Scottish & Southern Electricity Networks

RIIO ED2 Engineering Justification Paper (EJP)

Mainland Orkney – Hoy South – Asset Replacement

Investment Reference No: 388_SHEPD_SUBSEA_ORKNEY_HOY

Contents

Definitions and Abbreviations

Acronym	Definition
EJP	Engineering Justification Paper
CBA	Cost Benefit Analysis
CBRM	Condition Based Risk Management
CfD	Contracts for Difference
IDP	Investment Decision Pack
EfW	Energy from Waste
ESA	Electricity Supply Area
EV	Electric Vehicle
FES	Future Energy Scenarios
GIS	Geographic Information System
GW	Gigawatt
kW(h)	kilowatt (hour)
MW	Megawatt
OHL	Overhead Line
PEV	Pure Electric Vehicle
PHEV	Plug-in Hybrid Electric Vehicle
PV	Photovoltaics
BSP	Bulk Supply Point
GSP	Grid Supply Point
LRE	Load Related Expenditure
LCT	Low Carbon Technology
SSEN	Scottish and Southern Electricity Network
UG	Underground Cable

1 Executive Summary

This Engineering Justification Paper (EJP) for Scottish Hydro Electric Power Distribution (SHEPD) covers the asset replacement investment required to manage the Mainland Orkney – Hoy South 33 kV subsea cable which provides supplies to Mainland Orkney and surrounding islands.

A number of subsea cable circuits have failed during RIIO-ED1, causing significant impact on customer interruptions, constrained generation, and have resulted in impact costs for temporary generation and CO2 emissions. There has been a review of the approach taken to attempt to identify and pre-empt the impact of subsea cable failure by using a 'monetised risk-based approach' alongside a traditional CBRM approach, which was not viewed as identifying the critical circuits for the strategic programme effectively on its own.

Following optioneering and detailed analysis, as set out in this paper, the proposed scope of works for the Mainland Orkney – Hoy South circuit are as follows:

- Augment the existing Mainland Orkney – Hoy South 33kV subsea cable by laying a new 33kV subsea cable alongside the existing cable.
- Retain the existing Mainland Orkney – Hoy South subsea cable to create an augmented solution and provide a dual subsea connection to Hoy.
- Connect the new 33kV subsea cable to the existing 33kV network.

The anticipated cost to deliver the preferred solution is £[redacted]. The delivery programme for all subsea cables in ED2 will be determined through detailed planning and engagement with marine installation contractors and cable procurement opportunities. For simplicity, where required, the delivery year is assumed as 2024/25 in this EJP and this will be refined as our programme develops.

This scheme delivers the following outputs and benefits:

- Improves reliability and reduces the potential for customer interruptions due to a subsea cable fault.
- Significantly reduces the risk of constrained generation on this circuit in the event of an interruption, which would be £[redacted] m.
- Reduces the monetised risk forecast by the end of ED2 from £1.85m with no intervention, to zero whilst both cables are in commission, and £0.21m after the failure of the existing cable.

It should be noted that the Mainland Orkney - Hoy South cable forms part of the Pentland Firth West circuit to Orkney. As such, any fault on this cable has the same effects as a fault on the Pentland Firth West cable which is also proposed to have an augmented cable installed within the ED2 Period and has a separate EJP.

All subsea cable EJPs should be read in conjunction with the ***Scottish Islands (Annex 8.1)*** of our RIIO-ED2 Business Plan.

2 Investment Summary Table

Table 1 below provides a high-level summary of the key information relevant to this Engineering Justification Paper (EJP).

Table 1: Investment Summary

Name of Programme	Mainland Orkney – Hoy South Asset Replacement	
Primary Investment Driver	The Primary Investment Driver described within this EJP is the requirement to reduce the overall monetised risk associated with the loss of the existing subsea cable from Mainland Orkney to Hoy South.	
Investment reference/mechanism or category	Cost Benefit Analysis reference: 388_SHEPD_SUBSEA_ORKNEY_HOY	
Output reference/type	As above	
Cost (£m)	£[redacted]	
Delivery year	ED2 (2024/25)	
Reporting Table	CV7: Asset Replacement	
Outputs included in RIIO ED1 Business Plan	No	
CV7 Asset Replacement RIIO ED2 Spend (£m)	**ED2 (£m)**	**Total (£m)**
	[redacted]	[redacted]

3 Introduction

This Engineering Justification Paper (EJP) for Scottish Hydro Electric Power Distribution (SHEPD)covers the investment required to manage the performance of the Mainland Orkney – Hoy South - 33 kV subsea cable.

