MSIP Re-opener Application Stage 1 – Glenglass 132kV Substation		
Ofgem Scheme Reference/ Name of Scheme	SPT200199 / SPT-RI-302 – Glenglass 132kV Substation	
Investment Category	Local Enabling (Entry)	
Primary Investment Driver	Connection of customer-driven onshore wind generation	
Licence Mechanism/ Activity	Special Condition 3.14 Medium Sized Investment Projects Re-opener and Price Control Deliverable/ Clause 3.14.6 (a)	
Materiality Threshold exceeded (£3.5m)	Yes, as a single project due to the threshold for activity 3.14.6 (a)	
PCD primary Output	Generation: (MW)	
Total Project Cost (£m)	17.831	
Funding Allowance (£m)	To be confirmed	Requested
Delivery Year	2025/26	
Reporting Table	Annual RRP – PCD Table	
PCD Modification Process	Special Condition 3.14, Appendix 1	

Issue Date	Issue No	Amendment Details
31st January 2023	1	First issue of document.

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Table of Contents

1. Abbreviations / Terminology

Table 1: Table of Abbreviations

Abbreviation	Term
AIS	Air Insulated Switchgear
BEIS	Department for Business, Energy & Industrial Strategy
CDM	Construction Design and Management
CEC	Connection Entry Capacity
CfD	Contracts for Difference
CT	Current Transformer
ESO	Electricity System Operator
GIS	Gas Insulated Switchgear
GSP	Grid Supply Point
ITT	Invitation to Tender
Km	Kilometre
kV	Kilovolt
LC	Licence Condition
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
PCD	Price Control Deliverable
RAA	Restricted Availability Access
RIIO	Revenue = Incentives + Innovation + Outputs
SCADA	Supervisory Control and Data Acquisition
SGT	Supergrid Transformer
SHET	Scottish Hydro Electric Transmission
SPT	SP Transmission
SPEN	SP Energy Networks
STC	System Operator – Transmission Owner Code
VDUM	Volume Driver Uncertainty Mechanism
TO	Transmission Owner
TOCA	Transmission Owner Construction Agreement
VT	Voltage Transformer

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

3. Introduction

This MSIP Re-opener application sets out SPT's plans to carry out reinforcement work under SPT-RI-302 at Glenglass 132kV Substation within the RIIO-T2 period (April 2021 – March 2026). These works comprise the establishment of a new 132kV Substation utilising Gas Insulated Switchgear (GIS) and the reinforcement of 132kV underground cables at Blackhill substation to allow a minimum pre-fault summer rating of 220MVA on the Blackhill – Glenglass No.1 and No.2 circuits. The establishment of a new 132kV GIS substation at Glenglass will facilitate the connection of new renewable generation and the future extension of the south west Scotland 132kV network from Glenglass 132kV substation to the proposed Glenmuckloch 400/132kV substation, under SPT-RI-173, which itself will enable the connection of a planned pumped storage hydro scheme at Glenmuckloch and further renewable generation developments.

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 activity (a):

"3.14.6 The licensee may apply to the Authority for a direction amending the outputs, delivery dates or associated allowances in Appendix 1 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)"

Applying the RIIO-T2 Generation Connections Volume Driver Uncertainty Mechanism (VDUM) to this project results in the £17.831m estimated total project cost being £10.164m higher than the £7.667m allowance provided by the VDUM. An MSIP Re-opener application is therefore appropriate.

Full justification for the preferred investment option is presented within this MSIP Re-opener application document, together with a detailed description of the proposed solution.

The estimated total project cost may be subject to change. 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 as a Price Control Deliverable (PCD) 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 need identified in Section 4. The results of an evaluation of the alternative options are presented and the reasoning behind the selection of the preferred investment option is summarised.

Section 6 – Proposed Works

This section provides a description of the proposed solution. It sets out the project 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
7	Project Cost Estimate	3.12, 3.19, 3.20
8	Project Delivery	3.15, 3.16, 3.17

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

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 duty: -

- *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.*

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

- To at all times 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 at all times 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 available those parts of its transmission system which are intended for the purposes of conveying, or affecting the flow of, electricity so that such parts are capable of doing so and are fit for those purposes (LC D2); and
- To offer to enter into an agreement with the system operator on notification of 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 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 onshore wind, will play a vital role in reaching these legislated net zero targets. 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. In December 2022 the Scottish Government published its Onshore Wind Policy Statement, setting out its ambition deploy 20GW of onshore wind capacity by 2030.

On 9th September 2021, the Department for Business, Energy & Industrial Strategy (BEIS) announced a £265m[2] budget per year for the Contracts for Difference (CfD) Allocation Round 4, which launched on 13th December 2021 and concluded on 7th July 2022. For the first time since 2015, established technologies, including onshore wind, were able to bid. Given lowering technology costs and a

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

favourable subsidy regime, this will support a considerable number of onshore renewables projects to successfully transition from project inception and development through to energisation[3].
The next CfD auction, Allocation Round 5, is due to open in March 2023, with annual auction rounds expected thereafter.

4.3 Glenglass 132kV Substation – Background

Glenglass 132kV Substation forms part of the SPT network in south west Scotland, situated to the east of New Cumnock 275/132kV substation.

A geographic overview of the existing SPT system is provided in Appendix A, and an extract from this geographic overview, indicating existing transmission network connectivity in proximity to Glenglass 132kV Substation, is included in Figure 1.

