the uncertain timing related to consents and CfD arrangements the scope of this MSIP Re-Opener Application does not encompass the six bays noted above to connect the Berwick Bank Offshore Wind Farm. These are expected to be the subject of a separate MSIP Re-Opener application at a later date.

The proposed configuration of Branxton 400kV Substation will help to ensure the network is ready for the changes required by Net Zero targets. While capable of expansion, this configuration will help to reduce the risk of future busbar system extension requiring lengthy network outages and disruptive reconfiguration.

This MSIP Re-opener application is submitted in accordance with Licence Special Condition (LSpC) 3.14.6 and relates specifically to LSpC 3.14.6 activities (a) and (c):

"3.14.6 The licensee may apply to the Authority for a direction amending the outputs, delivery dates or associated allowances in Appendix1 in relation to one or more of the following activities:

(a) a Generation Connection project, including all infrastructure related to that project, the forecast costs of which are at least £4.24m more or less than the level that could be provided for under Special Condition 3.11 (Generation Connections volume driver);

(c) a Boundary Reinforcement Project that has received a NOA Proceed Signal in the most recent NOA"

The needs case for Branxton 400kV Substation and the factors that have an impact on the timing and scope of works are discussed in the following sections. Full justification for the preferred investment option is presented, together with a detailed description of the proposed solution.

The estimated total project cost may be subject to change. As agreed with Ofgem, a further submission will be made at the right time relating to the associated amendments outputs, delivery dates and allowances to be detailed as Price Control Deliverables (PCDs) in LSpC 3.14 Appendix 1.

3.1 Structure of Document

This MSIP Re-opener application is structured as follows:

Section 4 – Background and Needs Case

This section outlines the background to the proposed works and details the key project drivers.

Section 5 – Assessment of Options

This section sets out the approach taken to considering the distinct options available to address the needs identified in Section 4. The results of an evaluation of the alternative options are presented and the reasoning behind the selection of the preferred option is summarised.

Section 6 – Proposed Works

This section provides a description of the proposed solution. It sets out the scope and other key supporting information.

Section 7 – Project Cost Estimate

This section summarises the estimated cost of the selected option.

Section 8 – Project Delivery

This section outlines the approach which will be taken to deliver the project.

3.2 Requirements Mapping Table

Table 3 maps the requirements set out within Chapter 3 of the RIIO-T2 Re-opener Guidance and Application Requirements Document[1] against specific sections within this document.

Table 3: Requirements Mapping Table

Section	Description	Relevant Section(s) in RIIO-T2 Re-opener Guidance and Application Requirements Document
3	Introduction	3.3, 3.4
4	Background and Needs Case	3.8, 3.9, 3.10, 3.11
5	Assessment of Options	3.13, 3.14, 3.21, 3.22
6	Proposed Works	3.14, 3.16
7	Project Cost Estimate	3.12, 3.19, 3.20
8	Project Delivery	3.15, 3.17

[1] RIIO-2 Re-opener Guidance and Application Requirements Document: Version 1

4. Background and Needs Case

4.1 Statutory and Licence Obligations on SP Transmission plc

SP Transmission plc (SPT) is licenced under section 6(1)(b) of the Electricity Act 1989 ("the 1989 Act") to transmit electricity. The licence is granted subject to certain standard and special conditions. Under section 9(2) of the 1989 Act, SPT is required to fulfil the following duties:-

- To develop and maintain an efficient, co-ordinated and economical system of electricity transmission; and
- To facilitate competition in the supply and generation of electricity.

These statutory duties are reflected in SPT's transmission licence. In addition, SPT has the following obligations pursuant to its licence conditions (LCs):-

- To always have in force a System Operator-Transmission Owner Code (STC) which, amongst other things, provides for the co-ordination of the planning of the transmission system (LC B12);
- To always plan and develop its transmission system in accordance with the National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS) and in so doing take account of National Grid Electricity System Operator's (NGESO's) obligations to co-ordinate and direct the flow of electricity on, to and over the GB transmission system (LC D3);
- To make its transmission system available for the purpose of conveying, or affecting the flow of, electricity and to ensure that the system is fit for purpose (LC D2); and
- To offer to enter into an agreement with the system operator upon receipt of an application for connection, or for modification to an existing connection (LC D4A).

Section 38 and Schedule 9 of the 1989 Act also impose the following duties on SPT when formulating any relevant proposals. In response to statutory and licence obligations upon it, SPT therefore requires to ensure that the transmission system is developed and maintained in an economic, co-ordinated and efficient manner, in the interests of existing and future electricity consumers, balancing technical, economic and environmental factors.

4.2 Key Project Drivers

In June 2019, the UK parliament passed legislation introducing a binding target to reach net zero greenhouse gas emissions by 2050. In Scotland, the Scottish Parliament has committed Scotland to becoming a net zero society by 2045. The timely connection of low carbon generation, such as offshore wind, will play a vital role in reaching these legislated net zero targets.

The UK Government announced in October 2020 its commitment to make the UK a world leader in green energy and boosted the UK Government's previous 30GW target for offshore wind to 40GW by 2030. The Scottish Government ambition is 11GW of offshore wind in Scotland by 2030. Further commitments, by the UK Government in October 2021, to decarbonise the power system by 2035, further support the requirement for investment in the existing electricity transmission system to enable the timely connection and integration of the required renewable generation sources.

On 9th September 2021, the Department for Business, Energy & Industrial Strategy (BEIS) announced the budget for the next Contracts for Difference (CfD) auction, Allocation Round 4, which launched on 13th December 2021. £265m per year will be provided in the fourth round of the scheme, which aims to double the renewable electricity capacity secured in the third round and generate more than the previous three rounds combined. For the first time since 2015, established technologies, including

onshore wind and solar, will also be able to bid. Offshore wind has the largest budget allocation of £200m[2]. Given lowering technology costs and a favourable subsidy regime, we expect this will support a considerable number of renewables projects to successfully transition from project inception and development through to energisation[3].

4.3 Eastern HVDC Link

Branxton 400kV Substation will provide two connection points for the planned Eastern High Voltage Direct Current (HVDC) Link, between the Torness area and Hawthorn Pit in the NGET area in northern England. This HVDC link, proposed to be 2,000MW in rating, is a key enabler for the economic integration of renewable generation across Scotland. [redacted]

The position of the proposed Branxton 400kV Substation, as a strong node on the existing 400kV system in close proximity to the coast (approximately 1.8km), helps to minimise the level of additional onshore reinforcement required for the connection of an HVDC link.

4.3.1 Background

The north to south power transfer requirements on all of the northern transmission system boundaries increase significantly over the coming years due to the connection of new renewable generation throughout Scotland as part of the energy transition to meet legislated Net Zero targets. This trend is clearly demonstrated by the transfer requirements on the Scotland – England boundary.

Figure 1 indicates the 2020 Future Energy Scenarios (FES) and 2021 FES required transfer capability on the Scotland–England (B6) boundary. Existing capability is already exceeded, largely consistent with all Scotland and North England boundaries, driven by generation developments under the Connect and Manage regime, with the difference becoming pronounced by the mid-2020s in all scenarios.

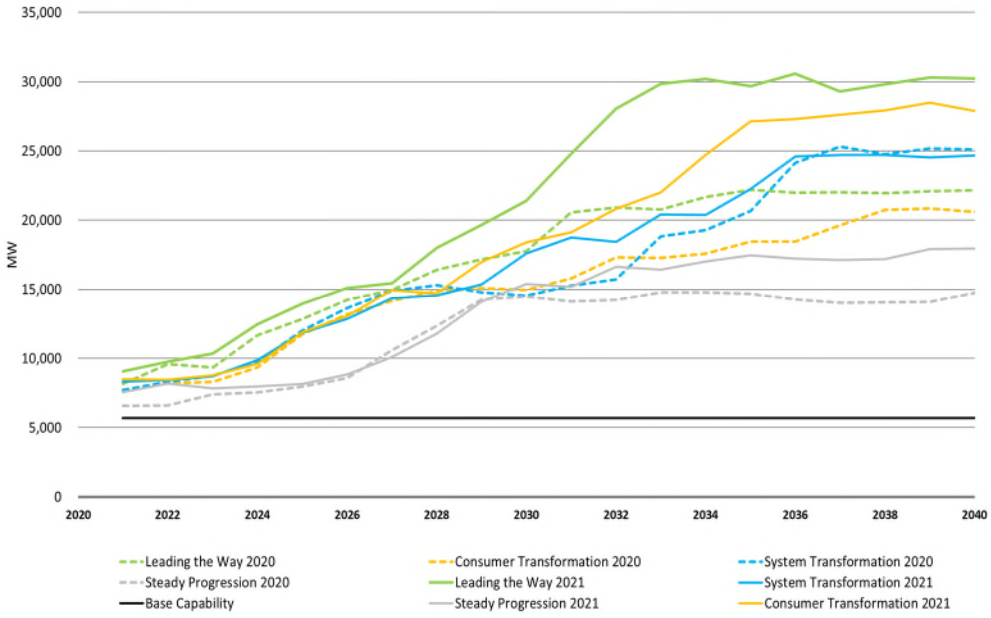


Figure 1: Required Transfers and base capability for boundary B6

[2] Biggest ever renewable energy support scheme backed by additional £265 million - GOV.UK (www.gov.uk)
[3] BEIS - Electricity Generation Costs (2020)

It can be seen in Figure 1 that in the coming years the unconstrained boundary flows on B6 are set to increase significantly. In order to maintain an efficient and economic transmission system whilst accommodating additional renewable generation, significant system reinforcement is required in a relatively short timeframe.

4.3.2 Network Options Assessment

The Network Options Assessment (NOA) 2020/21, published in January 2021, supported the recommendation of the associated Large Onshore Transmission Investment (LOTI) Initial Needs Case (INC) to progress the Torness to Hawthorn Pit (NOA reference E2DC) HVDC Link, and Peterhead to Drax (NOA reference E4D3) HVDC Link, giving both projects a "Proceed" signal.

