Scottish & Southern Electricity Networks

SSEN Transmission

RIIO-T2 Business Plan: T2BP-EJP-0037

Foyers Substation Works

Core Non-Load

Engineering Justification Paper

Scottish & Southern Electricity Networks

1 Executive Summary

Our paper A Risk Based Approach to Asset Management[1] sets out our approach to network risk and how we subsequently identify assets that require intervention to limit the rise of risk over the RIIO-T2 period.

This paper identifies the need for intervention on the 275/18kV transformers at Foyers substation. The primary driver for the scheme is the asset condition with a s[redacted]

The delivery of this project ensures continued generation connection of 300MW into the transmission network, as well as maintaining connection [redacted]

Following a process of optioneering and detailed analysis, as set out in this paper, the proposed scope of works is:

- Offline replacement of the 275/18kV Generation Transformers (GTs);
- Replacement of the single oil filled 275kV cable circuit between the generation site and Foyers Switching Station with two new XLPE 275kV cable circuits including 275kV circuit breakers.

This scheme will cost £41.6m and will deliver the following outputs and benefits during the RIIO T2 period:

- A long-term monetised risk benefit of R£82.6m;
- A reduction of total network risk calculated as R£4.3m;
- Improved operational flexibility and resilience in line with our goal to aim for 100% transmission network reliability for homes and businesses;
- A reduction in the volume of SF_6 on the network from the use of innovative non SF_6 equipment contributing to our goal of a one third reduction in greenhouse gas emissions.

The Foyers scheme is not flagged as eligible for early or late competition due it being under Ofgem's £50m and £100m thresholds respectively.

[1] A Risk Based Approach to Asset Management

Name of Scheme/Programme	Foyers Substation Works
Primary Investment Driver	Asset Health (Non-Load)
Scheme reference/ mechanism or category	SHNLT2017
Output references/type	NLRT2SH2017
Cost	£41.6m
Delivery Year	RIIO T2
Reporting Table	C 0.7 Non-Load Master Data
Outputs included in RIIO T1 Business Plan	No

2 Introduction

This Engineering Justification Paper sets out our plans to undertake condition-related work during the RIIO-T2 period (April 2021 to March 2026). The planned work is at Foyers substation as shown on the map on the following page.

The Engineering Justification Paper is structured as follows:

Section 3: Need

This section provides an explanation of the need for the planned works. It provides evidence of the primary and, where applicable, secondary drivers for undertaking the planned works. Where appropriate it provides background information and/or process outputs that generate or support the need.

Section 4: Optioneering

This section presents all the options considered to address the need that is described in Section 3. Each option considered here is either discounted at this Optioneering stage with supporting reasoning provided or is taken forward for detailed analysis in Section 5.

Section 5: Detailed Analysis

This section considers in more detail each of the options taken forward from the Optioneering section. Where appropriate the results of Cost Benefit Analysis are discussed and together with supporting objective and engineering judgement contribute toward the identification of a selected option. The section continues by setting out the costs for the selected option.