The Primary Investment Driver described within this EJP is based on reducing the overall monetised risk associated with this circuit which has been determined from the "Strategic Subsea Cable CBA Model" developed to determine the overall replacement / augmentaiton strategy for all subsea cables by mitigating the monetised risk associated with the subsea cable assets. The model evaluates the probabilty of failure, the cost of intervention and the impact cost and used this assesment across the asset population to determine the initial investment method to be considered. Further detail on the Strategic Subsea Cable CBA Model is provided in the ***Scottish Islands (Annex 8.1).***

The cable operates in parallel with the Mainland Orkney - Hoy Central 33 kV feeder providing supplies to Mainland Orkney and all surrounding islands, as shown in Fig 1. This cable is one of two main supply cables to the whole of the Orkney Island group as well as one of the two main export routes for all renewable generation on the islands.

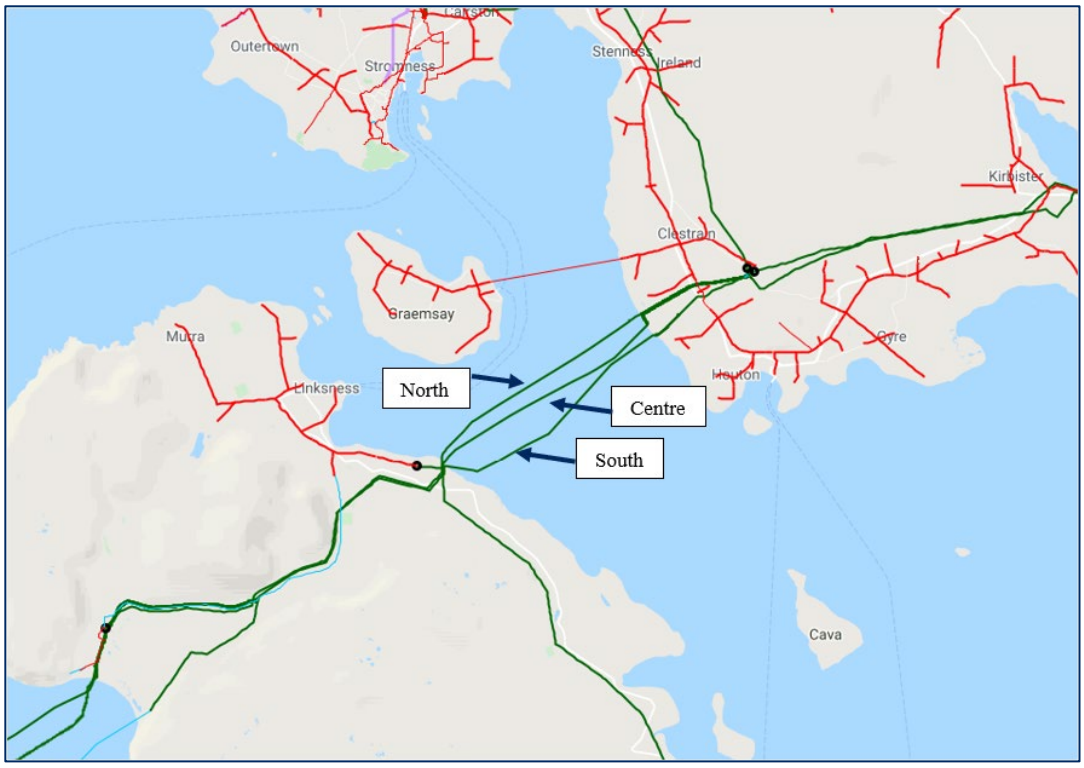

Figure 1 Mainland Orkney Hoy South - 33 kV Feeder

The Mainland Orkney - Hoy South 33kV cable is 22 years old. The connection arrangement and on-island generation mean that in the event of a cable fault supplies will be maintained and no mobile back-up generation will be required. However, there is 65.9 MW of generation that would be constrained at a cost of [redacted] m. Additionally, Kirkwall Power Station (KPS) may be required to run in periods of peak demand to peak lop. The cable is currently classified as Health Index 5 and Criticality Index C2.