NOA 2020/21 also recommended two further HVDC links from Scotland to south of the Humber in the NGET licence area, both with Earliest In Service Date (EISD) of 2031. Furthermore, NOA 2020/21 recommended that additional network investment options across the B6, B7a and B8 boundaries also proceed for delivery in the early 2030s, including several new onshore overhead lines in Scotland and the north of England. These options will continue to be developed and will be the subject of future LOTI (or alternative/ successor) submissions.

Early indication from NGESO on the NOA 2021/22 results has shown another significant increase in the level of north to south boundary reinforcements required to develop an economic system, particularly in its recommendation to continue development of the four Eastern HVDC Links and new onshore 400kV circuits referenced above. [redacted]

4.3.3 LOTI Need Case

In October 2020, the three onshore Transmission Owners submitted the LOTI INC for two planned subsea electricity transmission HVDC links, the first in a series of planned wider system reinforcements between Scotland and England along the east coast of the United Kingdom.

These HVDC links, between Torness and Hawthorn Pit, and Peterhead and Drax, will:

- Support the onshore system to meet the requirements of the National Electricity Transmission System Security and Quality Supply Standard (NETS SQSS);
- Alleviate constraints on the GB transmission system, enabling growth in renewable electricity and support the transition to Net Zero emissions in the most economical way; and
- Support green jobs throughout construction and operation, playing a key role in the green recovery from the coronavirus pandemic.

Ofgem published its decision on its assessment of the Eastern HVDC INC in November 2021[4] and, in this, recognised the clear consumer need for these two links.

In December 2021, SPT and NGET submitted to Ofgem the associated LOTI Final Needs Case (FNC), which presents the strong technical and economic need for a subsea HVDC link on the eastern side of the transmission network between Torness and Hawthorn Pit. Where appropriate, this document refers to the Eastern HVDC Link - Torness to Hawthorn Pit LOTI FNC, as opposed to replicating the detail here. However, the main conclusions of the FNC submission include:

[4] Ofgem - Eastern HVDC - Decision on the project's Initial Needs Case

- It is necessary to make significant investment in the capability of the existing transmission system from Scotland to the north of England to accommodate growth in renewable generation. This is required to maintain and operate an economic and efficient transmission system. It is critical to allow the network to keep pace with projected growth to support legislated Net Zero targets whilst also enabling significant constraint savings.
- The FNC Cost Benefit Analysis (CBA) from NGESO supports the joint SPT and NGET proposal, and demonstrates that the two proposed HVDC links are required as a vital next step in the, efficient, co-ordinated and economic development of the electricity transmission system.

[redacted]

- SPT and NGET (in conjunction with SSENT where appropriate) have developed a robust delivery strategy, procurement approach and technology selection process to deliver a positive outcome for all our stakeholders and best enable delivery by an EISD in 2027 (Regulatory Year 2027/28).

The connection points at Branxton 400kV Substation require to be available prior to the commissioning of the Eastern HVDC Link.

4.4 Offshore Wind Connections

The results of the ScotWind seabed leasing process, announced by Crown Estate Scotland on the 17th January 2022[5], underline both the scale of potential offshore wind development in Scotland and the commitment from industry to delivering the timely investments in energy infrastructure necessary to meet Net Zero targets. ScotWind offshore developments are expected to contribute towards the Scottish Government ambition of 11GW of offshore wind by 2030 and make a significant contribution towards 2045 and 2050 Net Zero targets.

Off the east coast of Scotland specifically, there is very high potential for offshore wind generation, in areas illustrated by the BEIS/ Ofgem Offshore Transmission Review (OTNR) Generation Map[6].

4.4.1 Berwick Bank Offshore Wind Farm

Berwick Bank Offshore Wind Farm[7] is an up to 4,150MW development. It has a contract for the connection of a development with 2,300MW Connection Entry Capacity (CEC) at Branxton, phased in two stages:

- Stage 1 - 1,400 MW contracted to connect in November 2026 - this stage is contingent on the construction of Branxton 400kV Substation and related works.
- Stage 2 - An additional 900 MW contracted to connect in November 2027 - this stage is contingent on the commissioning of the Eastern HVDC Link.

[5] Crown Estate Scotland - ScotWind offshore wind leasing delivers major boost to Scotland's net zero aspirations
[6] OTNR - Generation Map
[7] Reference OTNR Generation Map Area 13 and Area 15

This contracted position follows the development of a Connection and Infrastructure Options Note (CION), in accordance with STC Procedure (STCP) 18-1 and co-ordinated by National Grid Electricity Transmission (now NGESO), which recommended connection at Branxton 400kV Substation. The offshore developer has requested six Interface Points between the Offshore and Onshore Transmission Systems, although this may be subject to change as the project develops and detailed design of the offshore transmission system continues.

The Interface Points will be located at the 400kV GIS/ cable terminations within Branxton 400kV Substation. The offshore developer is responsible for all works between the offshore wind farm and the onshore Interface Points. SPT is responsible for the remainder of the connection works.

A Bilateral Connection Agreement is in place between NGESO and the developer on this basis, with a corresponding Transmission Owner Construction Agreement in place between NGESO and SPT.

[redacted]

Berwick Bank Offshore Wind Farm is owned by SSE Renewables (SSER) and further detail regarding the offshore wind farm can be found on the developer's website[8]. SSER indicate they anticipate submission of planning applications in spring 2022.

While the Berwick Bank development does not currently have planning consents or a Contract for Difference (CfD), we fully expect Berwick Bank and/or other offshore development(s) under the ScotWind leasing round, to connect at Branxton.

4.4.2 ScotWind

The results of the ScotWind leasing process, a programme managed by Crown Estate Scotland to lease areas of the seabed around Scotland for offshore wind farm development, were announced on the 17th January 2022. In summary:

- 17 projects with a capacity totalling 24.8GW have been selected out of a total of 74 applications, and have been offered option agreements which reserve the rights to specific areas of seabed.
- A total of just under £700m will be paid by the successful applicants in option fees and passed to the Scottish Government for public spending.
- Initial indications suggest a multi-billion pound supply chain investment in Scotland.
- Of the 17 projects selected, 6 are in the ScotWind East region[9] with a combined capacity of 10.5GW and option fees totalling £324.5m, of which 3 are in the East 1 Zone, with a combined capacity of 6.7GW and option fees totalling £199.8m.

The ScotWind results underline the scale of development potential off the east coast of Scotland and the commitment from industry to delivering the investments in energy infrastructure necessary to meet Net Zero targets. Several of the ScotWind projects are contracted to connect to the SPT system, and it is vital that the onshore transmission system is developed in a timely manner so as to enable the benefits of ScotWind to be realised and contribute to the Scottish Government's offshore wind ambition of 11GW by 2030.

[8] Berwick Bank
[9] Sectoral Marine Plan for Offshore Wind Energy

4.4.3 Offshore Transmission Network Review Interaction

SPT, together with SHET, NGET and NGESO, is actively engaged across all relevant workstreams of the BEIS/ Ofgem Offshore Transmission Network Review[10] (OTNR), with a particular focus on the development of a Holistic Network Design, currently programmed for summer 2022.

It is noteworthy that the up to 4,150MW Berwick Bank development does not form part of, and pre-dates, the ScotWind leasing process. [redacted]

[redacted]

4.5 Torness 400kV Substation Rationalisation

EDF recently announced that the existing 1,250MW Torness nuclear power station is expected to close by 31st March 2028. Once the power station closure date and de-fuelling programme becomes more certain, consideration will be given to significantly rationalising the 400kV GIS at Torness 400kV Substation, or decommissioning and dismantling it completely (removing up to 24,000 kg of SF_6 from the network, equivalent to up to 21% of the total volume currently in use on the SPT system).

Once Branxton 400kV Substation is established, rationalisation or disconnection of Torness 400kV GIS will be enabled, as Branxton will effectively form a 400kV bypass. Note that it is SPT's intention to construct Branxton 400kV as a GIS substation employing alternative Insulation and Interrupting Gases, avoiding the addition of SF_6 to SPT's inventory as far as technology maturity permits. This is in accordance with SPT's RIIO-T2 Environmental Action Plan[11].

There are currently two Grid Supply Points (GSPs) fed from Torness 132kV substation, Innerwick and Dunbar, as well as the power station supplies. There are options to rationalise the 400kV GIS, while maintaining the 132kV supplies e.g. by combining the existing SGT1 and SGT2 with two Branxton – Torness 400kV circuits to form two new transformer feeders, fed from Branxton.

As described in Section 5.2.4, the design of Branxton 400kV Substation is specifically intended to minimise the risk of asset stranding following the closure of Torness and de-fuelling of the reactors.

Engagement with EDF on the detail of their requirements will continue during RIIO-T2. Provision has been made in SPT's RIIO-T2 plan to carry out a detailed assessment of options to remove Torness 400kV Substation from the network following the cessation of generation and reactor de-fuelling[12].

4.6 Thornton Bridge – Torness Cables

The Torness to Thornton Bridge 400kV cables can present a thermal constraint under some network conditions, and limit Scottish import and export capability. The works in TORI 125[13] involve banking the existing cable between Torness and Thornton Bridge, on the Torness-Crystal Rig circuit, with one of the de-energised cables between Torness and Branxton compound.

[10] Offshore Transmission Network Review
[11] https://www.spenergynetworks.co.uk/userfiles/file/RIIO-T2_Annex_7_Environmental_Action_Plan.pdf
[12] See EJP_SPT_SPT200136.
[13] SPT-RI-125, Thornton Bridge and Torness 400kV Cable Upgrade, version 2.3, January 2019.

The implementation of TORI 125 would be challenging, in part as experience from the Torness – Branxton cable replacement project highlighted significant challenges in accommodating a second cable at the existing Torness 400kV GIS. The establishment of Branxton 400kV Substation will eliminate the requirement for TORI 125, as Branxton 400kV Substation effectively bypasses the thermal limitations of the Torness 400kV cable systems.

It is also noteworthy that the Eccles hybrid synchronous compensator project (NOA project ECVC) proposes the installation of a real time thermal rating (RTTR) system on the Torness – Thornton Bridge cables to provide better utilisation of these cables until Branxton is established.