Section 6: Conclusion

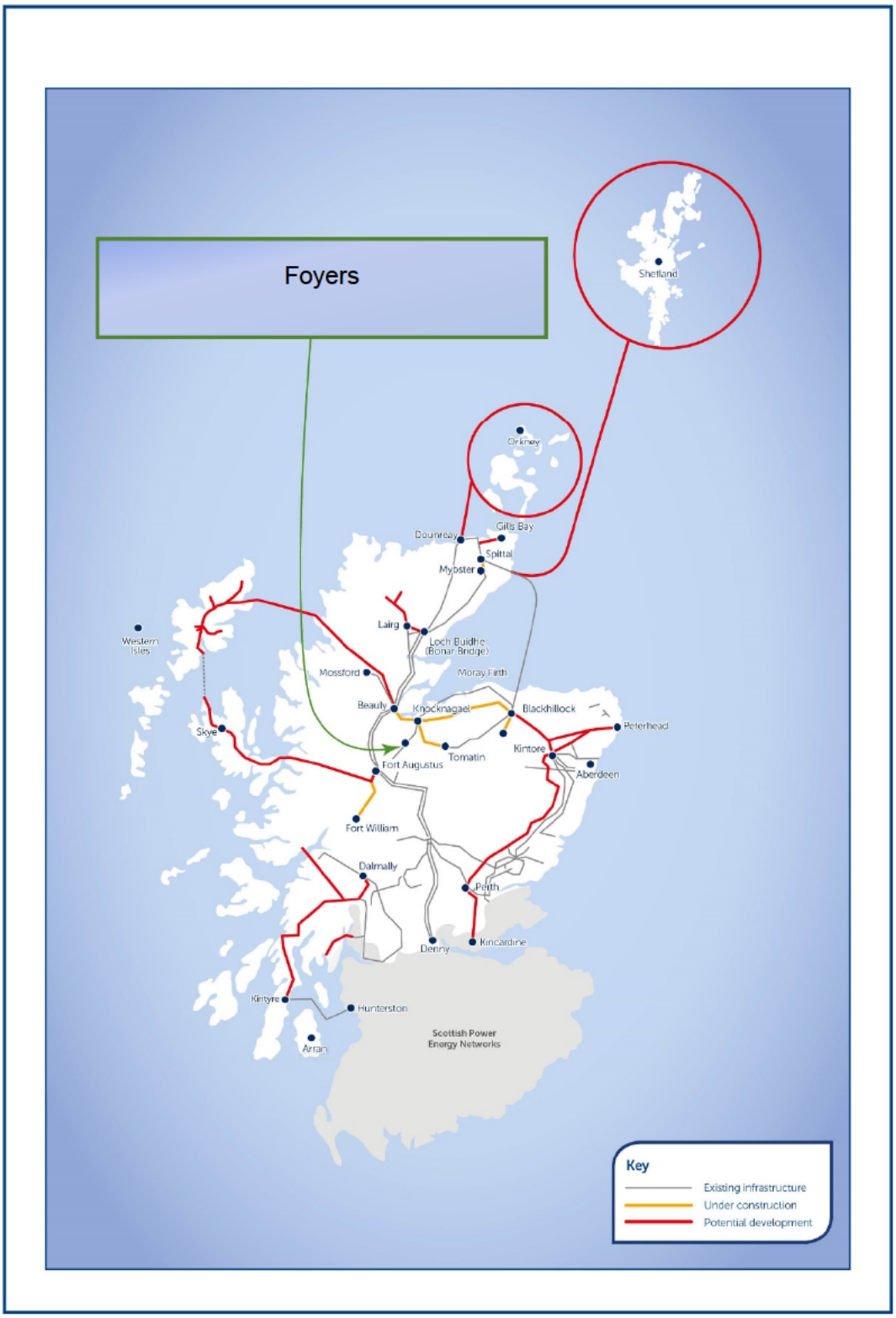
This section provides summary detail of the selected option. It sets out the scope and outputs, costs and timing of investment and where applicable other key supporting information.

Section 7: Price Control Deliverables and Ring Fencing

This section provides a view of whether the proposed scheme should be ring-fenced or subject to other funding mechanisms.

Section 8: Outputs included in RIIO-T1 Business Plan

This section identifies if some or all the outputs were included in the RIIO-T1 Business Plan and provides explanation and justification as to why such outputs are planned to be undertaken in the RIIO-T2 period.


Foyers
Shetland
Orkney
Dounreay
Gills Bay
Spittal
Mybster
Lairg
Loch Buidhe (Bonar Bridge)
Western Isles
Mossford
Moray Firth
Beauly
Knocknagael
Blackhillock
Peterhead
Skye
Tomatin
Kintore
Fort Augustus
Aberdeen
Fort William
Dalmally
Perth
Denny
Kincardine
Kintyre
Hunterston
Arran
Scottish Power Energy Networks
Key
Existing infrastructure
Under construction
Potential development

3 Need

This section provides an explanation of the need for the planned works. It provides evidence of the primary and, where applicable, secondary drivers for undertaking the planned works. Where appropriate it provides background information and/or process outputs that generate or support the need.