Section 4 provides high-level background information for this subsea asset category and explains the importance of this asset for our electricity distribution network and our network customers, and the motivation for ensuring our subsea cables are in good health over the course of RIIO-ED2 and beyond.

Sections 5 and 6 provide a summary of the corresponding intervention options which can be deployed as a solution to these condition related investment drivers.

Section 7 provides a detailed analysis then describes the cost and volumes arising from the preferred intervention options as supported by the Cost Benefit Analysis (CBA) results which complements this EJP.

Section 8 provides an overview of the deliverability and risk management considerations being adopted for the transition from RIIO-ED1 in to RIIO-ED2, and the delivery of subsea cable asset replacement projects.

Section 9 provides an overview of the information presented throughout the EJP and concludes a proposed solution recommended to manage the business case presented.

4 Background Information and Analysis

4.1 How Do We Determine Our Intervention Priorities

We introduced our Condition Based Risk Management (CBRM) system in 2014 following the RIIO-ED1 Business Plan submission. However, since August 2017, we switched over fully to maximise utilisation of the Common Network Assets Indices Methodology (CNAIM) modelling for all asset classifications applicable for the RIIO-ED1 requirements with the data inputs outlined in the Information Gathering Plan (IGP).

The RIIO-ED2 Business Plan submission has been based on the latest version of the industry standard CNAIM v2.1 which was approved for use in RIIO-ED2 by Ofgem in April 2021. The supporting data used in the modelling of this submission is based on the reported position of our asset condition for RIIO-ED1 Year 6 at the end of August 2021.

The full details of the Energy Network Association's NARMs Electricity Distribution Working Group (NEDWG) publication on CNAIM v2.1 is available on Ofgem's website. For further detail on our RIIO-ED2 NARMS strategy please see ***Safe and Resilient (Annex 7.1).***

Our proposed investment programme in ED2 is asset data led; refined and iterated by overlaying the industry standard risk management methodology with enhanced risk modelling and cable specific cost benefit analysis. We are proposing planned replacement of cables where the certainty of need is highest driven by high probability and impact of failure in ED2.

We have adopted a four-step funnel approach, as shown below, to determine the interventions required on the network. This approach allows us to filter from an initial examination of the complete list of subsea cables we operate to a credible and deliverable list of interventions which are supported by robust analysis. Steps 1 to 3 are set out in detail within our ***Scottish Islands (Annex 8.1).***

This EJP covers Step 4 for the Mainland Orkney to Hoy South cable which has qualified as requiring intervention. We set out here our approach to clearly justify why the circuit design approach is being proposed and associated costs are the most economic and efficient and what work would be required to deliver on these investments.

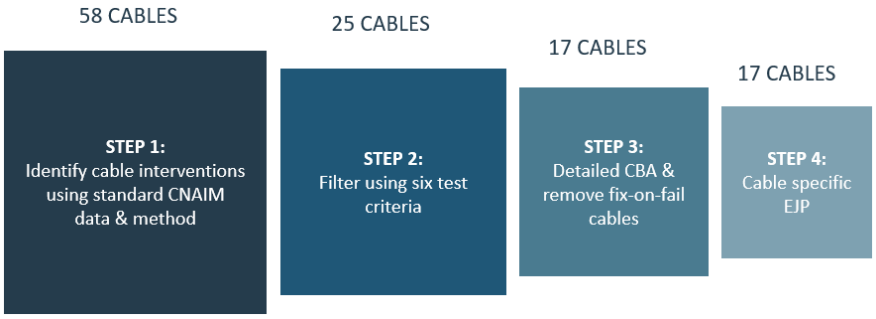

Figure 2 Filter Selection Process

4.2 Existing Network Arrangement

The existing 33kV network configuration is shown in Figure 1. There are three subsea cables shown on the network Mainland Orkney - Hoy North, Hoy Centre and Hoy South. The Mainland Orkney - Hoy Centre and South cables are the feeders providing power to Mainland Orkney and surrounding islands and are connected as shown in figure 3. The third circuit runs from Scorradale on Mainland Orkney to Hoy and feeds North Hoy, Lyness, Flotta and Flotta Occidental primary substations.