4.7 Alignment with RIIO-T2 Strategic Goals

As described in our RIIO-T2 plan[14] for the five-years to the end of March 2026, to mitigate the impacts of climate change and achieve a low-carbon energy system requires a level of focused effort and commitment never seen before. The mass electrification of transport and heat has only started and there is a huge amount required to build on the timely progress already made in the electricity sector.

Energy networks are critical to achieving the wider Net Zero emissions targets and with continued engagement with consumers, network users and our wider stakeholders, we've set a progressive plan in place to facilitate a Net Zero future. Our RIIO-T2 plan sets out four strategic goals – informed by our stakeholder priorities – that will keep us moving towards this sustainable future. These goals and their alignment with the development of Branxton 400kV Substation, are summarised in Figure 2.

Further detail regarding how this proposal aligns to our four Strategic Goals is outlined below:

Take a leading role in delivering a Net Zero future that is consistent with government objectives.

Providing the connection to the Torness – Hawthorn Pit HVDC Link, as well as contracted offshore wind generation, will increase both transmission capacity and the amount of renewable generation connected to the GB electricity network, contributing towards a reduced reliance on fossil fuel electricity generation sources.

Deliver the benefits of increased cost-efficiency to network users and consumers by continually innovating and applying whole system solutions.

The Eastern HVDC Link FNC CBA, prepared by NGESO, supports the joint SPT and NGET proposal to develop a new 2,000MW HVDC link between Torness and Hawthorn Pit. [redacted]

SPT's intention is to construct Branxton 400kV as a GIS substation employing alternative Insulation and Interrupting Gases, avoiding the addition of SF_6 to SPT's inventory, as far as technology maturity permits. This is in accordance with SPT's RIIO-T2 Environmental Action Plan[15].

[14] SP Energy Networks RIIO-T2 Business Plan
[15] https://www.spenergynetworks.co.uk/userfiles/file/RIIO-T2_Annex_7_Environmental_Action_Plan.pdf

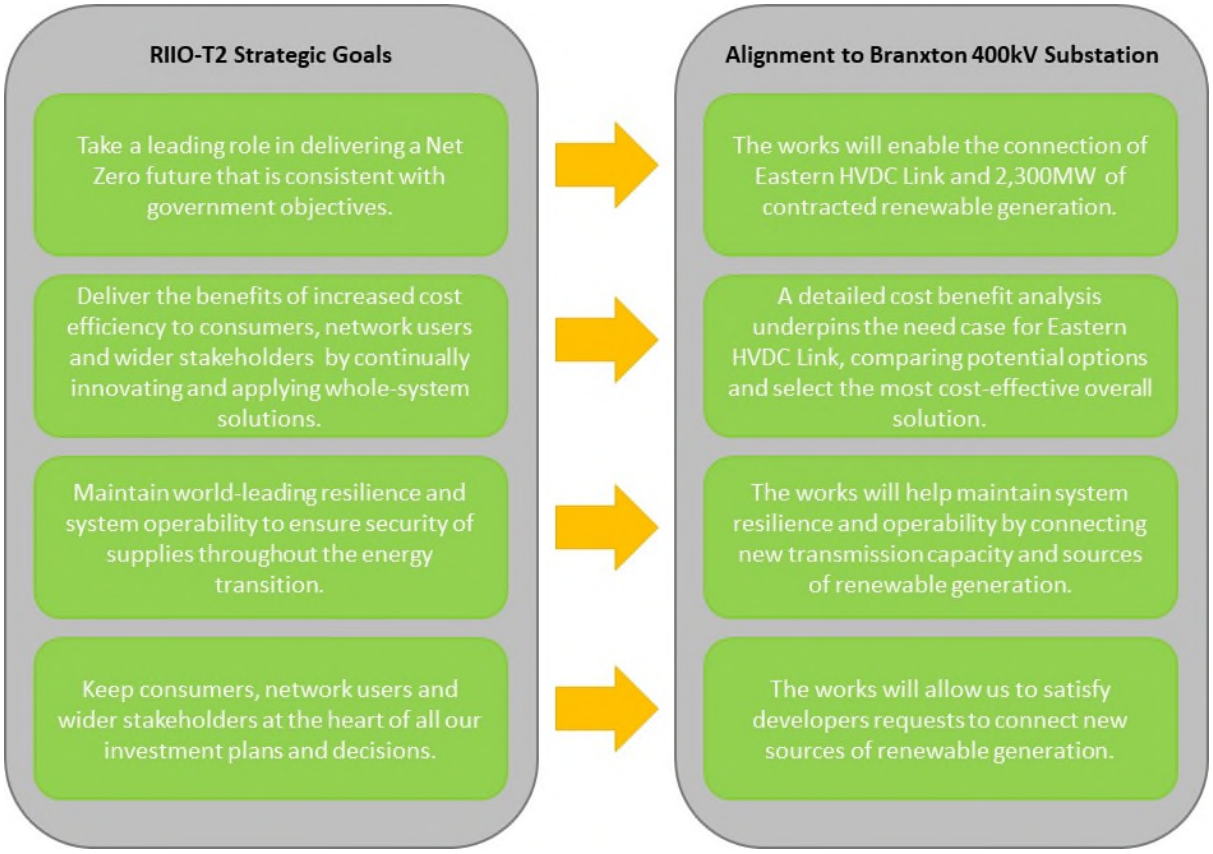


Figure 2: Alignment of the Branxton 400kV Substation Proposal with SPT RIIO-T2 Strategic Goals

Maintain world-leading resilience and system operability to ensure security of supplies throughout the energy transition.

The works will help maintain system resilience and operability by connecting additional transmission capacity, in the form of an Eastern HVDC Link, as well as the capability to connect new sources of renewable generation, with demand for network capacity likely to increase further, following the recent ScotWind leasing round announcement.

Keep network users and consumers at the heart of all our investment plans and decisions.

The completion of the Branxton 400kV Substation is required to maintain and operate an economic and efficient transmission system, and allow SPT to satisfy network users requests for connection, consistent with our statutory and licence responsibilities.

Key stakeholders have been consulted during the development of the proposed solution and we will continue to engage with stakeholders throughout the project development and delivery process. More detail on stakeholder engagement can be found in Section 6.6.

The completion of the Branxton 400kV Substation will continue to align with our future strategic ambitions.

5. Assessment of Options

5.1 Existing System Configuration at Torness

Existing transmission assets in the Torness area are indicated in Figure 3 below.

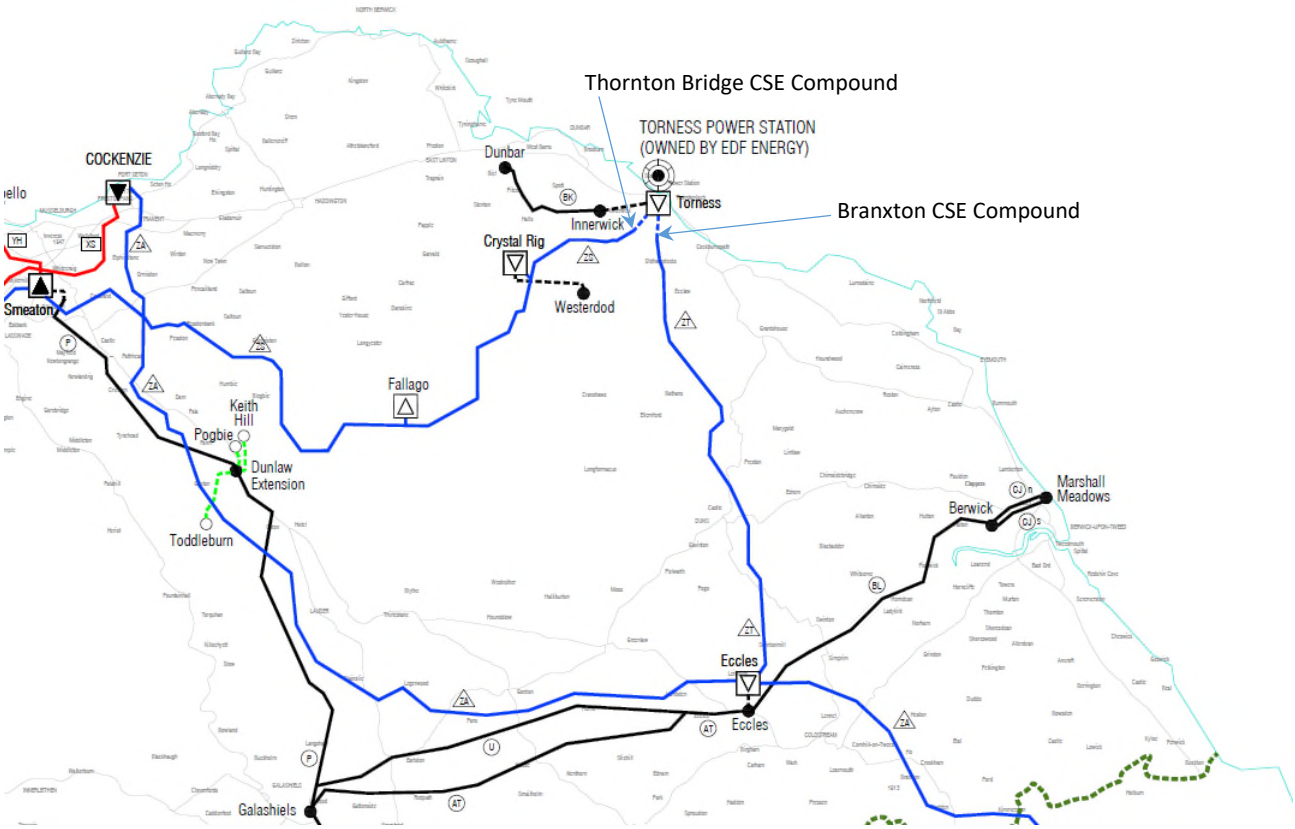


Figure 3 Geographic Indication of Torness 400kV Substation

Torness 400kV Substation is connected via four 400kV circuits, which terminate at Torness via 400kV cable systems. Each cable system is approximately 2km in route length from Torness to the Thornton Bridge and Branxton Cable Sealing End (CSE) compounds, which are located approximately 300m apart.