3.1 Background

The Foyers 275/18kV substation (built in 1975) facilitates the connection of the Foyers Pumped Storage Hydro scheme to the transmission network. This scheme has a capacity of 300MW and connects two 150MVA pumped storage units via a single 275kV cable circuit to a 275kV circuit breaker and a single 275kV busbar at Foyers Switching Station. Foyers Switching Station is connected to Knocknagael 275kV Substation via a double circuit 275kV tower line. The Foyers Pumped Hydro Scheme provides generation and demand services to NGESO and no increase in capacity is anticipated.

[redacted]

There are two generation transformers which are banked together and directly connected to the sealing end of the single 275kV oil filled cable. These GTs and their connection are the subject of this justification paper. GT1 was manufactured and installed in 1991, and GT2 was manufactured and installed in 1982. [redacted]

The transformers are installed at the power station, not within the 275kV switching substation compound. Ownership boundaries and the continued use of shared facilities with the customer (e.g. batteries/ LVAC) are also considered within the project.

[redacted]

Asset Need

3.1.1 Generation Transformers

The condition of GT2 (manufactured in 1982) is advanced in its degradation both internally and externally. This condition is in line with its age as well as its early history of vibration and tap changer problems. Oil samples indicate that the unit is experiencing insulation polymerization and with the historic vibration issues there is concern over the unit's ability to perform as required to the end of RIIO-T2. The gas levels in the oil samples indicate that GT2 has been subject to an electrical fault and there is evidence of a cyclical DGA trend in line with the maintenance interventions[3]. Based on the oil leaks and rusting, as well as the oil analysis, this unit requires replacement during RIIO-T2.

Currently there is no immediate asset health drivers for the replacement of GT1 (manufactured in 1991). Oil samples indicate early signs of insulation breakdown with an increasing trend in analysed gases driving a need for more frequent monitoring this is discussed further in the Foyers Asset Condition Report[3]. There are also external condition issues to be addressed regarding oil leaks and rusting.

3.1.2 275kV Cable Circuits

An oil filled 275kV cable connects the power station and switching station. This cable is the last 275kV oil filled cable circuit in operation in the network following a long-term strategy of replacement over the years. The power station was originally connected via a single transformer, when one of the windings failed this was replaced with a separate unit, which was installed over the 275kV cable route. This leads to the arrangement we have today with the two GTs providing the necessary total capacity for the power station, and GT2 located over the top of the cable as it enters the site.

The cable was manufactured by BICC and installed in 1981. Propriety joints will be very difficult to procure, should a fault occur.

Any works on either GT or the circuit connecting the power station necessitates a whole station outage. There is therefore an opportunity to minimize longer term disruption and [redacted] replacement of both GTs the circuit feeding them and an upgrade to remove the single circuit security to this site.

Under the existing network configuration, replacement of GT2 will necessitate extended outages on GT1. Due to the space constraints of the cable route it is likely that the existing cable will need to be removed to create space for the new circuit therefore there will be a whole station outage required. This presents an opportunity to consider the replacement of GT1 while this part of the network is subject to outage. As discussed in section 3.1 above the power station is [redacted]

[3] Foyers Asset Condition Report T2BP-ACR-0019

3.1.3 Shared Assets

The existing configuration of the GTs is not in line with our current practices and guidelines as the transformer LV circuit breakers are owned by the customer. Therefore, in the design of the replacement works this customer separation issue is addressed along with other shared assets. It is also worth noting that GTs cannot be taken out of service independently as there are no points of isolation on the HV side of the transformer. The only switching point is the 275kV power station breakers at the switching station which results in a full power station outage.

3.2 Growth Need

A meeting was held on 3rd October 2019 with the customer to discuss the portfolio of hydro generation schemes that would be affected by our works during the RIIO T2 period. This confirmed that there are no plans for increasing the output in the foreseeable future.

4 Optioneering

This section presents all the options considered to address the need that is described in Section 3. Each option considered here is either discounted at this Optioneering stage with supporting reasoning provided or is taken forward for Detailed Analysis in Section 5.