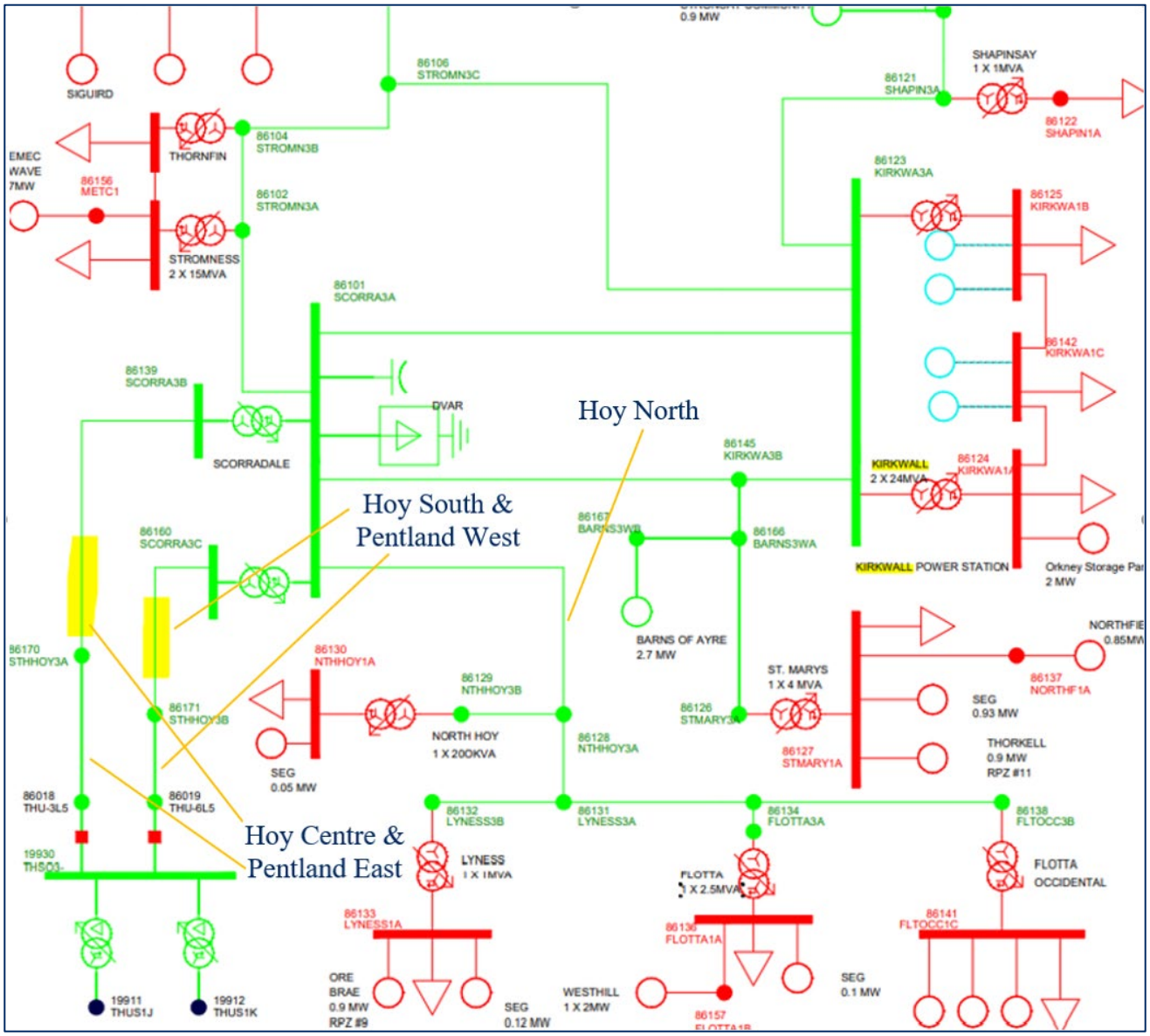

Figure 3 Mainland Orkney – Hoy South - 33 kV network schematic

The 33kV feeders run from Thurso on the mainland to Scorradale substation. The circuits feed over the Pentland Firth via two subsea cables, cross onshore over Hoy and then cross between Mainland Orkney and Hoy via the Mainland Orkney – Hoy Centre and South cables (highlighted yellow) before the final onshore network into Scorradale.