Torness 400kV Substation is an indoor substation utilising GIS in an “eight switch mesh” configuration.

As detailed Figure 4, the existing Torness 400kV Substation connects the following circuits:

- Crystal Rig 400kV
- Eccles No.1 400kV
- Eccles No.2 400kV
- Generator Transformer No.1
- Generator Transformer No.2
- Strathaven 400kV
- SGT1 (400/132kV 240 MVA)
- SGT2 (400/132kV 240 MVA)

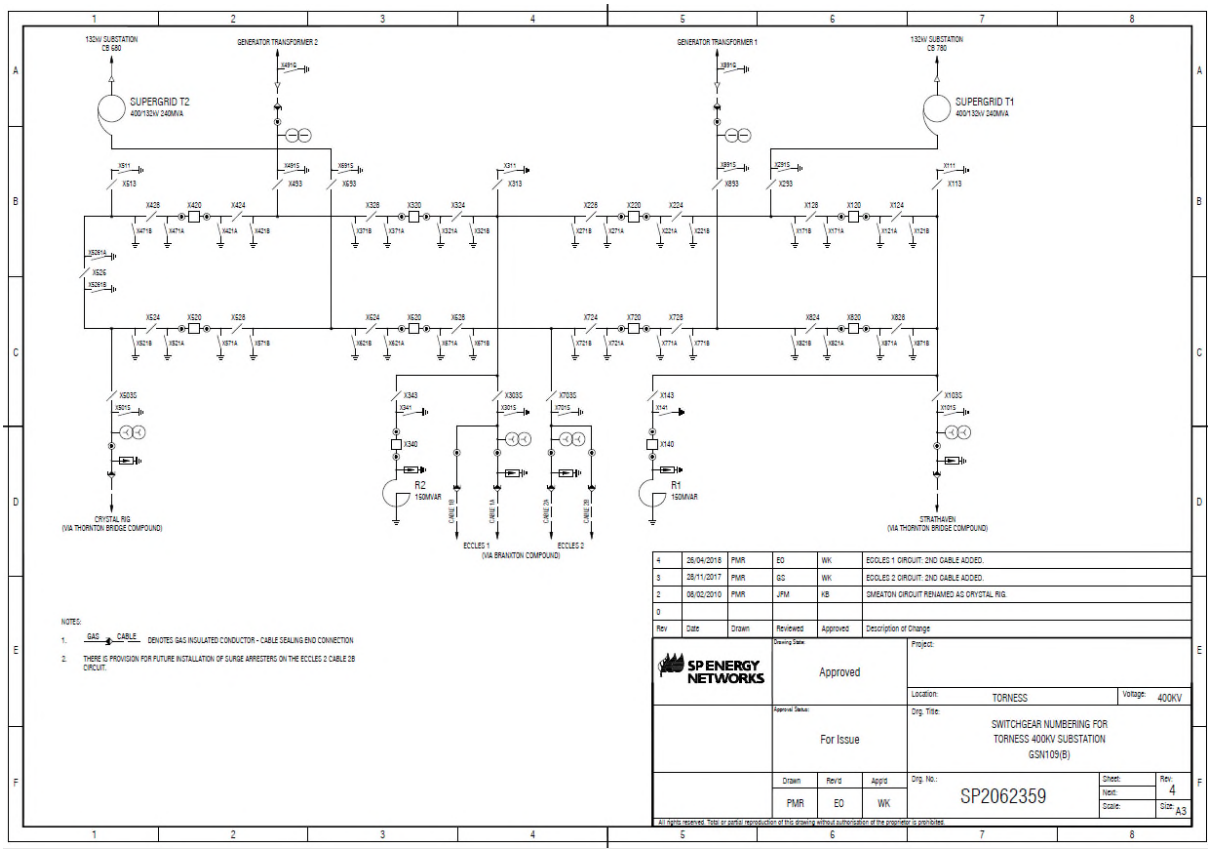


Figure 4 Existing Configuration – Torness 400kV Substation

5.2 Overview of Options

This section provides a description of options to connect an Eastern HVDC Link and offshore wind generation in the Torness area and details the key considerations.

Table 4 below presents a summary of the options considered.

Table 4: Options Summary

	Option	Outcome of Initial Review	Reason for Rejection
1	Do Nothing or Delay	Rejected	A 'Do Nothing' or 'Delay' option is not credible in relation to this project and would be inconsistent with SPT's various statutory duties and licence obligations. Timely progression of the Torness-Hawthorn Pit HVDC link (E2DC) is crucial to avoid additional annual constraint costs [redacted] and requires connections to be available in advance of Eastern Link commissioning.
2	Extension of Torness 400kV GIS substation.	Rejected	The existing Torness 400 kV Substation is located within the Torness Nuclear Licenced Site. Torness 400 kV Substation is an indoor GIS substation configured in a 400 kV eight-switch mesh arrangement. Extending the existing substation is not viable due to its configuration (which is inconsistent with NETS SQSS requirements), vintage and space constraints. Further, were it to be viable, connecting the Eastern Link and offshore wind generation at Torness would also require significant uprating of the 400kV cables between Torness and the Thornton Bridge cable sealing end compound.
3	New AIS substation at Branxton.	Rejected	See the discussion in Section 5.2.1. below. This option has been rejected due to: (i) the topography across the footprint of an AIS substation in the vicinity of the Thornton Bridge CSE compound (there is an approximate height difference of around 60m from one end of an outdoor AIS substation footprint to the other) - constructing an outdoor AIS substation in this area is not considered to be feasible; and (ii) the topography across the footprint of an outdoor AIS substation in the vicinity of the Branxton CSE compound is such that it is a significantly higher cost option relative to the GIS options considered in Options 4, 5 and 6. It is also noteworthy that, in general, Branxton's location near the coast makes it unsuitable for outdoor AIS. An indoor, double-bus AIS substation (were an AIS option feasible) would require a very large building and increased footprint, leading to a significant risk of delay due to land purchase and consenting risks.
4	New 14-bay GIS substation at Branxton.	Proposed for Further Consideration	-
5	New 23-bay GIS substation at Branxton.	Proposed for Further Consideration	-
6	New 21-bay GIS substation at Branxton.	Proposed for Further Consideration	-

Options 4, 5 and 6 all provide feasible solutions. These options are discussed in further detail in the following sections.

All of Options 4, 5 and 6 require deviation of the ZS overhead line route line entry at the Thornton Bridge CSE compound and the ZT overhead line route line entry at Branxton CSE compound to enable the termination of these overhead line circuits within the new Branxton 400 kV Substation.

The Torness-Thornton Bridge CSE compound 400kV cables and the Torness-Branxton CSE compound 400kV cable connections have to be diverted to the new Branxton 400kV Substation. Options 4 and 5 achieve this diversion of the existing 400kV circuits via eight substation bays, while Option 6 utilises six bays.

5.2.1 Option 3 - AIS Substation

As outlined in Table 4 above, an outdoor AIS substation construction has been rejected for Branxton 400kV Substation.

The topography across the footprint of an AIS substation in the vicinity of the Thornton Bridge CSE compound is such that there is an approximate height difference of around 60m from one end of an outdoor AIS substation footprint to the other. Constructing an outdoor AIS substation in this area is not therefore considered to be feasible.

An AIS substation in the vicinity of the Branxton CSE compound is considered to be more feasible than in the vicinity of the Thornton Bridge CSE compound, however, the topography across the footprint of an outdoor AIS substation in this area is such that it would be a significantly higher cost option relative to the GIS options considered in Options 4, 5 and 6.

The practical land and planning difficulties with any AIS development are further complicated by the wider infrastructure requirements in the area, including the development of an HVDC converter station (Eastern Link), and onshore infrastructure associated with offshore wind farm developments, both requiring significant land areas.

It is also noteworthy that, in general, Branxton's location 1.8km from the coast makes it unsuitable for outdoor AIS. Saline pollution is considered a significant risk for sites within 5km of the coast. Any outdoor AIS in such a location would require a special insulation class and high fault and equipment failure rates would be expected. These considerations led to Torness 400kV Substation being constructed indoors, similar to other substations which form part of the Main Interconnected Transmission System in close proximity to the coast e.g. Cockenzie 275kV Substation.

5.2.2 Option 4 - 14 Bay 400kV GIS Substation

This option involves constructing a new 14-bay GIS substation with eight bays for the diverted circuits, two bays for the connection of the Eastern HVDC Link, two bus-sections and two bus-couplers, as shown in Figure 5.

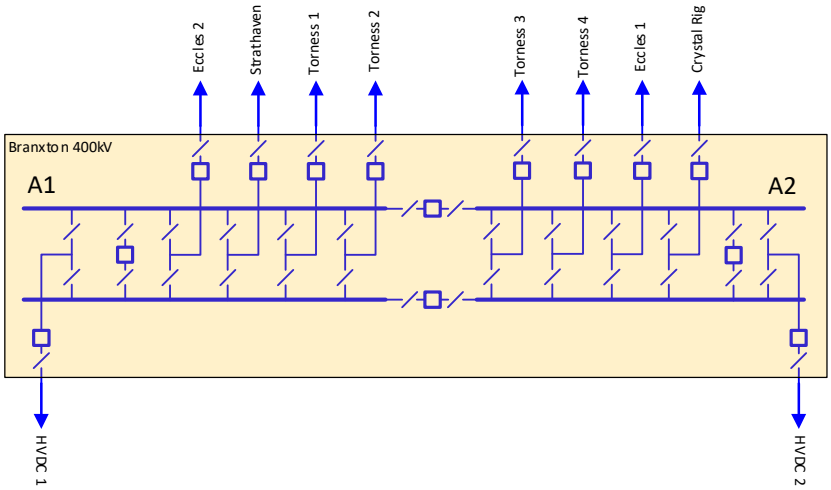


Figure 5 - Branxton 400 kV 14-bay option

This lowest-cost "minimum build" option, includes no provision for offshore wind development, and is therefore inconsistent with the co-ordinated connection of contracted and planned offshore wind developments in the Firth of Forth.