The asset health requirement for Foyers Generation Transformers is replacement of the 165MVA 275/18kV GT2 due to a condition-based driver. There is also a requirement for an upgrade of the transformer bund arrangement and auxiliary assets to align with current engineering standards and to achieve satisfactory business separation. This transformer is showing signs of advanced ageing and is approaching the end of asset life; therefore, a replacement unit is deemed necessary.

The option of further deferral of asset replacement works has not been considered, primarily as a result of the reported asset health. Furthermore, asset refurbishment is not considered a technically viable solution, due to both the asset health and need for additional site upgrades. It is also worth noting that removal of the asset is not acceptable since the hydro scheme require continued connection in the transmission network for generation as well as black start capability.

Due to the layout of the substation at the generation site the GTs are very confined and do not meet current standards in terms of adequate fire damage zones, oil containment, operability, maintenance access and business separation.

The 275kV oil filled cable, servicing the generation site from the switching station, [redacted] This situation is exacerbated by the routing of this circuit running under GT2. Therefore, a failure of the cable at this point, or a failure of the GT2 could result in an extended outage of the site. Records indicated that there have been oil leaks on this cable.

The power station, substations, cable route and switching station all inhabit land on the banks of Loch Ness. All these items of infrastructure are highly visible, as well as being in very close proximity to the loch itself. As a result, a sympathetic and cautious visual approach should be taken regarding the oil filled cables and transformers.

[redacted]

Table 1 – Options considered

Option	Option Detail	Cost (£m)	Taken forward to Detailed Analysis?
Base A	Replace GT2 only in situ	-	No
Base B	Replace GT2 only offline	-	No
1	In situ build of direct replacement for both 275/18kV transformers at the Power Station	-	No
2	Offline build of direct replacement for both 18/275kV transformers near the Power Station.	41.6	Yes
3	Offline build of replacement for both transformers with 18/132kV transformers near the Power Station and 132/275kV transformers at the Substation.	44.2	Yes
4	Combined offline, and in situ, staged replacement of both 18/275kV transformers to coincide with Generator outages	-	No

Baseline A and B

This option considers the replacement of just GT2. As discussed earlier in section 3, these transformers are banked with no method isolating either one individually. The transformer GT2 cannot be replaced in-situ with a solution that meets current engineering standards, therefore GT2 needs to be accommodated in a new compound outside of the power station boundary. If GT2 is installed in an off-site compound the option to make the 275kV connection is by breaking into the existing oil filled cable. This will require the design and supply of a specialised joint, the cable was manufactured by BICC and it is unlikely that such a joint can be procured. This would then mean a new section of cable back to the power station. If a propriety joint cannot be sourced the alternative would be to replace the circuit with a new XLPE cable. There would also continue to be issues of business separation or the lack of SHE Transmission controlled and owned LV circuit breaker. The limited space at the power station also means that fire damage zones of GT1 if retained in its current location compromises the security of the GT2 connection.

The outages to carry out this work would require lengthy outages on [redacted], and the option of replacing GT2 only, whether in situ or off line, is not a technically acceptable solution.

NOT PROGRESSED TO DETAILED ANALYSIS

Option 1

This option assumes a replacement of GT1 and GT2 in the existing space. This option does not deliver a solution which is aligned with current standards due to space constraints and is therefore not technically acceptable. [redacted] Due to the configuration of the GTs, whereby they are banked onto the 275kV circuit, it is not possible to take only one unit out of service at a time which would result in a lengthy outage to the customer with a long Emergency Return To Service (ERTS) [redacted]

NOT PROGRESSED TO DETAILED ANALYSIS

Option 2

This option assumes an offline replacement of the transformers in an area to be developed just outside the current Power Station compound approximately 150m away. This new compound allows all current standards to be achieved as well appropriate business separation. The transformer compound would contain the new GTs, with two new 18kV cable circuits installed back to the power station and terminated at two new 18kV breaker bays situated in the vacated GT enclosures. An 18kV resin coated busbar connection will be considered during the refinement of the project as an alternative to the cable connection.