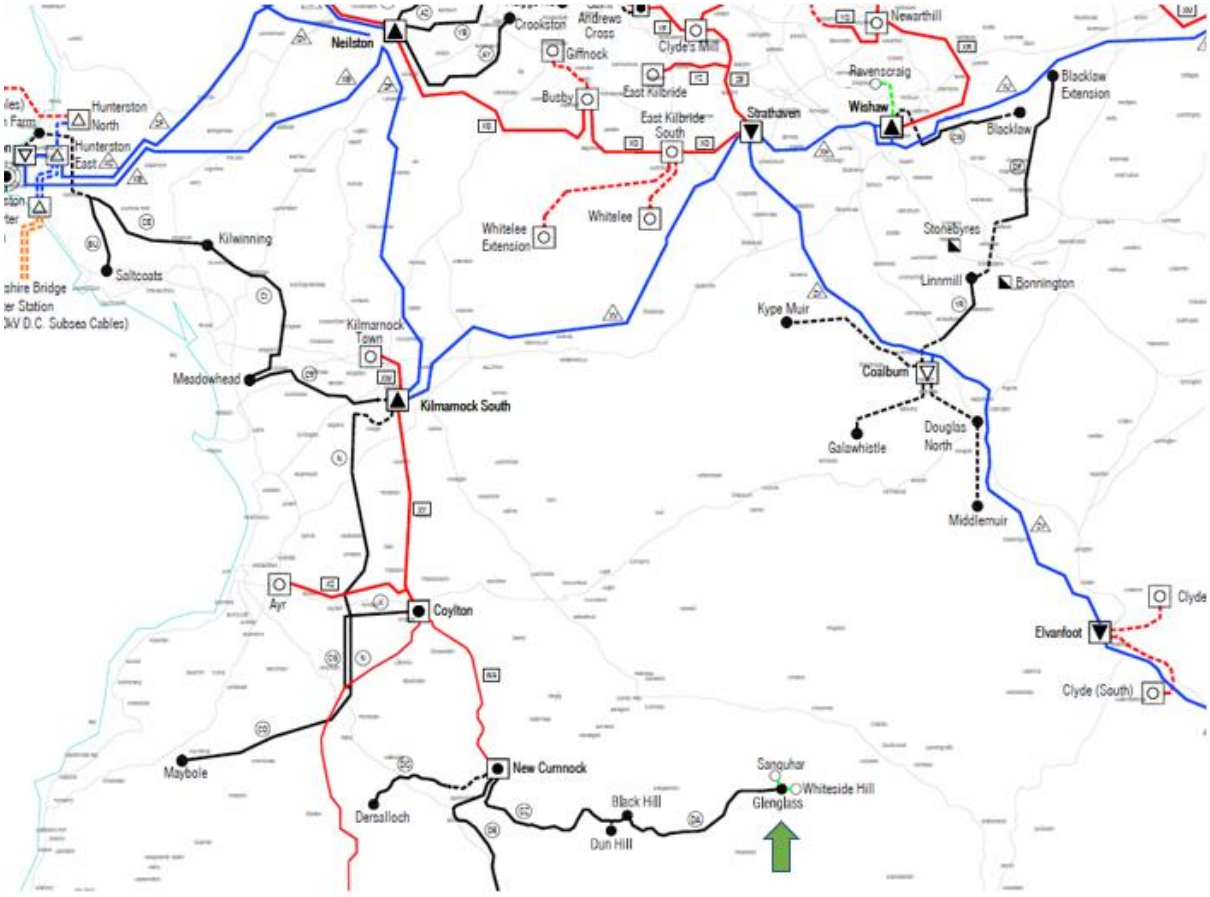

Figure 1: Geographic Indication of Glenglass 132kV Substation

Glenglass 132/33kV substation was commissioned in 2017 and is connected to the SPT network via two 132kV overhead line (OHL) circuits that enter the site from the west side of the substation. These OHL circuits are incoming circuits from Blackhill 132kV substation and are effectively an extension of the 132kV transmission network from New Cumnock 132kV Substation via Blackhill 132kV Substation.

[3] BEIS Electricity Generation Costs (2020) - GOV.UK (www.gov.uk)

The Blackhill - Glenglass No.1 and No.2 circuits connect two 90MVA 132/33kV Transformers (Glenglass T1 and T2), with the low voltage side of the transformers providing two incoming 33kV circuits to a single busbar, 6 bay, 33kV GIS switchboard within the Glenglass 132/33kV substation site.

4.4 Glenglass 33kV Substation – Existing Renewable Generation Capacity

There are 3 wind farm connections, totalling 94.8MW, currently connected to the SPT 33kV GIS switchboard at Glenglass. There are no existing demand connections, and none planned at this time.

The existing 94.8MW of renewable generation capacity currently connected into Glenglass 132kV Substation at 33kV is summarised in Table 4 below:

Table 4: Connected Generation at 33kV

Site	Connection Status	Capacity (MW)
Sanquhar Wind Farm	Connected	30.0
Whiteside Hill Wind Farm	Connected	27.0
Twentyshilling Wind Farm	Connected	37.8
Total Connected Capacity to date (MW)		**94.8**

4.5 Glenglass 33kV Substation – Planned Renewable Generation Capacity

A further 33.6MW (non-firm[4]) of contracted generation capacity is currently planned to be connected to Glenglass at 33kV. This planned additional generation is summarised in Table 5 below:

Table 5: Contracted Generation at 33kV

Site	Connection Status	Consent Status	Capacity (MW)	[redacted]
Glenmuckloch Wind Farm	Contracted	Consented	33.6	
Total Contracted Capacity (MW)			**33.6**	

4.6 Glenglass 132kV Substation – Planned Renewable Generation Capacity

SPT has entered into TO Construction Agreements (TOCAs) with NGESO to connect five renewable generation development sites in the Kirkconnel and Sanquhar areas to (or via) Glenglass 132kV Substation. These five generation sites are:

- Sandy Knowe wind farm;
- Sanquhar II wind farm;
- Cloud Hill wind farm;

[4] Non-Firm - *For an intact transmission network, no overloading may occur and thus the generation will not be disconnected. Following a single transmission circuit outage (planned or unplanned), the generation will be disconnected if overloading of the transmission network results. This will be dependent upon the particular network conditions (typically maximum generation and minimum load).*

- Glenmuckloch Hydro Pumped Storage (contingent upon SPT-RI-173); and
- Lethans wind farm (contingent upon SPT-RI-173).

SPT has investigated various alternative options to provide these connections and has determined that connections directly to, or via, the Glenglass substation offers the most appropriate solution.

During the process of identifying and evaluating options for each connection offer, due regard was given to the key criteria of developing and maintaining an 'efficient, co-ordinated and economical system of electricity transmission', as set out in the licence conditions. As well as determining the optimum point of connection, the most appropriate method of connection (e.g., overhead line, underground cable, wood pole vs. steel tower, connection voltage etc.) was also considered.

4.6.1 Direct Connections to Glenglass 132kV Substation

A total of 321.6MW of renewable generation capacity is contracted to connect directly to Glenglass at 132kV. This generation is summarised in Table 6 below:

Table 6: Connected/Contracted Generation - Directly Connected to Glenglass 132kV Substation

Site	Connection Status	Consent Status	Capacity (MW)	[redacted]
Sandy Knowe Stage 1 – connects to the network initially via a T-off of the Blackhill-Glenglass No.2 circuit	Connected	Consented	51 (not included in total below)	
Sandy Knowe Stage 2 & 3– connects to the network initially via a T-off of the Blackhill-Glenglass No.2 circuit	Contracted	Consented	35.4 (not included in total below)	
Sandy Knowe Stage 4	Contracted	Awaiting Consent	21.6	
Sanquhar II	Contracted	Awaiting Consent	250.0	
Cloud Hill	Contracted	Awaiting Consent	50.0	
Total Contracted Capacity (MW)			**321.6**	

Sandy Knowe:

Sandy Knowe wind farm will connect to the network in 4 stages:

- Stage 1 of the connection will accommodate 51MW generation capacity to the SPT network during [redacted].
- Stage 2 introduces a Restricted Available Access (RAA[5]) arrangement to the connection to allow it to accommodate a generation capacity between 51MW to 86.4MW.
- Stage 3 will see the requirement of the RAA removed on the completion of "SPT-RI-158 New Cumnock Substation Extension" project.
- Stage 4 will introduce a further generation capacity increase to 108MW in [redacted].

Stage 1 of the Sandy Knowe wind farm connection was energised in [redacted] To achieve this contracted connection, the Sandy Knowe feeder circuit will initially T-off the Blackhill – Glenglass No.2 circuit before being turned into a dedicated bay at the Glenglass 132kV GIS substation during its construction. There will be no change to this connection arrangement during Stage 1- Stage 3.

To remove an enduring imbalance on the Blackhill – Glenglass circuits, as part of the SPT-RI-302 projects construction works, the Sandy Knowe feeder will be turned into Glenglass 132kV GIS substation. The current programme for the SPT-RI-302 project shows that this change to the connection configuration of the Sandy Knowe feeder will be completed approximately 3 years in advance of the final stage, Stage 4 of the Sandy Knowe connection project. There will be no impact to the Sandy Knowe feeder connection configuration post-SPT-RI-302 project completion as a result of

[5] Restricted Available Access (RAA) - When the transmission network is intact, the network conditions may be such that the network becomes overloaded, requiring generation to be disconnected. Available on an interim basis only for developments with planning permission

the increase in generation capacity being connected to the network on the completion of Stage 4 of the Sandy Knowe project.

Sanquhar II

Sanquhar II wind farm is planned to connect directly into the proposed Glenglass 132kV GIS substation. It is contracted and anticipated to connect by [redacted] and will represent 250MW additional generation capacity. This connection is customer funded in accordance with SPT-TOCO-188.

Cloud Hill

Cloud Hill wind farm is planned to connect directly into the proposed Glenglass 132kV GIS substation. It is contracted to connect by [redacted] and will represent 50MW additional generation capacity. This connection is customer funded in accordance with SPT-TOCO-2277.

Figure 4 in Section 5.2.5 shows the funding split for this project between SPT-RI-302, SPT-RI-173, SPT-TOCO-188 and SPT-TOCO-2277.