This arrangement would significantly limit future connections to the site. Note that future offshore renewable generation connections would require extension of the busbars at either end to comply with the requirements of NETS SQSS paragraph 2.6 and NETS SQSS Appendix A. This requirement would not be removed by the closure of Torness, and would increase the cost and outage requirements of future busbar extensions.

The busbar arrangement in Figure 5 presents significant issues, particularly during testing after extension of the busbars (or after repair or maintenance) e.g. testing of an extended busbar A1 would require earthing of all five feeders on the A1 side of the substation[16], which is a significant outage that could potentially lead to high constraint costs and operational risk during testing.

To avoid such a high number of circuit outages, the 14-bay option would therefore require at least the introduction of two additional bus-section circuit breakers and an additional bus-coupler, splitting each busbar into three sections and thereby reducing the number of feeders that would have to be removed from service during the commissioning of future extensions to the busbars. This adds a further three bays to the design, increasing the total number of bays to 17 (inclusive of two bays for the Eastern HVDC Link).

5.2.3 Option 5 - 23 Bay 400kV GIS Substation

This co-ordinated option involves constructing a new 23-bay GIS substation with eight bays for diverted circuits, four bus-sections and three bus-couplers, two bays for the connection of the Eastern HVDC Link and six future bays for the connection of the contracted 2,300MW Berwick Bank Offshore Wind Farm, as shown in Figure 6. This layout provides operational flexibility and security against an infeed loss above the NETS SQSS limit.

[16] Assuming compliance with Iberdrola Networks Specification INS 50.43.02, High Voltage Gas Insulated Switchgear for Substations, 07-2018, Issue 05. Also see IEC 62271-203, High-voltage switchgear and controlgear – Part 203: Gas-insulated metal-enclosed switchgear for rated voltages above 52 kV (e.g. the example in section F.4.5).

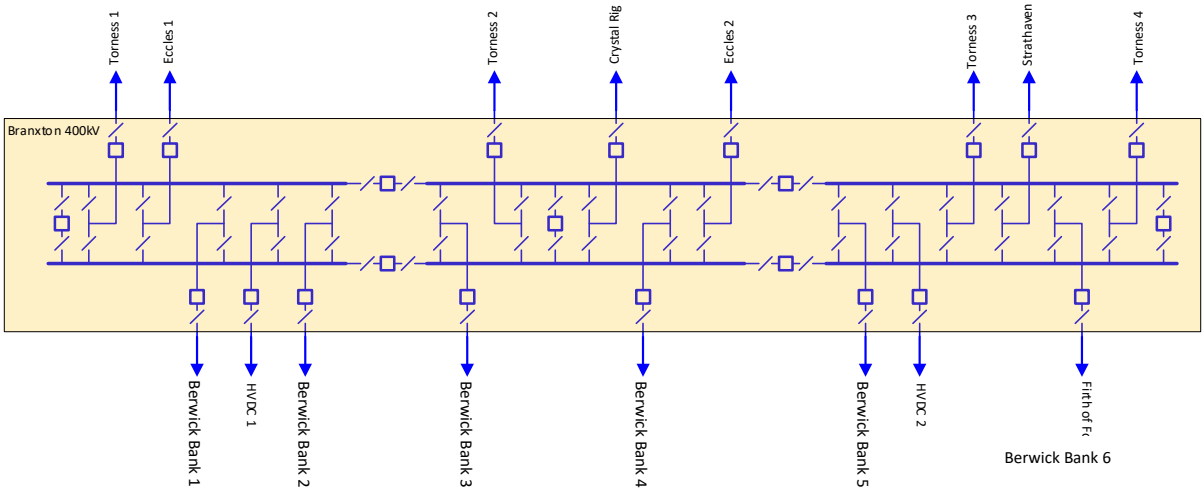


Figure 6 - Branxton 400 kV 23-bay option

This arrangement accommodates six future bays for the 2,300MW element of the wider Berwick Bank project, in line with the current contracted position, and bypasses the thermally limiting Torness 400kV cables.

Subject to detailed design, further extension could accommodate additional offshore wind capacity e.g. the additional 1,850MW of the wider Berwick Bank project or ScotWind capacity. This configuration mitigates the significant outage requirements which would be necessary for such extension in Option 4.

While there remains some uncertainty around aspects the detail and timing of the Berwick Bank Offshore Wind Farm connection, a significant area offshore has been identified by Crown Estate Scotland for further development. We believe that the offshore bays will be utilised by Berwick Bank or another development, pending the conclusion of ongoing discussions with the Berwick Bank Offshore Wind Farm developer and the OTNR Pathway to 2030 Holistic Network Design. The provision of these offshore bays does not form part of this MSIP Re-Opener application.

5.2.4 Option 6 - 21 Bay 400kV GIS Substation

This option involves constructing a new 21-bay GIS substation with six bays for diverted circuits, four bus-sections and three bus-couplers, two bays for the connection of the Eastern HVDC Link and six future bays for the connection of the contracted 2,300MW Berwick Bank Offshore Wind Farm, as shown in Figure 7, together with the connections to Torness 400kV Substation.

The rationalisation in the number of bays compared to Option 5 is achieved through the creation of two three ended 400kV circuits, to which the original 400kV fluid filled cables from the Thornton Bridge CSE compound to Torness will be connected. This minimises the risk of asset stranding at Branxton 400kV Substation and is in anticipation of the ultimate closure of Torness Power Station.

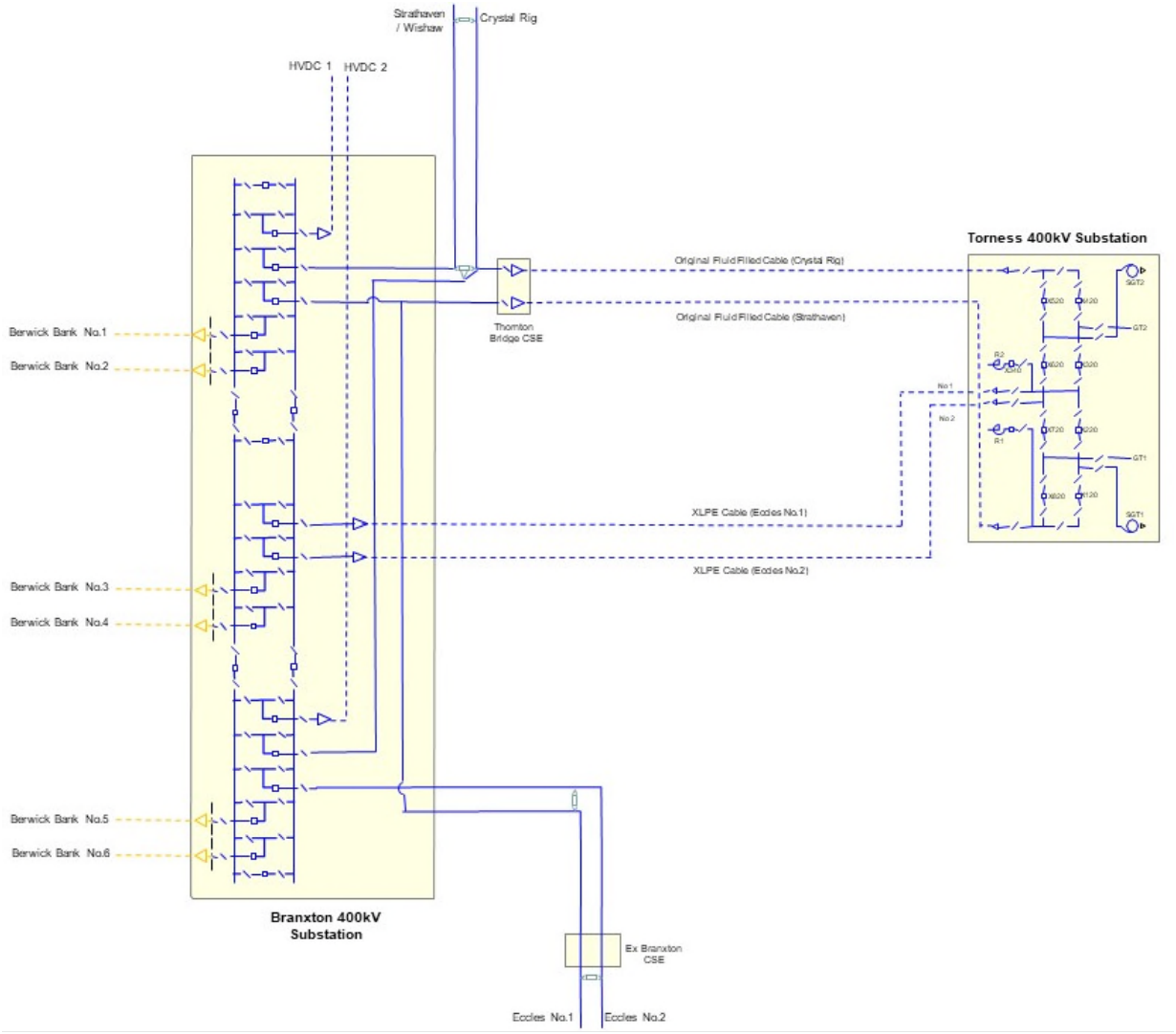


Figure 7 - Branxton 400 kV 21-bay option.

Similar to Option 5, this layout provides operational flexibility and security against an infeed loss above the NETS SQSS limit. It accommodates future bays for the 2,300MW element of the wider Berwick Bank project in line with the current contracted position and bypasses the thermally limiting Torness 400kV cables.

Subject to detailed design, further extension could accommodate additional offshore wind capacity e.g. the 1,850MW balance of the wider Berwick Bank project or ScotWind capacity. This configuration further mitigates the outage requirements which would be necessary for such extension in Option 5.

Whilst uncertainty remains around the connection of Berwick Bank Offshore Wind Farm, as indicated in Section 4.3, significant additional areas of seabed off the east coast are in the process of being leased by Crown Estate Scotland for ScotWind developments. We believe that the offshore connection bays in an initial 21-bay development at Branxton will be utilised in the foreseeable future; either by Berwick Bank or one or more other developments. The provision of these offshore bays does not form part of this MSIP Re-Opener application.