This option also presents the opportunity to address the risks presented by the 275kV oil filled cable in a sensitive location as well as single circuit risk to the connection of this key operational site. To address these issues this option proposes the installation of two XLPE 275kV cable circuits from the new GTs to two new 275kV circuit breaker bays at Foyers switching station. The switching station will need to be extended to accommodate the new bays, and the exiting power station breaker bay can be developed into a bus section bay providing additional security to the site.

[redacted]

PROGRESSED TO DETAILED ANALYSIS

Option 3

Offline build of replacement for both transformers with 18/132kV transformers at the Power Station and 132/275kV transformers at the Substation.

This option proposes the replacement of the existing 275/18kV GTs with 132/18kV units in the same location as the offline compound in option 2. This requires two 18kV circuits from the compound to two circuit breaker bays at power station as per option 2. From the new transformer compound two new 132kV circuits run to the exiting switching station. The switching station requires extension to accommodate a five bay 132kV AIS board, two 275/132kV transformers and two additional 275kV breaker bays. As per option 2 the existing power station bay would be repurposed to provide a bus section.

This option presents a technically compliant solution.

PROGRESSED TO DETAILED ANALYSIS

Option 4

This option proposes a solution that delivers the same electrical result as option 2, however the delivery strategy is different as it proposes a staged programme in line with the generation outages in 2025.

This option proposes that one GT is replaced in a compound near the power station with an 18kV circuit installed back to the power station with the second GT replaced in situ. The works within the confines of the power station due to lack of available space cannot meet current engineering standards.

NOT PROGRESSED TO DETAILED ANALYSIS

5 Detailed Analysis

This section considers in more detail each of the options taken forward from the Optioneering section. Where appropriate the results of Cost Benefit Analysis are discussed and together with supporting objective and engineering judgement contribute toward the identification of a selected option. The section continues by setting out the costs for the selected option.

Taking into consideration the site configuration, lack of adequate space, business separation [redacted] the engineering judgment to consider solutions that looked at the replacement of GT2 as well as early intervention by replacing GT1. With the replacement of both GTs and a driver to replace the fluid filled cable this naturally leads to a solution that delivers two independent 275kV cable connections, one to each GT. This requires a reconfiguration of the Foyers switching station adding an HV circuit breaker to each GT circuit and a bus section breaker. This scope of work is therefore delivering a solution that provide a safe and secure whole system approach at the same time as addressing the asset condition delivering an asset that is fit for purpose for the foreseeable future.

5.1 Cost Benefit Analysis

We have carried out a Cost Benefit Analysis (CBA) using counterfactual Net Present Value (NPV) analysis to demonstrate the potential benefits of each of the shortlisted options, with Option 2 presented as the baseline option for comparison purposes. Our CBA Methodology[4] sets the process and mechanics of our approach to CBA.

The results for this CBA, including relevant calculated Net Present Values (NPVs), are summarised in Table 2 below:

Table 2: CBA Options Summary

CBA reference	Description of Option	Total Forecast Expenditure (£m)	Total NPV	Delta (Option to Baseline)	Total NPV (inc monetised risk)
Baseline (Option 2)	Off-line 18/275kV	-£42.71	-£39.61		£16.09
Option 3	Off-line 18/132/275kV	-£45.95	-£42.74	-£3.13	£12.96

[4] Cost Benefit Analysis Methodology

The results of the CBA demonstrate that Option 2 is the best option from an NPV assessment as it delivers £3.13m of additional value compared to Option 3. This option has been taken forward as the proposed solution to the needs for intervention that were identified.

5.2 Project Sensitivity

As outlined in our core RIIO-T2 business plan document, "A Network for Net Zero", we believe we have a critical role to play in delivering Net Zero ambitions in both the UK and Scotland. Therefore, our plan has been carefully designed with the flexibility to deliver pathways to Net Zero. Our policy paper "A Risk-Based Approach to Asset Management" outlines our approach to monitoring and assessing the condition of our assets to maintain the reliable and resilient network that is expected by our stakeholders. Where asset condition deteriorates, we undertake a programme of cost-effective, risk-based interventions to maintain the longevity and performance of the transmission network. Each of our non-load related projects for T2 is underpinned by Asset Condition Reports which clearly outline that the works are necessary and driven by reliability.