[redacted]

4.6.2 Connections to Glenglass 132kV Substation via SPT-RI-173

A total of 242MW of renewable generation capacity is contracted to connect to Glenglass 132kV substation via the completion of SPT-RI-173. This generation is summarised in Table 8 below:

Table 8: Contracted Generation Connected to Glenglass 132kV Substation via SPT-RI-173

Site	Connection Status	Consent Status	Capacity (MW)	[redacted]
Glenmuckloch Pumped Storage	Contracted	Consented	210	
Lethans	Contracted	Consented	132	
Total Contracted Capacity (MW)			**342**	

As part of SPT-RI-173[6], Glenglass 132kV substation is planned to have two 132kV incoming OHL circuits from the proposed Glenmuckloch 400/132kV substation. This will further extend the 132kV transmission circuit, which originates at New Cumnock 132kV substation, to the Glenmuckloch 132kV substation via Blackhill and Glenglass 132kV substations.

The Glenmuckloch 400/132kV substation, when established, will provide a connection to the Glenmuckloch Pumped Storage facility and other planned renewable generating connections in the area, including the consented Lethans development.

The Glenmuckloch 400/132kV substation is also planned to connect into Redshaw 400kV substation as part of the works identified in SPT-RI-236. Redshaw 400kV will have a direct connection to the Strathaven – Harker 400kV (ZV) overhead line route.

4.7 Glenglass 132/33kV Substation – Generation Summary

The 3 wind farm connections which currently connect into the 33kV GIS switchboard at Glenglass provide a total renewable generation capacity of 94.8MW. This will rise to 128.4MW with the commissioning of Glenmuckloch wind farm, currently contracted in [redacted]

The total renewable generation capacity currently planned and contracted for connection directly into Glenglass at 132kV is 321.6MW.

To enable the connection of the planned generation capacity into Glenglass 132kV substation, and to accommodate the further extension of the 132kV OHL network to the future Glenmuckloch 400/132kV substation (as per SPT-RI-173), it is necessary to reinforce the Glenglass 132kV substation with the introduction of a 10 Bay, double busbar, 132kV GIS switchboard at the site.

This 132kV GIS switchboard will be SF6 free, in accordance with the SP Energy Networks RIIO-T2 Business Plan 2021-2026.

In addition to the introduction of the 10 Bay, double busbar, 132kV GIS switchboard at Glenglass, it will also be necessary to uprate the 132kV cables sections which connect the Blackhill – Glenglass 132kV OHL No.1 & No.2 circuits at Blackhill 132kV substation. The 132kV cables at Blackhill will be uprated to match the 220MVA summer pre-fault rating of the Blackhill – Glenglass 132kV OHL circuits.

4.8 Alignment with RIIO-T2 Strategic Goals

As described in our RIIO-T2 plan[7] 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 SPT-RI-302 - Glenglass 132kV GIS substation project, are summarised below:

[6] The SPT-RI-173 project is expected to be the subject of a separate MSIP Re-Opener application at a later date.
[7] SP Energy Networks RIIO-T2 Business Plan

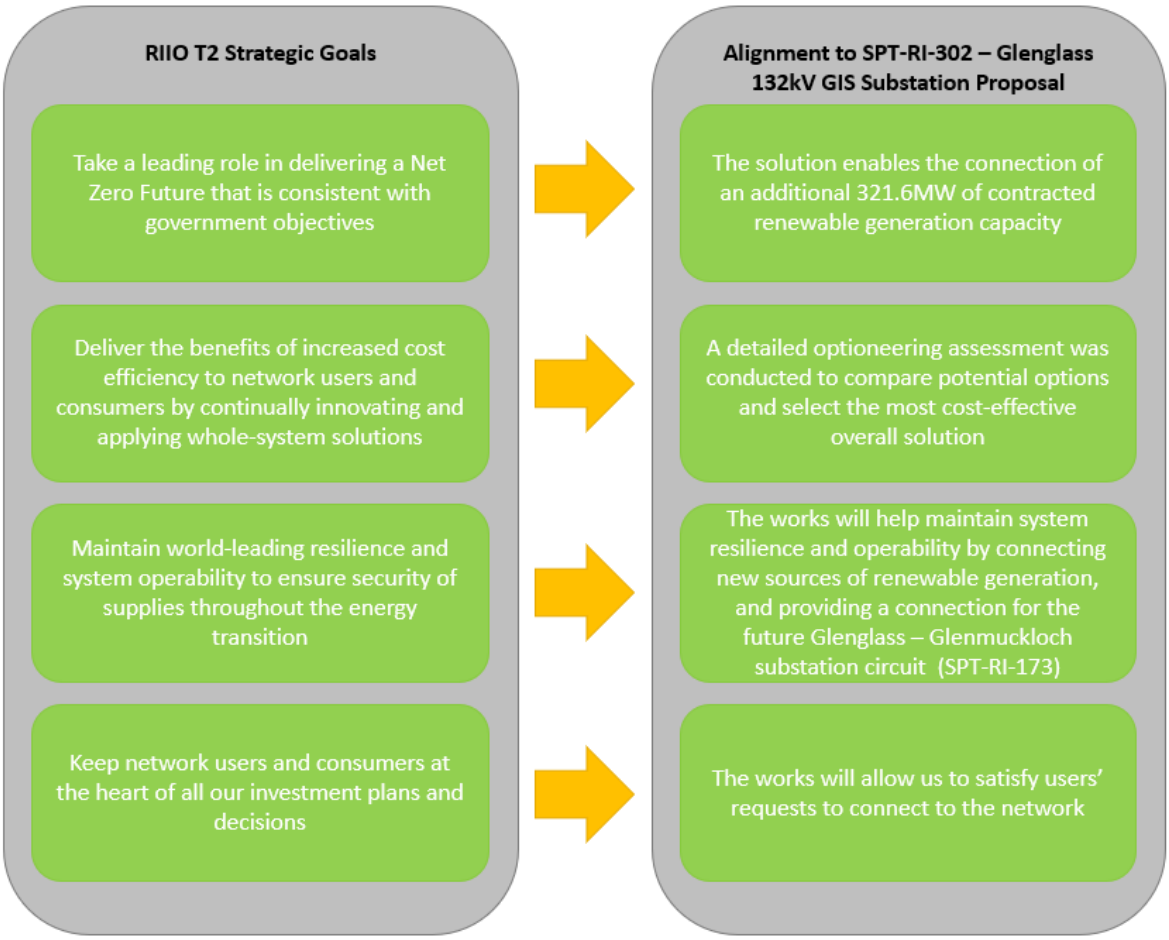

Figure 2: Alignment of the SPT-RI-302 Proposal with SPT RIIO-T2 Strategic Goals

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.

By investing in a 10 Bay, double busbar, 132kV GIS switchboard at Glenglass Substation it will enable the connection of an additional 321.6MW of contracted renewable generation capacity in the surrounding area. This will alleviate the need to constrain the renewable generation sources and will contribute 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.

Following receipt of applications for connection, SPT has worked with NGESO throughout the connection offers process to issue connection offers which reflect the most cost-effective connection solutions on a whole systems basis, compliant with the relevant technical standards.

During the Optioneering phase of this project multiple solutions were assessed to establish the most cost-effective engineering solution. More information can be found in Section 5.

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

The installation of a 10 Bay, double busbar, 132kV GIS switchboard at Glenglass Substation will help maintain system resilience and operability by enabling the connection of new sources of renewable generation in the area, as well as enabling the connection of the planned extension of the 132kV network to Glenmuckloch 400/132kV substation via the future Glenglass – Glenmuckloch 132kV OHL circuit (SPT-RI-173).

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

The completion of the installation and commissioning of a 10 Bay, double busbar, 132kV GIS switchboard at Glenglass Substation will allow SPT to satisfy network users' requests for connection to the SPT network and is consistent with SPT's statutory and licence responsibilities, including Licence Condition D4A.