5.3 Option Assessment

As described in our RIIO-T2 Business Plan Annex 8[17], while most engineering justification papers have a CBA aligned with the RIIO-T2 CBA model, projects in the following categories do not:

- Live projects rolling over from RIIO-T1, since they have already initiated, with decisions made during the previous price control.
- Customer connection projects, as the proposed approach is based on agreement with the connecting party as they will bear a sizeable proportion of the costs incurred.
- TO Reinforcements associated with new connections, where the options considered are evaluated purely based on the lowest cost solution, which meets the project objectives, as the benefits are all comparable.
- Projects justified through the Network Options Assessment Process as these are subject to an extensive and rigorous CBA process by the Electricity System Operator who can consider market options, and different options which may be offered by Transmission Owners.

Projects in the four categories above have an associated document (this MSIP Re-Opener application in respect of Branxton 400kV Substation) explaining the feasible options and the reasoning behind the selection of the preferred investment option.

The short-listed options relating to the co-ordinated development of the transmission system in the Torness area to enable the connection of an Eastern HVDC Link, and significant offshore wind connection, are described in Section 5.2 while Table 5 summarises the key benefits and disadvantage of each option.

[17] Annex 8 - Cost Benefit Analysis Methodology (spenergynetworks.co.uk)

Table 5: Option Benefits, Drawbacks and Selection Outcome

	Option	Outcome of Initial Review	Key Advantage	Key Disadvantage	Option Outcome
4	New 14-bay GIS substation at Branxton.	Proposed for Further Consideration	Lowest up-front cost "minimum build".	Provides no facilities for offshore wind development and is therefore inconsistent with contracted and planned offshore wind development.	Rejected
5	New 23-bay GIS substation at Branxton.	Proposed for Further Consideration	Enables the connection of Eastern HVDC Link and the contracted 2,300MW element of Berwick Bank Offshore Wind Farm, while bypassing the thermally limiting Torness 400kV cables. The three-section design provides operational flexibility and security.	Higher capital cost relative to Option 6 due to additional two 400kV GIS bays, which are at increased risk of asset stranding following closure of Torness Power Station.	Rejected
6	New 21-bay GIS substation at Branxton.	Proposed for Further Consideration	Lower capital cost relative to Option 5 due to rationalisation of two 400kV GIS bays, minimising risk of asset stranding following closure of Torness. Mitigates the outage requirements necessary for future extension of the busbar system relative to Options 4 and 5.		Proposed

Option 6 is therefore the preferred investment option for the timely and co-ordinated connection of:

- The proposed 2,000MW Eastern HVDC Link to the north east of England; and
- A significant amount of offshore wind generation from the North Sea at Branxton, including the 2,300MW contracted Berwick Bank Offshore Wind Farm development.

The timing of the proposed capital investment is aligned with the current programme for the commissioning of the Eastern HVDC Link to Hawthorn Pit (and the contracted connection programme for Berwick Bank Offshore Wind Farm).

There is no market based alternative to the preferred investment option.

6. Proposed Works

6.1 Summary

The proposed configuration of Branxton 400kV GIS Substation, to be constructed adjacent to the existing CSE compounds at Thornton Bridge and Branxton, is indicated in Figure 7 above.

It is proposed that the development of the substation is progressed on the basis of an initial 21 bay installation. The detailed design of the site will incorporate provision for future extension of the busbar system at a later date should this be necessary e.g. to facilitate further offshore wind or associated developments.

The new Branxton 400kV GIS Substation will connect the following circuits:

- Crystal Rig/ Torness 400kV
- Eccles No.1/ Torness 400kV
- Eccles No.2 400kV
- Strathaven 400kV
- Torness No.1 400kV
- Torness No.2 400kV
- Eastern Link No.1
- Eastern Link No.2

Direct GIS/cable terminations will be employed to help minimise the substation footprint and associated civil platform work.

The substation will be developed to accommodate six Interface Points between the Onshore Transmission System and the Berwick Bank Offshore Transmission System, to be located at the 400kV GIS/ cable terminations within Branxton 400kV Substation. The offshore developer will be responsible for all works between the offshore wind farm and the onshore Interface Points. SPT will be responsible for the remainder of the connection works.

The number of bays for the 2,300MW element of the Berwick Bank development may be subject to change as the offshore developer refines and optimises the design of the offshore wind farm and associated offshore transmission system. These bays do not therefore form part of this MSIP Re-Opener application, but will be reflected in SPT's contracting strategy for the GIS.

6.2 Overhead Line Works

Detailed engineering confirms that the required connectivity can be achieved with the installation of only one additional 400kV overhead line tower. This terminal tower will extend the existing Branxton - Eccles 400kV overhead line (ZT) route from the existing CSE compound by a single span to the location of the new substation. New cross arms will require to be installed on the existing Thornton Bridge – Crystal Rig 400kV overhead line (ZS) route terminal tower, enabling the downleads to be diverted into the new substation compound.

Overall, the extent of the overhead line works required helps to minimise associated environmental impacts and wider project programme risks.

The works described above would be common to each of Options 4, 5 and 6 in Section 5.2.

6.3 Cable Works

No modification of the Thornton Bridge – Torness 400kV fluid filled cable systems is required.

The Branxton – Torness 400kV XLPE cable systems will be diverted to terminate in the new Branxton 400kV Substation, requiring the installation of short sections of new 400kV cable and associated joints.

Existing equipment within the Branxton CSE compound will be removed as required to enable the overhead line arrangement described above.

The works described above would be common to each of Options 4, 5 and 6 in Section 5.2.

6.4 Civil Engineering Works

Branxton 400kV Substation will be of an indoor GIS design. The primary civil engineering works for the development of Branxton comprise:

- The design and construction of the site civil platform;
- The design and construction of the GIS building;
- The design and construction of foundations and structures necessary to support the equipment within the new substation; and
- Enabling works to achieve the above e.g. works to facilitate temporary and/or enduring accesses for construction, operation and maintenance purposes.

To facilitate the construction of the new substation, and to minimise disruption to the local community, it is planned to construct a temporary access road which will remove a high proportion of heavy goods vehicles from the local road network. In addition, it is proposed to build a construction compound close to the A1 to service the main construction deliveries and welfare requirements.

The works described above would be common to each of Options 4, 5 and 6 in Section 5.2.

In view of the works which will be required to establish the civil platform for the substation, an alternative location for the site was considered. While this alternative would have reduced the extent of civil platform works, any economic advantage was eliminated by the virtue of the additional overhead line and cable works required to deliver the necessary network connections.

The preferred location of the Branxton 400kV Substation balances technical requirements, economic considerations, the impact on the environment and the people who live, work and enjoy spending time in the area.

6.5 Environmental and Consent Related Works

The new Branxton 400kV Substation is a vital part of the proposed Eastern HVDC Link project, which will provide additional transmission capacity between Scotland and England.

There are three core elements to the wider Eastern Link project:

- A new 400kV substation (Branxton);
- A new converter station; and
- Underground and marine cables.

SPT has taken a co-ordinated approach to all aspects of these works in view of the need to deliver an overall and integrated solution which recognises potential interaction and cumulative impacts.

The Branxton 400kV Substation project requires planning consent from East Lothian Council.

A Pre-Application Notification was submitted to East Lothian Council on 17th September 2021, followed by public consultation completed in Q4 2021. A full and formal planning application was submitted to East Lothian Council on the 14th December 2021.

6.6 Stakeholder Engagement

SPT's Stakeholder Engagement Plan for Branxton and the wider Eastern HVDC Link is closely aligned to our wider Stakeholder Engagement commitments as outlined in our RIIO-T2 business plan. It centres around timely engagement with a wide range of stakeholders to achieve mutually acceptable outcomes. We recognise that stakeholders' influence and interest in the project will vary as the project develops and that stakeholders' opinions may change over time.

Full details of our stakeholder engagement is provided in the December 2021 Eastern HVDC Link - Torness to Hawthorn Pit LOTI FNC Section 4 and Appendix 2 (an extract of which is included as Appendix B to this document).

Further detail can also be found on the Eastern HVDC Link project website: Introduction - SP Energy Networks.

We also continue to work closely with SSER as they develop their proposals for the Berwick Bank Offshore Wind Farm.

7. Project Cost Estimate

As agreed with Ofgem, a further submission will be made at the right time relating to the associated amendments to the outputs, delivery date and allowances to be detailed in LSpC 3.14 Appendix 1. The detail in this section is therefore indicative pending that further submission.

7.1 Estimate Total Project Costs

Aligned with the format of the Re-Opener Pipeline Log, Table 6 details the expected energisation year and the current view of potential direct capital expenditure.

Table 6: Estimated Incidence of Expenditure

	Potential direct capex value per year, £m, 18/19 price base								
Energisation Year	Yr 21/22: direct capex	Yr 22/23: direct capex	Yr 23/24: direct capex	Yr 24/25: direct capex	Yr 25/26: direct capex	Yr 26/27 (T3): direct capex	Yr 27/28 (T3): direct capex	RIIO-T2 Total: direct capex	Total: direct capex
2026/27	0.50	6.19	15.04	19.28	27.39	14.06	0.18	68.41	82.65

The capital expenditure associated with the two Eastern HVDC Link bays forms part of the Eastern HVDC Link LOTI Final Needs Case submission. It is not included in this MSIP Re-Opener application.

7.2 Regulatory Outputs

The indicative primary asset outputs are identified in Table 7 below:

Table 7: Regulatory Outputs Table (Volumes)

Asset Category	Asset Sub-Category Primary	Voltage	Forecast Additions	Forecast Disposals
Circuit Breaker	CB (Gas Insulated Busbar) (ID)	400kV	13	
Other switchgear	Disconnector (AIB)	400kV	1	
Cable	Substation Cable - 1 core per phase	400kV	1.6	
Overhead Tower Line	Tower	400kV	1	
Overhead Tower Line	400kV OHL (Tower Line) Conductor	Rating <=2550 MVA	0.2	
Overhead Line Fittings	Fittings	400kV	2	

As indicated, the capital expenditure associated with the two Eastern HVDC Link bays forms part of the Eastern HVDC Link LOTI Final Needs Case submission and the associated assets are not therefore included in Table 8 above.