Table 3: Sensitivity Analysis Table

Sensitivity	Test and impact observed – switching inputs
Asset Performance / deterioration rates	Switching deterioration assumption: The asset performance / deterioration rates can only improve or deteriorate. As the need for this project is driven by an asset condition report (as outlined in Section 3), the asset condition will not improve in the intervening period. The second option is for the asset performance to deteriorate and therefore the need remains, and the project would be considered for advancement within available outages.
Ongoing efficiency assumptions	Switching efficiency assumption: increased or decreased. Test would have no impact on (feasible) option selection, the options move in parallel and have no impact on ordering within CBA.
Demand variations	No demand at this site and none forecast
Energy scenarios	Sensitivity considered in Section 3 (Need) already. As this is a non-load project and the need is driven by the asset condition, the work would be required regardless of any changes to the energy scenarios.

Asset utilisation	Our policy paper "A Risk-Based Approach to Asset Management" outlines our approach to monitoring and assessing the condition of our assets to maintain the reliable and resilient network that is expected by our stakeholders. Where asset condition deteriorates, we undertake a programme of cost-effective, risk-based interventions to maintain the longevity and performance of the transmission network. Each of our non-load related projects for T2 is underpinned by Asset Condition Reports which clearly outline that the works are necessary and driven for reliability.
Timing / delivery	We have considered timing of investments as part of our CBAs.
Consenting / stakeholders	Where applicable we have considered consenting and stakeholder engagement as part of section 5 (Detailed Analysis) and the impact which this has had on the selection of the preferred solution.
Public policy / Government legislation	We have considered the impact of public policy, government legislation and regulations as part of the need (section 3), optioneering (section 4) and detailed analysis (section 5) and the impacts this has on the selection of the preferred solution. For example, the projects have considered the impact of the UK Governments' Net Zero emission by 2050 target, SQSS and ESQCR.

5.3 Proposed Solution

The scope of the selected solution is to build an offline 18/275kV transformer compound housing two new generation transformers with two new 275kV circuits to the Foyers switching station with new 275kV bays. The project will be energised with the RIIO-T2 period. The table below details the outputs.

Table 4: Outputs from preferred option

Plant	Size of new plant	Replacement for
18/275kV Transformer	2 x 165MVA units	2 x 165MVA units
275kV cable circuit	2 x 275kV XLPE cable (700m per circuit)	1 x 275kV oil filled cable (850m)
275kV circuit breaker	4 x 275kV feeder bays 1 x 275kV bus section	1 x 275kV feeder bay
18kV circuit breaker	2 x 18kV cable bay	-