4.3 Existing Asset Condition

The Common Network Asset Indices Methodology (CNAIM) models maintained by SSEN provide a Health and Criticality Index for each individual asset. This is calculated using a variety of asset-specific data which includes basic parameters in addition to the observed and measured condition (where available) of each asset.

The Mainland Orkney – Hoy South 33kV subsea cable is EHV 300 EPR SWA Prysmian type and has been in service for 22 years. The health index of the subsea cable is Health Index HI5 with a Criticality Index of C2. The PoF is 0.191 at the start of ED2, rising to 0.824 at the end of ED2 with no intervention.

4.4 Demand Forecast

The 33 kV Mainland Orkney - Hoy South subsea cable operates in parallel with the Mainland Orkney - Hoy Centre 33 kV subsea cable with a combined load of 35.81 MVA.

The Mainland Orkney - Hoy Centre cable is currently being replaced in ED1 with a 400mm² 33 kV subsea cable rated at 30 MVA. The current Mainland Orkney - Hoy South 33 kV subsea cable is a 300mm² Prysmian rated at 30 MVA.

The forecast growth on the feeder is 6.34%, giving a forecast demand in 8 years of 58.3 MVA. The demand projection is shown in Figure 4.

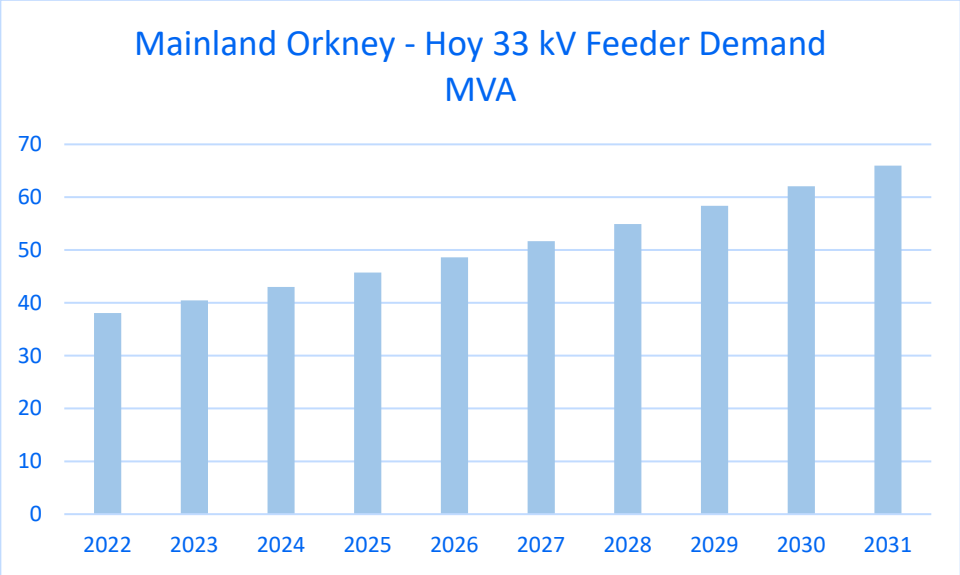

Figure 4 Mainland Orkney - Hoy 33 kV Feeder Demand

The demand on the feeders is in excess of the rating of a single circuit. However, in the event of an outage during peak demand the power station at Kirkwall has generation to support the demand.

There is a proposed transmission link from the Scottish mainland to Orkney involving a 220 MW link to cater for renewable generation tied to the CfD. A conditional acceptance has been granted, subject to commitment for a certain number of MWs from generators. It is anticipated that this will cater for the expected growth in demand and generation on Orkney should it go ahead. The solution selected for this distribution cable will provide flexibility in the future at distribution level, if required, in the future should the T-Link not go ahead.