Key stakeholders have been consulted during the development of the proposed solution and we will continue to engage with stakeholders throughout the project delivery process. Stakeholder engagement has included statutory consultees associated with the planning application for these works (e.g., Local Authority, SEPA, NatureScot) and the third-party landowner Forestry Land Scotland. More detail on stakeholder engagement can be found in Section 8.4.

The completion of the SPT-RI-302 Glenglass 132kV GIS Substation will continue to align with our future strategic ambitions.

5. Assessment of Options

Various alternative options were considered to accommodate the requirements of proposed onshore wind and other planned generation developments in the Glenglass area.

The SPT-RI-302 – Glenglass 132kV Substation project facilitates both the connection of additional contracted renewable generation to the network at Glenglass 132kV substation and the extension of the 132kV transmission network from Glenglass 132kV substation out to the planned Glenmuckloch 400/132kV substation, which is proposed under SPT-RI-173.

The options assessed included a 'Do Nothing' option, an option for the installation of an AIS 132kV switchboard at Glenglass 132kV substation, an option for an AIS 132kV switchboard at an alternative location to Glenglass 132kV substation and an option for a GIS 132kV switchboard at Glenglass substation.

Apart from the 'Do Nothing,' option, all other options included the requirement to uprate the incoming 132kV cables of the Blackhill – Glenglass 132kV circuits into Blackhill 132kV substation.

5.1 Existing System Configuration at Glenglass 132kV Substation

Glenglass 132kV Substation forms part of the south west Scotland electricity transmission network and currently serves the Glenglass 33kV switchboard which provides connection to the SPT network for 3 renewable generation sites in the nearby area.

Glenglass 132kV substation currently provides a connection to two incoming 132kV OHL circuits from Blackhill 132kV substation. The site includes two 132/33kV, 90MVA transformers which provide two incoming 33kV circuits to the Glenglass 33kV GIS Switchboard.

As detailed in Figure 3, Glenglass 132kV Substation comprises the following:

- Blackhill No1, 132kV OHL circuit
- Blackhill No2, 132kV OHL circuit
- T1 (132/33kV, 90 MVA, transformer)
- T2 (132/33kV, 90 MVA, transformer)
- Glenglass 33kV Switchboard

The connected and contracted generation position, together with minimum demand level at Glenglass 132kV substation, are detailed in Section 4 of this document.

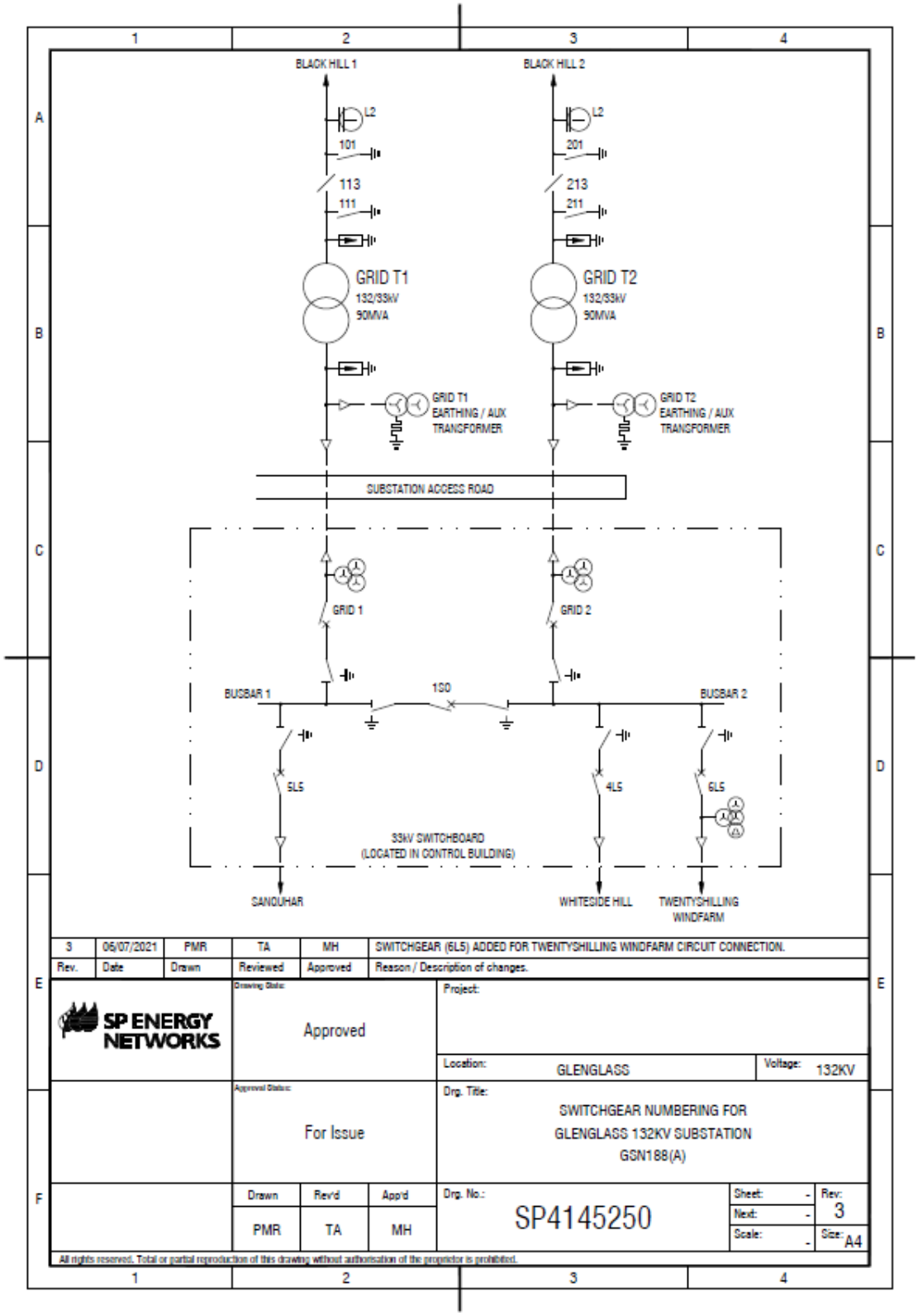

Figure 3 Existing Configuration – Glenglass 132kV Substation

5.2 Overview of Options

This section provides a description of each reinforcement option and details the key considerations. A summary of each option is described at the end of this section.

5.2.1 Option 1 – Do Nothing or Delay

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, including Licence Conditions D3 and D4A, which require SPT to comply with the NETS SQSS and to offer to enter into an agreement with the system operator upon receipt of an application for connection, such offers being in accordance with the STC and associated Construction Planning Assumptions provided by NGESO. The proposed works are identified as Enabling Works in the connection agreements relating to the projects in Table 12, SPT-RI-173 and SPT-RI-236.

5.2.2 Option 2 – New 132kV AIS Substation at Glenglass

This option involves the reinforcement of the Glenglass 132kV substation with the introduction of a 10 Bay, double busbar, 132kV AIS substation at the site. This option also involves the uprating of 132kV cables on the Blackhill – Glenglass 132kV circuits at the Blackhill 132kV substation end of the circuits, to match the 220MVA rating of the Blackhill – Glenglass 132kV OHL No.1 & No.2 circuits.