5.4 Competition

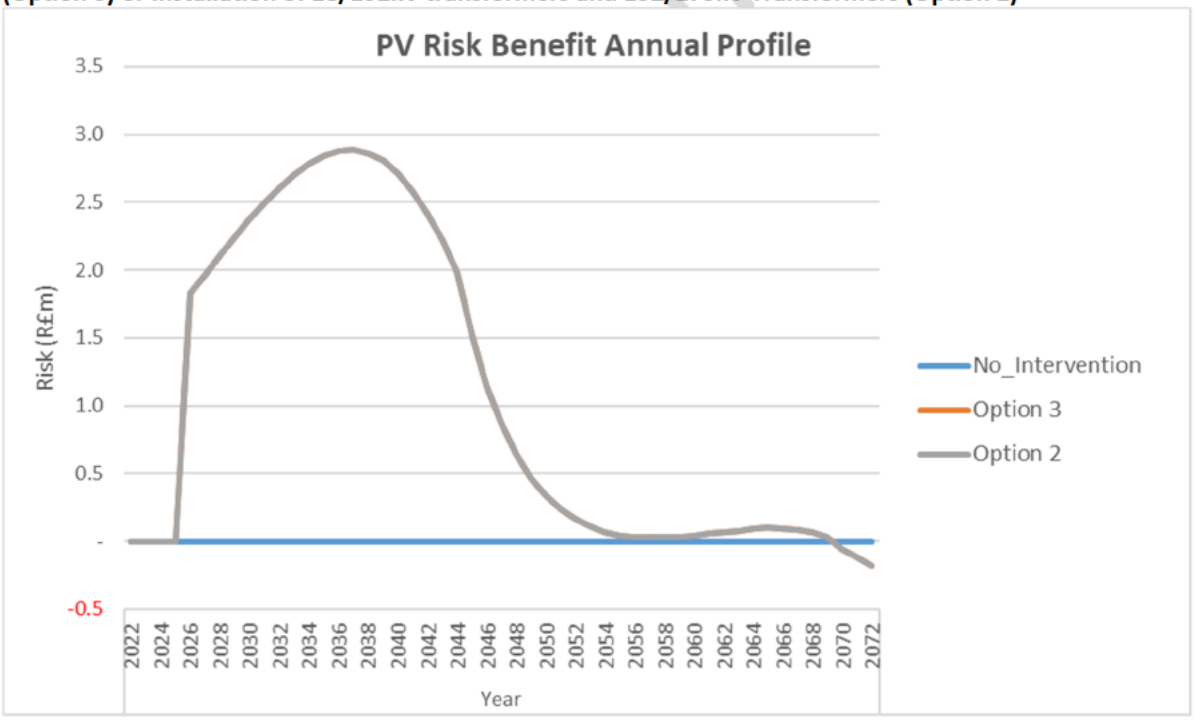
The Foyers scheme is not flagged as eligible for early or late competition due it being under Ofgem's £50m and £100m thresholds respectively.

5.5 Risk Benefit

A Risk Benefit Analysis has been carried out in order to compare "no intervention" against the selected "with intervention" option. Please note that while monetised risk is denoted as a financial figure, it is important to note that it is not "real" money and does not correspond to the cost that SHE Transmission would incur if an asset was to fail and these values are thus identified with R£ prefix (for more details please refer to A Risk Based Approach to Asset Management[1]).

The long-term monetised risk benefit which would be realised through the completion of this project is R£82.6m. The long-term benefit is derived by consideration of the risk of the asset experiencing a catastrophic failure weighted by the probability that the asset will survive for the Options and "no intervention" scenarios. The long-term benefit is an aggregation of the risk of all assets being considered within the option. The risk of each Option is then compared with the "no intervention" scenario. The "no intervention" scenario assumes that when the asset experiences a catastrophic failure the asset is replaced.

Figure 2: Long Term Benefit of Proposed Interventions – Direct replacement of the 18/275 kV transformers (Option 3) or Installation of 18/132kV transformers and 132/275kV Transformers (Option 2)



The long-term risk benefit for both options shown in Figure 2 follow identical profiles throughout their lifetime and as such, the graph displays only one line. In addition to assessing the long-term risk benefit, a monetised risk benefit has also been determined. The monetised risk benefit which would be realised through the completion of this project is R£4.3m.

5.6 Innovation & Sustainability

In support of our Sustainability and Environmental policies, the replacement of 850m of oil filled cable on the banks of Loch Ness will remove the last oil filled cable circuit from our network.

5.7 Carbon Modelling

We are committed to managing resources over the whole asset lifecycle – i.e. including the manufacturing of assets, construction, operations and decommissioning activities – to reduce our greenhouse gas emissions in line with climate science and become a climate resilient business. It is our aspiration that the carbon lifecycle cost of investment options plays a key role within our project development (between gates 1 and 2) and is considered in the selection of a preferred solution. We have therefore developed an internal carbon pricing model that estimates a carbon cost for each option considered in our CBA through deriving values for:

1 Embodied carbon, which relates to the carbon emissions associated with the manufacturing and production of the materials use in production of the lead assets (transformer, reactors, underground cables and overhead lines. Overhead line is made up of tower/wood pole/composite pole, conductor and fittings) procured and installed as part of the project.

2 The carbon emissions associated with the main stages of the project lifecycle (construction, operations and decommissioning).