8. Delivery

We have applied our project management approach to ensure that this project work is delivered safely, and in line with the agreed time, cost and quality commitments. We have a proven track record of delivering essential transmission network upgrade projects and will draw upon this knowledge and experience to effectively manage these works. We have assigned a dedicated Project Manager to the works at every stage who will be responsible for overall delivery of the scope and is the primary point of contact for all stakeholders.

8.1 Delivery Schedule

A standard approach has been applied to the planning phase of these works and that will continue for the reporting and the application of processes and controls throughout the lifecycle. Table 8 summarises the key milestones within the delivery schedule.

Table 8: Key Milestone

Milestone	Phase	Estimated Completion Date
1	Planning application submission	December 2021
2	ITT long lead items (GIS equipment)	February 2022
3	ITT Enabling civil works	November 2022
4	Award GIS contract	December 2022
5	Award Enabling civil works	April 2023
6	ITT Balance of Plant	May 2024
7	Award Balance of Plant	January 2025
8	Transfer existing circuits	October 2025 to October 2026

Regular meetings with the Project and Construction Management Teams shall be undertaken to assess the ongoing effectiveness of the Project Management interfaces.

The Project Manager will facilitate internal Project Team Meetings, in which project progress and deliverables will be reviewed and any arising risks or issues will be discussed and addressed.

8.2 Risk and Mitigation

A Risk Register was generated collaboratively during the initial design stages to identify any risks, which if realised, could result in deviation from the delivery plan. Mitigation strategies have also been developed to manage the risks identified and these will be implemented by the Project Manager. The risk register shall remain a live document and will be updated regularly. Currently, the top scheme risks are:

- Impact of Covid on supply chain for plant and materials
- Impact of Brexit on the supply for plant and materials
- Securing planning and other consents
- Ground conditions/ civil works
- Utilisation of new SF_6 free GIS technologies

8.3 Quality Management

SPT Projects shall undertake regular inspections on projects and contractors to monitor and measure compliance with SPT environmental, quality and Health and Safety requirements, as detailed in the Contract specifications for the work. All inspections shall be visual, with the person undertaking the inspection ensuring that evidence of the inspection and any actions raised are documented.

The following inspections shall be completed:

- Quality Inspections (monthly)
- Environmental Inspections (monthly)
- Safety Assessments & Contractor Safety Inspection (daily, with full time Site Manager)
- Project Management Tours (monthly)

The scope of audits and Inspections is to determine compliance with:

- Procedures & Guides
- Planned arrangements for ISO 9001, 14001 & 18001
- Legal and other requirements.

9. Conclusion and Recommendations

This MSIP Re-opener application demonstrates the need to establish Branxton 400kV Substation, with works commencing in the RIIO-T2 period (April 2021 – March 2026) and completing in the RIIO-T3 period, to enable the timely and co-ordinated connection of the proposed 2,000MW Eastern HVDC Link to the north east of England. These works will also:

- Prepare the network for the connection of a significant amount of offshore wind generation from the North Sea at Branxton, including the 2,300MW contracted Berwick Bank Offshore Wind Farm development.
- Prepare the network for the closure of Torness Power Station, currently expected in RIIO-T3, and the subsequent rationalisation/ decommissioning of the Torness 400kV GIS; and
- Eliminate some of the thermal bottlenecks in the SPT network around Torness, which can impact both Scottish import and export capability.

The main conclusions of this submission are:

- The timely connection of low carbon generation, including offshore wind, will play a vital role in reaching legislated net zero targets, and is aligned with SPT's RIIO-T2 strategic goals.
- It is necessary to make significant investment in the capability of the existing transmission system from Scotland to the north of England to accommodate growth in renewable generation. This is required to maintain and operate an economic and efficient transmission system. It is critical to allow the network to keep pace with projected growth to support legislated Net Zero targets whilst also enabling significant constraint savings.

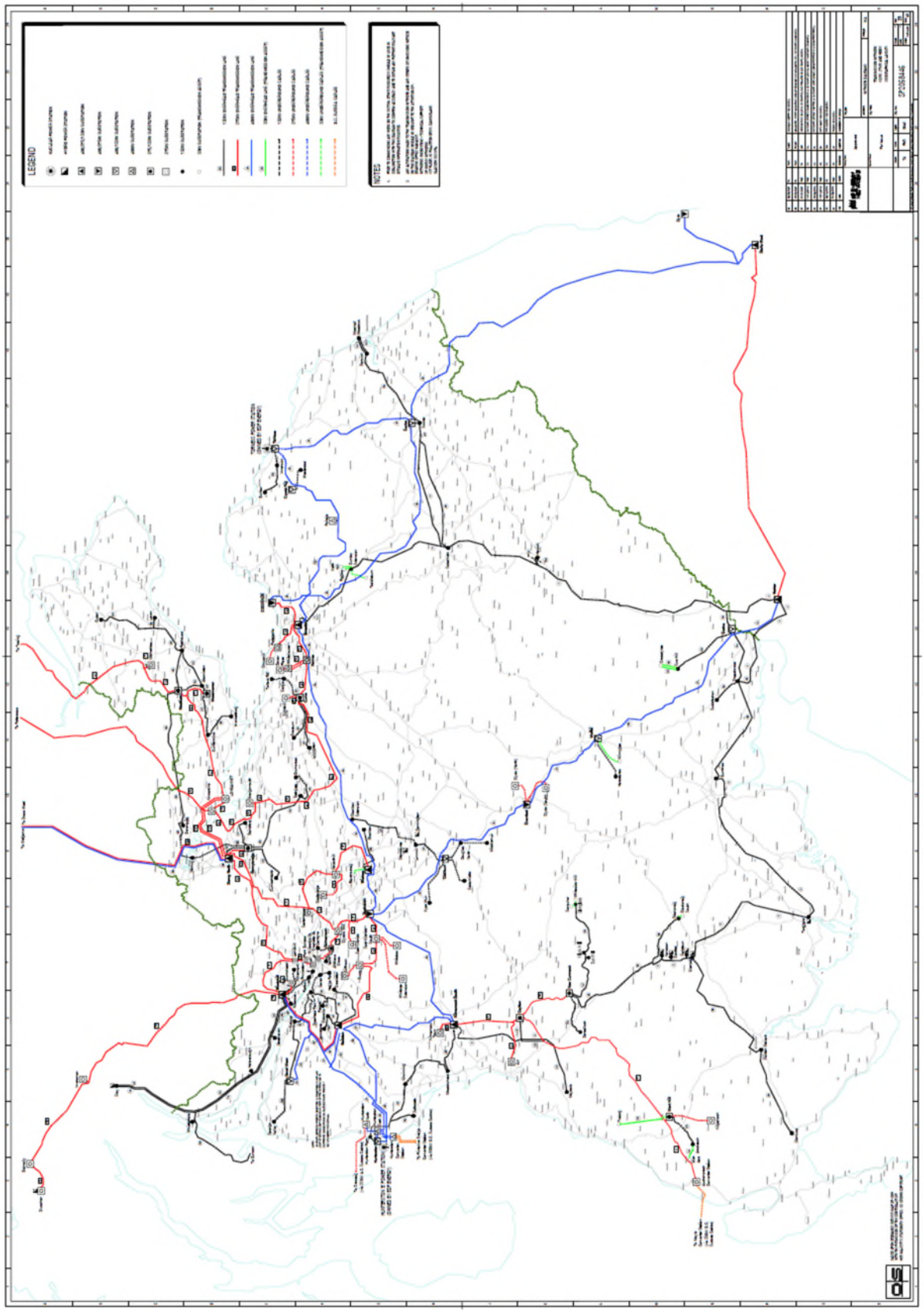
- The connection points at Branxton 400kV Substation will require to be available prior to the commissioning of the Eastern HVDC Link.
- An MSIP Re-opener application is required in respect of these works.

We, respectfully, request Ofgem's agreement to the following :

- The option being progressed addresses a clear customer need and represents value to UK consumers, therefore, the works should proceed based on the preferred solution (Option 6).
- Efficient expenditure is fully funded, as necessary to maintain programme timelines and mitigate project delivery risk e.g. order long-lead equipment, prior to the second stage submission and assessment.

At this time discussion with the Berwick Bank Offshore Wind Farm developer is ongoing alongside the BEIS and Ofgem led OTNR project. This will be reflected in SPT's contracting strategy for the 400kV GIS equipment. We will continue to develop the detailed design for Branxton 400kV Substation against this background, and in line with the requirements other stakeholders, including EDF in respect of Torness Power Station.

Appendix A - SP Transmission System, Geographic Overview



Appendix B - Responding to Stakeholder Feedback

The following is an extract from the December 2021 Eastern HVDC Link - Torness to Hawthorn Pit LOTI FNC, Appendix 2. This appendix outlines the key themes from stakeholder engagement, identifying stakeholder asks along with the engagement activities carried out. It should be read in conjunction with Section 4 of the same document. Further detail can also be found on the project website: Introduction - SP Energy Networks

SPT Onshore Engagement Activities

Key Theme: "Design and build a solution that is sensitive to the local communities and the environment"

Option Appraisal Approach

During the options appraisal process to consider site and route options, consultation with statutory consultees and other organisations was undertaken to obtain existing environmental data. In addition, stakeholder feedback on the options considered was sought. This included an options appraisal workshop held in July 2020 with members of the planning and landscape teams at East Lothian Council, NatureScot, Scottish Environment Protection Agency (SEPA) and Historic Scotland. Discussions were also held with EDF Energy in terms of the licenced nuclear site boundary. Further discussions were held with East Lothian Council in early 2021 to discuss the site options.