The 10 Bay, double busbar, 132kV AIS substation at Glenglass would consist of 7 feeder bays, 2 Transformer bays and a bus coupler bay. The circuits to be connected are as follows:

- Blackhill No. 1
- Blackhill No. 2
- T1 Transformer
- T2 Transformer
- Sandy Knowe Wind Farm
- Sanquhar II Wind Farm (Funded via SPT-TOCO-188)
- Cloud Hill Wind Farm (Funded via SPT-TOCO-2277)
- Glenmuckloch No.1 (Funded via SPT-RI-173)
- Glenmuckloch No.2 (Funded via SPT-RI-173)

This option was considered, however discounted for the following reasons:

- The existing Glenglass 132kV substation is located close to a steep hill to its North.
- To extend the existing Glenglass 132kV substation would require significant earthworks to provide a suitable substation platform to accommodate the 10 bay, 132kV AIS switchboard.
- These earthworks would require significant volumes of earth to be removed from the site due to the need to excavate into the side of the steep hill to the North of the site.
- This option would realise increased environmental risk and carbon footprint impact due to the significant earth removal from the site.
- Total cost of this option is estimated to be £36.793m with the ground preparation/earthworks alone estimated to cost £18.29m.
- This option is therefore not considered to be the most economical solution that would achieve the requirements of SPT-RI-302 – Glenglass 132kV Substation when compared to other options.
- In addition to the economic disadvantage this option provides, it also provides significant technical, environmental, and potential programme disadvantages relative to Option 5.
- This option will not economically accommodate the extension of the switchboard if additional feeder bays are required at Glenglass due to future connection applications being made in the area. This is due to the expensive ground preparation/earthworks costs that will be incurred

and will subsequently be more expensive to incorporate than the extension of a GIS board at Glenglass.

5.2.3 Option 3 – New 132kV AIS or GIS Substation at Alternative location to Glenglass between Blackhill and Glenglass 132kV substations

This option would involve the establishment of a new 132kV AIS or GIS substation located between the Glenglass 132kV substation and Blackhill 132kV substation. This new substation would accommodate 7 Bay, double busbar, 132kV AIS or GIS switchboard at the site. This option also involves the uprating of 132kV cables on the Blackhill – Glenglass 132kV circuits at the Blackhill 132kV substation end of the circuits, to match the 220MVA rating of the Blackhill – Glenglass 132kV OHL No.1 & No.2 circuits.

The 7 Bay, double busbar, 132kV AIS or GIS switchboard at Glenglass consists of 6 feeder bays and a bus coupler bay. The circuits to be connected are as follows:

- Blackhill No. 1
- Blackhill No. 2
- Glenglass No.1
- Glenglass No.2
- Sandy Knowe Wind Farm
- Sanquhar II Wind Farm (Funded via SPT-TOCO-188)

This option was considered, however discounted in advance of a detailed cost estimating exercise, for the following reasons:

- After review of the area along the Blackhill – Glenglass OHL circuit, there was no suitable location to position a 132kV AIS/GIS substation. Any locations that could be deemed feasible would require significant amounts of earthworks to be carried out over and above the earthworks required for Option 5, along with additional access roads being created, control building built, auxiliary supplies and telecoms systems installed which would provide further cost and programme impacts.
- It would also be necessary to install 2 new terminal towers on the Blackhill – Glenglass OHL circuit. This may present an added programme and planning risk to the project in comparison to Option 5.
- If an area for this option was identified in the proximity of, but not immediately adjacent to, the Blackhill – Glenglass OHL circuit, it would require a redesign of the OHL circuit installation for the affected spans and towers to allow it to turn into the AIS 132kV substation. This would require new towers, additional overhead line and/or cables to be installed and would subsequently drive additional cost, planning and programme risk into the project.
- Option 5's design accommodates for a load flow scenario which allows all 33kV derived generation on the 132kV board to be pointed towards Blackhill/New Cumnock and the 132kV derived generation being pointed towards Glenmuckloch when TORI 173 & 236 have been completed.
- An AIS board between Blackhill – Glenglass would not accommodate this load flow scenario and would result in changes to existing connection agreements in that some connection agreements would change from being firm to non-firm.

- This option proposes that Glenmuckloch OHL circuits would still terminate at Glenglass with the 132kV busbar and line disconnector bay arrangement at Glenglass being redesigned to link the Glenmuckloch circuits to the Blackhill circuits

5.2.4 Option 4 – New 132kV AIS or GIS Substation at Alternative location to Glenglass between Glenglass and the future Glenmuckloch 132kV substation

Option 4 would involve the establishment of a new 132kV AIS or GIS substation located in an area between the existing Glenglass 132kV substation and the future Glenmuckloch 132kV substation.

This option was considered, however discounted in advance of a detailed cost estimating exercise due to programme timeframe for this project to be delivered.

Option 4 would require the AIS or GIS substation to connect into the future Glenglass – Glenmuckloch 132kV OHL circuit which is to be delivered by SPT-RI-173. Planning permission for the OHL between Glenglass and Glenmuckloch is not expected to be received in time to allow the completion of SPT-RI-173 to realise the Sanquhar II wind farm connection date of [redacted]

SPT-RI-302 was split from the original SPT-RI-173 to enable the Sanquhar II wind farm to achieve its connection date. This meant that SPT-RI-302 would not have its programme constrained by the lengthy planning process that exists with the addition of a new OHL route onto the network. Option 4 would re-introduce this programme constraint onto the SPT-RI-302 project and subsequently the Sanquhar II wind farm connection date would not be achieved.

5.2.5 Option 5 – New 132kV GIS Substation at Glenglass

This option would involve the reinforcement of the Glenglass 132kV substation with the introduction of a 10 Bay, double busbar, 132kV GIS switchboard at the site. This option also involves the uprating of 132kV cables on the Blackhill – Glenglass 132kV circuits at the Blackhill 132kV substation end of the circuits, to match a minimum 220MVA pre-fault summer rating of the Blackhill – Glenglass 132kV OHL No.1 & No.2 circuits.

The 10 Bay, double busbar, 132kV GIS substation at Glenglass consists of 7 feeder bays, 2 Transformer bays and a bus coupler bay. The circuits to be connected are as follows:

- Blackhill No. 1
- Blackhill No. 2
- T1 Transformer
- T2 Transformer
- Sandy Knowe Wind Farm
- Sanquhar II Wind Farm (Funded via SPT-TOCO-188)
- Cloud Hill Wind Farm (Funded via SPT-TOCO-2277)
- Glenmuckloch No.1 (Funded via SPT-RI-173)
- Glenmuckloch No.2 (Funded via SPT-RI-173)

The proposed configuration of Glenglass 132kV GIS and Blackhill 132kV cable uprating are indicated below in Figure 4:

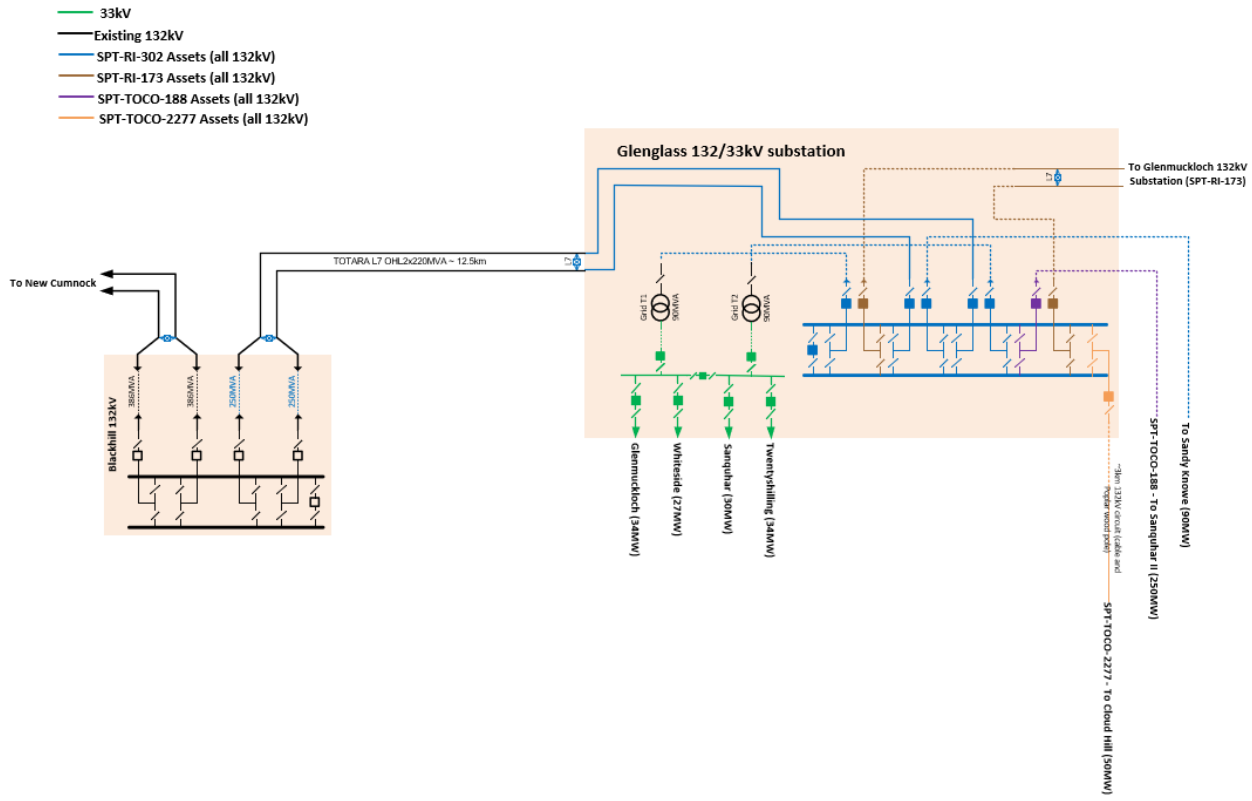

Figure 4 - Proposed single line diagram of Glenglass GIS and Blackhill 132kV cables uprating

The advantages of this option are:

- It provides the most economical solution to achieving the requirements of SPT-RI-302 – Glenglass 132kV Substation.
- The location of the 10 Bay, double busbar, 132kV GIS switchboard can be accommodated by extending the existing Glenglass 132kV substation footprint into land adjacent to the existing substation compound on its East side.
- This option requires significantly less earthworks and movement of spoil to alternative locations than the equivalent 132kV AIS solution at the site (Option 2) and subsequently offers both economic and environmental benefits.
- The 132kV GIS switchboard and GIS building could accommodate the extension of the switchboard by a further 3 Bays to 13 Bays in total within the current GIS building design, with this GIS building design also capable of further extension [redacted]

5.3 Option Assessment

As described in our RIIO-T2 Business Plan Annex 8[8], while most engineering justification papers have a Cost Benefit Analysis (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 the SPT-RI-302 – Glenglass 132kV Substation project) explaining the feasible options and the reasoning behind the selection of the preferred investment option.

The options that have been assessed with a view to meeting the requirements of the SPT-RI-302 – Glenglass 132kV Substation project are described in Section 5.2 above, while Table 7 below summarises the key benefits and disadvantage of each option, together with an indication of estimated cost.

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

Table 9: Option Benefits, Drawbacks and Selection Outcome

No.	Option	Estimated Capital Cost[9]	Key Advantage	Key Disadvantage	Option Outcome
1	Do Nothing or Delay	-	None	Failure to comply with statutory duties and licence obligations.	Rejected
2	New 132kV AIS Substation at Glenglass	£36.793m	Should meet the requirements of SPT-RI-302 – Glenglass 132kV Substation project.	To extend the existing Glenglass 132kV substation would require significant earthworks to provide a suitable substation platform to accommodate the 10 bay, 132kV AIS switchboard. This option also suffers from significant technical, economic, environmental, and potential programme disadvantages relative to Option 5.	Rejected
3	New 132kV AIS/GIS Substation at Alternative location between Blackhill and Glenglass 132kV substations	No assessment of costs was undertaken, as explained in Section 5.2.3	Not a feasible option.	No location could be identified for the development of a new 132kV AIS/GIS substation between Glenglass and Blackhill 132kV substations which would avoid extensive and costly earthworks or Blackhill - Glenglass OHL circuit modification. This option would also require some customers to have their existing 'Firm' connection agreement contracts changed to 'Non-Firm' connection agreement contracts.	Rejected
4	New 132kV AIS/GIS Substation at Alternative location to Glenglass between Glenglass and the future Glenmuckloch 132kV substation	No assessment of costs was undertaken, as explained in Section 5.2.4	Not a feasible option.	This option would not allow the Sanquhar II connection date to be realised. This is due to the AIS or GIS substation requiring to connect into the future Glenglass – Glenmuckloch 132kV OHL circuit which is to be delivered by SPT-RI-173. This new OHL circuit is not expected to obtain planning permission in a sufficient timescale to meet the Sanquhar II connection date.	Rejected

[9] All values are direct capex in 2018/19 prices.

No.	Option	Estimated Capital Cost[9]	Key Advantage	Key Disadvantage	Option Outcome
5	New 132kV GIS Substation at Glenglass	£17.831m	This option provides the most economical solution to achieving the requirements of SPT-RI-302 – Glenglass 132kV Substation and the least impact to the environment in comparison to Option 2.		Proposed

To deliver and achieve the requirements of the SPT-RI-302 – Glenglass 132kV Substation project, Option 5 is the preferred investment option for this project which provides significant economic and technical benefits at the least risk to the environment in comparison to other options.

6. Proposed Works

6.1 Project Summary

As discussed above, the most appropriate option to enable the connection of planned and contracted generation capacity into Glenglass 132kV substation, and to also accommodate the further extension of the 132kV network out to the future Glenmuckloch 400/132kV substation (via SPT-RI-173), is to reinforce Glenglass 132kV substation with the introduction of a 10 Bay, double busbar, 132kV GIS switchboard at the site.

This requires the existing substation footprint to be extended to accommodate a new 132kV GIS substation building and reconfiguration of the existing layout to ensure all circuits are connected appropriately to the new 132kV GIS substation. The new 132kV GIS building will be designed to initially provide space for 13 Bays and be extendable if future connection applications require further bays to be added.

In addition to the introduction of the 10 Bay, double busbar, 132kV GIS switchboard at Glenglass, it will also be necessary to uprate the 132kV cables sections which connect the Blackhill – Glenglass 132kV OHL No.1 & No.2 circuits to Blackhill 132kV substation. The 132kV cables at Blackhill will be uprated to match the 220MVA rating of the Blackhill – Glenglass 132kV OHL circuits.

The proposed configuration of the reinforced Glenglass 132kV Substation is indicated in Section 5, Figure 4 above.

The planning, survey, engineering, and construction works that are required to take place to achieve the scope of the SPT-RI-302 – Glenglass 132kV Substation project are summarised in the following sections:

6.1.1 Pre-Engineering Works

The following lists are indicative based on previous experience of such sites and as such should not be read as definitive. Seeking to drive efficiencies throughout the project, any surveys that have been undertaken for the site and are still suitable should be reused.

The following surveys will be carried out:

- Building/environmental consents should be obtained.
- Topographical survey of the site.
- GPR survey of areas to be excavated to validate approximate locations of buried services.
- Bearing capacity checks.
- Geo Environmental Investigation to identify the relevant geotechnical parameters to facilitate the civil engineering design works.
- Earthing Study.
- Insulation Co-ordination Study – This will be required for the proposed 132kV GIS to define surge arrester requirements.
- Define final tower positions for Glenmuckloch 1 & 2.
- Production of Wire clearance and Phasing diagrams for Blackhill circuits. Electromechanical loads will also be required.
- Transport Survey to assess the access of the new Equipment.
- Environmental Study.

6.1.2 Environmental and Consents Works

- The proposed works require an extension to the existing compound. The extension sits out with SPEN's existing operational land area; therefore, Permitted Development rights will not apply. As such, planning consent will be sought from Dumfries and Galloway Council. Relevant landowner agreements will also need to be put in place if required.

- Existing Environmental management plans will be revisited and updated to consider the substation reconfiguration. The Substation is located within a rural location with an adjacent water course named as Euchan Water.