It is our vision to embed carbon considerations within our strategic optioneering and project development processes, which will require us to determine a way of flagging high carbon options within our CBA outputs. We will continue to develop our thinking in this space, which will involve our model being validated by a third party, so the results included in this EJP are indicative and subject to change.

In terms of the results of analysis for this project, which are captured in the carbon footprint results table.

Table 5: Carbon Modelling

	Project Information	Baseline (Option 2)	Option 3
Project info	Project Name/number	0	0
	Construction Start Year	2026	2026
	Construction End Year	2028	2028
Cost estimate £GBP	Embedded carbon	£ 436,537	£ 746,433
	Construction	£ 234,295	£ 367,991
	Operations	£ 124,777	£ 153,275
	Decommissioning	£ 107,266	£ 168,476
	Total Project Carbon Cost Estimate	**£ 902,876**	**£ 1,436,175**
Carbon footprint tCO2e	Embedded carbon	5,829	9,967
	Construction	3,082	4,840
	Operations	546	670
	Decommissioning	308	484
	Total Project Carbon (tCO2e)	**9,764**	**15,961**
Project Carbon Footprint by Emission Category	Total Scope 1 (tCO2e)	332	371
	Total Scope 2 (tCO2e)	213	299
	Total Scope 3 (tCO2e)	9,219	15,291
SF• Emissions	Total SF• Emissions 3 (tCO2e)	288	310

Option 2 (baseline) is the option that delivers the lowest comparative carbon footprint, which does align with our option selection in the CBA.

5.8 Cost Estimate

The cost of the preferred option for works at Foyers has been developed using rates from existing substation framework contracts and benchmarks from delivered RIIO-T1 projects. The total cost for delivering the scope of works for the proposed solution is £41.6m.

6 Conclusion

The proposed solution to address the asset health and of Foyers generation transformers, also delivers improvement in the configuration of [redacted], as well as removing the last oil filled 275kV oil filled cable circuit from the system.

The proposal justified in this document delivers the follow scope of work:

- Offline replacement of the 275/18kV Generation Transformers (GTs);
- Replacement of the single oil filled 275kV cable circuit between the generation site and Foyers Switching Station with two new XLPE 275kV cable circuits including 275kV circuit breakers.

This scheme will cost £41.6m and will deliver the following outputs and benefits during the RIIO T2 period:

- A long-term monetised risk benefit of R£82.6m;
- A reduction of total network risk calculated as R£4.3m;
- Improved operational flexibility and resilience in line with our goal to aim for 100% transmission network reliability for homes and businesses;
- A reduction in the volume of SF_6 on the network from the use of innovative non SF_6 equipment contributing to our goal of a one third reduction in greenhouse gas emissions.

The Foyers scheme is not flagged as eligible for early or late competition due it being under Ofgem's £50m and £100m thresholds respectively.

7 Price Control Deliverables and Ring Fencing

As set out in our Regulatory Framework paper (section 1.12 and Appendix 3) we support a key principle from Citizens Advice – one that guarantees delivery of outcomes equivalent to the funding received - to ensure that RIIO-T2 really deliver for consumers.

For our core non-load projects this means that we commit to delivering our overarching NARMs target. If we do not deliver the NARMS target, or a materially equivalent target, then we should be subject to a penalty. Equally, if we over-deliver against our target and are able to justify that the over-delivery is in the consumers interests and could not have been reasonably factored into our business plan at the time of target setting then we should be made cost neutral for this work.

Core non load projects should not be ring fenced. This is to allow for substitution of projects in order to meet that NARMs target. We need flexibility to respond to up to date asset data information or external influences on our network during the price control; this information might drive us to substitute one project for another in order to ensure a reliable and resilient network. Ring fencing projects may result in sub-optimal decisions, having adverse consequences for the health of our network, which will ultimately be reflected in the NARMs target.

8 Outputs included in RIIO T1 Business Plan

There are no outputs associated with this scheme included in our RIIO-T1 plans.

Appendix 1

Figure 1 – Foyers Network Diagram