The robust and detailed Options Appraisal, carried out in consultation with East Lothian Council, has led to a site being selected that is considered to have the least impact on the environment and the local communities. The proposed converter station location is sited on an infilled quarry and is located adjacent to an Energy Recovery Facility and Cement Works at Dunbar. There are no environmental designations on the site and no residential properties border the area. The site is also supported by good access.

The design of the converter station will consider views into the site and how the layout design can minimise impacts on those views.

Screening Opinion

In March 2021 SPT submitted a request for a screening opinion to East Lothian Council. The Screening Opinion from East Lothian Council confirmed that an Environmental Impact Assessment (EIA) is required.

Scoping Opinion

In order to determine which aspect of the Project are likely to give rise to environmental effects and to inform the requirements and content of the EIA Report, SPT prepared a Scoping Report, which was submitted to East Lothian Council on 30 June 2021 together with a request for a Scoping Opinion under Regulation 17 of the EIA Regulations. The Scoping Report set out the components comprising the development, topics to be assessed, proposed assessment methodologies and mitigation as well as topics to be scoped out of the EIA.

The purpose of scoping is to ensure that the EIA process focuses on the key environmental issues. Therefore, the Scoping Report sought to focus the EIA on the main effects, with each of the topic-based chapters within the Scoping Report setting out a provisional list of significant effects prior to mitigation and a second provisional list of non-significant effects to be 'scoped out' of full assessment. These were drafted on the basis of the findings of the preliminary survey work undertaken, the professional judgement of the EIA team, experience from other projects of a similar nature, and guidance and standards of relevance to the topic area in question.

The EIA will be undertaken to assess the potential effects of the converter station on the local environment and communities. This will include specific information requested by stakeholders included within the EIA Report.

A landscaping plan will be developed as part of the EIA to include measures to mitigate potential effects, including the use of planting and earthworks to screen or break up views of the converter station, with the aim to achieve no net loss of biodiversity.

Key Theme: "Minimise the effect of additional infrastructure on the East Lothian area"

Public Consultation

Having identified preferred site and route options, public consultation was undertaken in August 2021 to invite views on the preferred option for the proposed development and information on any other issues, suggestions or feedback, particularly views on the local area, for example areas used for recreation, local environmental features. The consultation consisted of:

Week commencing 9th and 16th August 2021 SPT hosted online chats with members of the public. They were able to chat to the project team about the project and consultation material via an online chat function to the SP Energy Networks website. During week commencing 23rd August 2021 SPT hosted drop-in sessions to allow residents to meet and ask questions of the project team via an online video function. Material was also available to view at Dunbar library and at Innerwick Village Hall as well as online via the SP Energy Networks website. SPT also briefed MPs, MSPs, local ward councillors and community councillors.

Powering Scotland Towards Net Zero

Eastern Link Project

SP ENERGY NETWORKS

We'd like your views

Scotland is a world leader in the fight against climate change. Our country has a target of Net Zero carbon emissions by 2045, with the UK committed to Net Zero by 2050. To help meet those targets, SP Energy Networks is consulting on a vital new energy link between Scotland and England, known as the Eastern Link Project.

To enable us to deliver this crucial project, we need to build a new substation and converter station and lay underground cables and marine cables at our preferred locations in East Lothian. We would like to hear your views on the preferred options to help us develop our plans. We will then carry out an environmental impact assessment, consult with you again and submit planning applications to East Lothian Council.

Due to Covid-19 restrictions we are unable to hold public exhibitions to outline our plans, but we will be holding a series of online events to explain our proposals and answer any questions you may have.

Our consultation events will be held on the following dates:

- Tuesday 10th August 2021 (8am-12 noon)
- Thursday 12th August 2021 (4pm -8pm)
- Thursday 19th August 2021 (4pm – 8pm)
- Friday 20th August 2021 (8am – 12 noon)

You can also meet the team on 24th August (6 - 8pm) and 26th August 2021 (8 - 10am).

You can find full details, maps and documents at our website:
www.spenergynetworks.co.uk/eastern_link

You can also share your views or request a paper feedback form or a call back by phone on 0800 093 1664, or email to info@tornesseasternlink.com

better future, quicker

What disruption can I expect?

Some disruption will be inevitable in a project of this size, but it is too early to be precise until we have developed our final proposals. We always take every opportunity to minimise the impacts of construction and we will talk to all local communities who will be affected. Detailed information will be available in the next round of consultation.

SP Energy Networks will work in partnership with the local community to minimise local access and transport issues. We will aim to minimise any potential impact on environmentally sensitive areas and have carried out a detailed siting and routing assessment to identify and avoid these areas wherever possible. Following consultation, we will be carrying out detailed surveys and assessments of the proposed options.

Once construction is completed, disruption to the local community is expected to be minimal. The converter station will have no permanent staff presence however there will be a requirement to carry out routine maintenance.

Why is it important to take part in the consultation?

It is important that we hear the views of local people and we'll be speaking to local communities, landowners and elected representatives to explain our plans and ask for feedback.

We will be holding virtual public consultation events for the project, from 2nd to 27th August 2021 for you to explore the material and share feedback.

We are in the planning stages of the project, and we will need consent from East Lothian Council before our plans are finalised. As part of the process, we'll be presenting our plans to the local community and getting your feedback on our proposed project. To do this, we will be holding online virtual public consultations via our dedicated website.

Due to the ongoing restrictions surrounding Covid-19, our public consultation will be online and can be accessed at **www.spenergynetworks.co.uk/eastern_link**. As well as providing information about the proposal, the website and consultation provides an opportunity to see an online 3-D model of the proposals.

How are we consulting?

We will be holding online virtual public consultations via our dedicated website: **www.spenergynetworks.co.uk/eastern_link**
We are holding live Q&As and meet the team video sessions on our website so that you can engage with the team directly.

Our consultation dates and times are below:
LIVE Q&AS DATES AND TIMES
TUESDAY 10th August 2021 (8am – 12 noon)
THURSDAY 12th August 2021 (4pm – 8pm)
THURSDAY 19th August 2021 (4pm – 8pm)
FRIDAY 20th August 2021 (8am – 12 noon)

MEET THE TEAM VIDEO SESSIONS DATES AND TIMES
TUESDAY 24th August 2021 (6pm – 8pm)
THURSDAY 26th August 2021 (8am – 10am)

You can also share your views by phone on 0800 093 1664, or email to info@tornesseasternlink.com

Further to this, specific consultation in relation to the proposed substation development has been undertaken. A Proposal of Application Notice (PAN) was submitted to East Lothian Council (reference 21/00004/PAN) in accordance with Town and Country Planning (Development Management Procedure) Regulations (Scotland) 2013 and the relevant provisions of the Town and Country

(Scotland) Act 1997 (as amended) on 15 September 2021. The PAN included details of the public exhibitions to be held to inform local communities and other local stakeholders of the project.

The Eastern Link Project

Branxton Substation – Consultation

At SP Energy Networks we keep electricity flowing to homes and businesses throughout Central and Southern Scotland, North Wales, Merseyside, Cheshire and North Shropshire. We do this through the network of substations, overhead lines and underground cables, which we own, operate and maintain.

We are undergoing unprecedented change to the way electricity is generated and used and as the distribution and transmission operator, we're committed to delivering a cleaner, greener future.

To help deliver this greener energy to homes and businesses across the UK, we need to increase flexibility of our network between Scotland, with its renewable energy capacity, and England.

By 2030, the Government's target is for 40GW of offshore wind to be delivered - enough to power every home in the UK.

To meet our target, we need to increase the capacity of the electricity network between Scotland and its reserves of renewable energy, with the rest of the UK whilst ensuring Scotland remains supported by a secure and stable supply of energy.

Scotland is committed to becoming net zero in all greenhouse gases by 2045, with England and Wales committed to net zero by 2050.

www.spenergynetworks.co.uk/eastern_link

The Eastern Link Project

Branxton consultation

OUR PROPOSALS

As part of the Eastern Link project, we are consulting on three core areas which you can find more information about here. For this consultation we would like feedback on our proposals for a new substation in Branxton.

The new substation is both a vital part of the proposed Eastern Link project which will provide a new energy link between Scotland and England and a connection point for significant offshore green energy generation.

The new substation at Branxton will enable connections between proposed offshore generation and the existing network via the proposed converter station at Oxwell Mains and subsea HVDC cables. Underground cables will also link the substation to both the proposed converter station and subsea cable landing site near Torness.

Proposed substation at Branxton

Our proposals for the Branxton site would include:

- a new permanent access point from the local public road to substation compound;
- a new building which will house gas insulated electrical switchgear and plant;
- overhead line (OHL) terminal gantries;
- parking provision for staff
- a diesel generator;
- a small distribution substation building to provide ancillary power, lighting, heating and ventilation;
- a new 3 m high steel palisade security fence with 1.2m power fencing above around the perimeter and internal fencing around the live compound;
- main water connection or grey water harvesting and storage;
- removal of existing vegetation and mitigation planting
- a 265m section of overhead line
- underground cable diversions.

www.spenergynetworks.co.uk/eastern_link

Consultation events were scheduled for Tuesday 26th and Thursday 28th October with the consultation running until 12th November 2021. Public exhibition material was also available at Dunbar library and Innerwick Village Hall.

Further details can be found in the Pre-application Consultation Report (PAC) submitted as part of the application for consent for the proposed substation development.

Further pre-application consultation for the converter station is scheduled for Q1 2022.

Key Theme: ***Build a solution which minimises disruption to landowners***

Towards the end of the options appraisal process, SPT identified all landowners who own land within the proposed development boundary. Owners were identified via a title deed search at the Land Registry.

SPT made contact with these landowners to make them aware of the proposal and of the potential for the proposal to directly affect land owned by them. SPT encouraged individual landowners to attend the consultation events to discuss the proposal with SPT staff and, in addition, offered individual face-to-face meetings with each landowner.

Following the consultation period and during the detailed design stage of the proposed development, SPT has continued to hold individual meetings with landowners and their representatives to gather feedback on the design. For reasons of privacy and commercial confidentiality, the details of these meetings and discussions are not included here. However, SPT has sought to address the concerns raised and suggestions received from landowners where reasonable and where other technical, environmental and economic considerations allow.