- The extended substation will result in changes to the existing land drainage which may result in an increase in surface water runoff and pollution risk. However, this will be mitigated in the new site drainage design to ensure there are no detrimental effects on the environment. Appropriate consultation will be required to be made with SEPA relating to any proposals to alter the surrounding water burns or drainage features of the surrounding landscape.

- A Flood Risk Assessment has been carried out utilising the SEPA flood risk database in advance of the work by SPEN. A report will accompany the planning application for the proposed substation extension works. This determines the flood risk to the proposed development of the site and in turn develop the required mitigation.

- Consideration will need to be given for traffic management for the access and egress of vehicles. The main access road has several residential properties which will require effective communication with during the delivery of materials and site personnel.

- A Landscape master plan including visualisations will accompany the planning application for the proposed substation extension works.

- A review of the surrounding ecology and ornithology will be presented in the environmental appraisal that will accompany the planning application for the proposed substation extension works.

6.1.3 Project Summary Substation/OHL/Cable Works

- ***Civil Works:***

  - Extension of existing substation Platform to accommodate reconfigured substation arrangement.
  - Extend existing Fence line.
  - Establish 132kV GIS building and associated infrastructure.
  - Modify existing perimeter drainage and extend around new platform footprint.
  - Extend cable trough system between existing and compound extension.
  - New access road to proposed GIS building connecting into existing compound access road.

- ***Main Plant 132kV Works:***

  - Establish 132kV GIS 10 bay (incl. Bus Coupler) Double Busbar switchboard. The circuits to be connected are as follows:

    - Blackhill No. 1
    - Blackhill No. 2
    - T1 Transformer
    - T2 Transformer
    - Sandy Knowe Wind Farm
    - Sanquhar II Wind Farm (Funded via SPT-TOCO-188)
    - Cloud Hill Wind Farm (Funded via SPT-TOCO-2277)
    - Glenmuckloch No.1 (Funded via SPT-RI-173)
    - Glenmuckloch No.2 (Funded via SPT-RI-173)

  - Re-locate Auxiliary Transformer 2 and associated NER to enable routing of Blackhill No.1 and No.2 Gas Insulated Busbar (GIB) out with GT2 Fire Damage Zone.
  - Re-Orientate Blackhill No.1 and No.2 OHL circuits to provide adequate space for GIB connections along with GT1 and GT2 cable connected circuits. An assessment for the re-use of the existing Blackhill No.1 and No.2 overhead line termination gantries for their new location will be undertaken.
  - Establish GT1 and GT2 132kV cable connections to GIS.
  - Diversion of Sandy Knowe Windfarm circuit from Blackhill 2 circuit, Tower DA68, to new GIS board.
  - Establish LVAC sub board within new 132kV GIS building.
  - Establish Auxiliary Systems within new GIS building.

- ***132kV Blackhill Substation Cable Works:***

  - The Blackhill - Glenglass No.1 and No.2 circuits are limited by the rating of an existing 132kV underground cable installation at the Blackhill end of both circuits.
  - This installed underground cable system connects the Blackhill 132kV GIS switchboard to the terminal tower of the Blackhill - Glenglass 1 & 2 OHL circuits at the Blackhill substation end of the circuits.
  - The existing cable circuits are suitable for the existing 90MVA transformers at Glenglass it is proposed to increase this rating to match the capacity of the Blackhill - Glenglass No.1 and No.2 OHL circuits as a minimum. This will be achieved by replacing the existing cables with a new cable installation that will increase the installed 132kV cable capacity to a minimum pre-fault summer rating of 220MVA.

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 Estimated Total Project Cost

Aligned with the format of the Re-Opener Pipeline Log, Table 10 details expected energisation year and our current view of potential direct capital expenditure in RIIO-T2. The (RIIO-T2) allowances will be subject to the Opex escalator mechanism:

Table 10: Estimated Incidence of Expenditure

		Potential direct capex value per year, £m, 18/19 price base								
Energisation Year	Pre-RIIO-T2: direct capex	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
2025/26	0	0.565	0.196	5.971	10.079	1.021	0	0	17.831	**17.831**

7.2 Potential Volume Driver Allowance

Applying the RIIO-T2 Generation Connections VDUM to this project results in a £7.667m allowance provided by the VDUM. The allowance is calculated as per Table 10.1 below. Please note that this excludes the further allowance permitted under Licence Special Condition 3.36 Opex escalator to provide a better comparison to direct expenditure.

Table 10.1: Volume Driver Allowance

Volume Driver (*2018/19 price base)*		£m/unit	Unit	Volume Driver Allowance (£m)
Project	Fixed Cost	1.700	1.00	1.700
Shared Use	New Build/Extension Substation, MVA	0.010	300[10]	3.00
	Cable <1km	1.820	1.63[11]	2.967
Total				**7.667**

[10] The 300MW includes the 250MW Sanquhar II generation connection capacity and the 50MW Cloud Hill generation connection capacity. Noting that Sandy Knowe is currently connected the VDUM Allowance above does not include the incremental 21.6MW associated with Sandy Knowe Stage 4. Note that were this to be included, this would not change the requirement for this MSIP Re-opener application.

[11] The total Unit length of the Cable is made up of non-contiguous lengths across multiple circuits which is why the Cable <1km rate was used in this instance.

Table 10.2: Comparison of Volume Driver Allowance and Estimated Cost

		Potential direct capex value per year, £m, 18/19 price base								
Description	Pre-RIIO-T2: direct capex	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
Allowance	0	0	3.833	1.917	1.917	0	0	0	7.667	7.667
Cost	0	0.565	0.196	5.971	10.079	1.021	0	0	17.831	17.831
Variance	0	-0.565	3.637	-4.054	-8.162	-1.021	0	0	-10.164	-10.164

The potential VDUM allowance for the project is lower than the estimated cost by £10.164m. This is more than £4.24m, which is the threshold set in LSpC 3.14.6(a) for consideration under this uncertainty mechanism.

7.3 Regulatory Outputs

The indicative primary assets outputs, are identified in Tables 11 below:

Table 11: Regulatory Outputs Table (Volumes)

Asset Category	Asset Sub-Category Primary	Voltage	Forecast Additions	Forecast Disposals
Circuit Breaker	CB (Gas Insulated Busbar) (ID)	132kV	*6 units	
Substation Platform	Platform Creation	132kV	1	
132kV UG Line	Cable	132kV	**1.63km	**0.88km

*Note: The circuit breaker count reflects those additional units which are to be funded from SPT-RI-302. A further 4 units will be funded by SPT-RI-173 (2 units), SPT-TOCO-188 (1 unit) and SPT-TOCO-2277 (1 unit).

**Note: Forecast Additions and Disposals are indicative pending further detail design to be carried out.

7.4 Alignment with Other Projects

The SPT-RI-302 – Glenglass 132kV Substation project is an Enabling works project for the following renewable generation customer application projects:

Table 12: Related Customer Application Projects.

Contract Ref	Project Name	Type
SPT-TOCO-159	Windy Standard III	Transmission
SPT-TOCO-165	Sandy Knowe Wind Farm	Transmission
[redacted]		
SPT-TOCO-188	Sanquhar II Wind Farm	Transmission
SPT-TOCO-2277	Cloud Hill Windfarm	Transmission
SPT-TOCO-233	Glenmuckloch Wind Farm	Transmission
SPT-TOCO-312	Glenmuckloch Pumped Storage	Transmission
SPT-TOCO-373	Twentyshilling Wind Farm	Transmission
SPT-TOCO-388	Windy Rig Wind Farm	Transmission
SPT-TOCO-490	Lethans Wind Farm	Transmission
SPT-TOCO-568	Breezy Hill Wind Farm	Transmission

[redacted]

Twentyshilling wind farm is currently connected to the transmission network. This connection has had a Modification Application submitted and associated offer accepted that will result in an increase to their original TEC. This TEC increase will be accommodated in stages with the current connection agreement requiring a Restricted Availability Access (RAA) scheme to be in place to allow the full TEC increase to be connected to the transmission network. The final stage of this Modification Application requires the removal of the RAA scheme with the completion of this stage being contingent on the completion of SPT-RI-173, SPT-RI-302 and SPT-RI-236.

As stated in Section 4.4 Sandy Knowe wind farm will initially connect onto the transmission network via a T-off arrangement of the Blackhill – Glenglass No.2 circuit. The Sandy Knowe wind farm feeder circuit will then be turned into a dedicated bay at the Glenglass 132kV GIS switchboard during its construction. The turning in of the Sandy Knowe wind farm feeder circuit to the Glenglass 132kV GIS switchboard will remove an enduring imbalance on the Blackhill – Glenglass circuits.

The Windy Rig wind farm connection agreement currently requires a RAA scheme in place to allow the wind farm's earlier than originally planned connection to the transmission network. The removal of this RAA scheme is the final stage of the Modification Application which requested the early connection of the wind farm to the transmission network. The completion of the final stage and removal of the RAA scheme is contingent on the completion of SPT-RI-173, SPT-RI-302 and SPT-RI-236.

Sanquhar II Wind Farm is contracted and anticipated to connect into the proposed Glenglass 132kV GIS switchboard by [redacted] and with this connection being carried out during the construction works for the SPT-RI-302 – Glenglass 132kV Substation project.

SPT-RI-302 is also an Enabling works project for SPT-RI-173 & SPT-RI-236. The scope of SPT-RI-173 requires the delivery of a new Glenmuckloch 400/132kV substation to the northeast of Glenglass, which provides a connection to the future Glenmuckloch Pumped Storage facility and other planned renewable generating connections in the area. The scope of SPT-RI-173 also requires the extension of the Southeast Scotland 132kV transmission network from Glenglass 132kV to Glenmuckloch 400/132kV substation with the introduction of 2 new OHL circuits between the Glenglass 132kV to Glenmuckloch 400/132kV substations. The Glenmuckloch 400/132kV substation is also planned to connect into Redshaw 400kV substation as part of the works identified in SPT-RI-236 with Redshaw 400kV substation connecting to the Strathaven – Harker 400kV (ZV) overhead line route.

Cloud Hill, Glenmuckloch wind farm, Glenmuckloch Pumped Storage project, Lethans and Breezy Hill wind farms are all contingent of SPT-RI-302 and are due to be completed after the completion of the SPT-RI-302 – Glenglass 132kV Substation project.

Given the number of projects that are contingent of SPT-RI-302 being completed, there is a clear need for the Glenglass 132kV substation to be delivered [redacted]

8. Project 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 this project. We have assigned a dedicated Project Manager to this project 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 this project and that will continue for the reporting and the application of processes and controls throughout the project lifecycle. Table 13 summarises the key project milestones within the delivery schedule.

Table 13: Key Project Milestone

Milestone	Phase	Estimated Completion Date
1	ITT long lead items (GIS equipment)	September 2022
2	Planning application submission	February 2023
3	ITT Enabling civil works	February 2023
4	Award GIS contract	March 2023
5	Award Enabling civil works	May 2023
6	Planning application determination	May 2023
7	Commence Site Works	July/August 2023
8	ITT Balance of Plant	August 2023
9	Award Balance of Plant	February 2024
10	Transfer existing circuits	April 2025 – June 2025
11	Finish Site Works	June 2025

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 Project Risk and Mitigation

A Project Risk Register was generated collaboratively during the project kick-off meeting to identify any risks, which if realised, could result in deviation from the project 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 by the project team. Currently, the top project risks are:

8.3 Quality Management

SPT adopts a "life cycle" approach to Quality Management in major project delivery. Our Management Systems are certified to ISO 9001, ISO 14001 and ISO 45001. Various areas applicable to these standards ensure a quality product is delivered. The significant areas detailed below:

8.3.1 Quality Requirements During Project Development

Any risk or opportunity that may affect the quality of the product are detailed in the Project Risk Register (that is noted in Section 6.5 above).

The suppliers of main equipment may also receive a Factory Acceptance Test Inspection when the asset is being built.

8.3.2 Quality Requirements in Tenders

Each contract that SPT issues has a standard format. Specifically in relation to quality, this will include a Contractors' Quality Performance Requirement (CQPR). This CQPR represents a specification that details roles and responsibilities for all parties during the works, frequency and format of reporting. It will also specify the document management process to be adhered to during the delivery of the project. In addition to the CQPR, each project has a contract specific Quality Management Plan, detailing the inspection and testing regime for works as well as the records to be maintained.

8.3.3 Monitoring and Measuring During Project Delivery

SPT Projects 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 are visual, with the person undertaking the inspection ensuring that evidence of the inspection and any actions raised are documented.

The following inspections are completed:

- Quality Inspections (monthly)
- Environmental Inspections (monthly, with weekly review by third party Environmental Clerk of Works)
- 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.

8.3.4 Post Energisation

SPT Projects and SPT Operations carry out a Defect Liability Period Inspection within the Contract Defect Liability Period with the aim of identifying any defects and rectifying them with the contractors.

8.4 Stakeholder Engagement

SPT is committed to delivering optimal solutions in all the projects we undertake. A key part of this is engaging with relevant stakeholders throughout the project development and delivery process. Stakeholders can include customers, regulatory bodies and other statutory consultees, national and local government, landowners, community groups, and local residents and their representatives (e.g., MPs, MSPs and councillors).

Community impacts associated with construction activities are considered at project initiation by completion of a Community Communications Plan, which details the stakeholders relevant to the project, the communication channels that will be used to engage with them, the information that will be provided to and sought from them, and the timescales over which this will happen. It considers any sensitivities that may require increased stakeholder consultation and details specific events that will be held with stakeholders during the development of the project.

As part of this project, SPT has engaged with statutory consultees associated with the planning application for these works - the Local Authority, SEPA and NatureScot - and the third-party landowner Forestry Land Scotland. Public consultation has been carried out with other stakeholders, including community councils and local residents. A consultation feedback report will accompany the planning application. All document relating to the planning application can be found at; https://www.spenergynetworks.co.uk/pages/glenglass_132kv_gis_substation_extension.aspx .

Due to the location and nature of this project, no sensitivities or community impact issues have been identified, but a general level of interest from local representatives has been noted and we will continue to engage with them throughout the project.

Continued Stakeholder engagement will inform the details of the construction and permanent drainage details for the works.

9. Conclusion and Recommendations

This MSIP Re-opener application demonstrates the need to carry out infrastructure reinforcement at Glenglass 132kV substation as identified in SPT-RI-302. This work is planned to be undertaken within the RIIO-T2 period (April 2021 – March 2026) with an energisation of the proposed 132kV GIS substation planned for June 2025, [redacted] Further contracted onshore wind generation will connect into the Glenglass 132kV GIS following the Sanquhar II Wind Farm connection and energisation date, that will take the total onshore wind generation planned for connection into Glenglass 132kV GIS to 321.6MW.

The main conclusions of this submission are:

- The timely connection of low carbon generation, such as onshore 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 invest in transmission infrastructure at Glenglass 132kV Substation to facilitate the connection of a total of 321.6MW of contracted onshore wind generation and to provide the shared infrastructure enabling works for SPT-RI-173 [redacted] with this submission proposal having been identified as the most economic and efficient option.

- Applying the RIIO-T2 Generation Connections VDUM to this project results in the £17.831m estimated cost being £10.164m higher than the £7.667m allowance provided by the VDUM. An MSIP Re-opener application is therefore required. Submission of this MSIP Re-opener application is aligned with the contracted connection programme.

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 project should proceed based on the preferred solution (Option 5).

- 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.

10. Appendix - SP Transmission System, Geographic Overview