5 Summary of Options Considered

This section of the report sets out the investment options that have been considered for intervention on the existing cable. The approach taken has been to ensure investment options demonstrate best value for money for network customers.

5.1 Summary of Options

The table below provides a high-level summary of the 6 investment options under consideration along with the advantages and disadvantages associated with each. A more detailed description of each option is then provided within the following sub-sections.

Table 2: Summary of Primary Investment Options

Option	Description	Advantages	Disadvantages	Results
1. Do Minimum	Replace on failure	Low initial cost	Availability and lead time of material and resource when required. High cost of repair where practical with unknown resolution of the fault.	Rejected
2. Replace	Replace the cable with the equivalent size cable on the same route	Improves HI. Provides new life cycle and allows reduced probability of failure	Improves the reliability with the new circuit, and reduces the risk of constrained generation.	Rejected
3. Replace with larger cable	Replace the cable with a larger cable on the same route	Improves HI. Provides new life cycle. This provides greater capacity on this cable but the parallel cable is rated at 30MVA	Higher cost for limited increase in capacity.	Rejected
4. Augmentation	Lay a new cable and retain the old cable, connecting new cable into the 33 kV network.	Similar cost to replacement. Provides third cable for the remainder of the existing cable life.	Improves the security of supply with three cables in commission. However, would fall back to two circuits following the failure of the existing circuit. This would then revert to the equivalent of option 2.	Recommended option
5. Augmentation larger cable	Lay a new larger cable and retain the old cable, will provide greater capacity.	Similar cost to replacement. Provides third cable for the remainder of the existing cable life.	Improves the security of supply with three cables in commission. However, would fall back to two circuits following the failure of the existing circuit. This would then revert to option 3.	Rejected

6. Two new cables along existing route	Lay two new cables along the known route of the existing cable and provide three cables connecting Mainland Orkney and Hoy.	Provides three high reliability cables and removes the impact of a failure for the first.	Higher cost and would provide greater subsea capacity but may not be utilised with restrictions on the 33 kV feeders to Thurso Grid and Scorradale.	Rejected

6 Analysis and Cost

For all options considered it is anticipated that any new cable installed would follow a similar route to the existing cable route shown previously.

6.1 Option 1: Do-Minimum replace on failure

The total cost of this option is based on a planned replacement cost, uplifted by [redacted] % to represent the premium paid when conducting works in an emergency situation. This gives a total replacement cost for this option of £5.45m. This is estimated to be the cost when the replacement is done under emergency conditions without sufficient time to plan and procure the replacement in an efficient manner. This option assumes a replacement would provide at least the same capacity as the existing cable; it is currently anticipated this require a 400mm² cable to provide capacity of 30 MVA which would match the Mainland Orkney – Hoy Centre 33 kV cable being replaced in 2022 (ED1). This option would incur the constrained generation cost.

Costs incurred would be the following

- Constrained generation £[redacted] m
- Capital cost £[redacted] m

This option avoids any initial cost; however, the cost of an emergency replacement would be higher than a planned replacement if the cable fails. This option was rejected, as it would incur constrained generation costs and reputational damage. The replacement cost in an emergency would be around [redacted] % higher than planned replacement costs.

6.2 Option 2: Replace the cable with an equivalent cable, 400 mm²(30MVA)

Replacing the cable with a new 400mm² subsea cable would be the lowest capital cost solution and will improve the Health Index and reduce the Probability of Failure resulting in a change to the characteristics set by the age and condition. The Probability of Failure will reduce from 0.191 to 0.0212 under this option. This reduces the monetised risk from £1.848m, at the start of ED2 to £0.205m following intervention. The new cable will be connected to the existing network points on Mainland Orkney and Hoy, and the old cable disconnected. This provides the simplest connection arrangement and avoids additional land-based costs. This provides the benefits of option 1 but at a lower capital cost and avoids the constrained generation that would be incurred after a failure of the circuit.

The capital cost would be £[redacted].

6.3 Option 3: Replace with a larger 500 mm² cable

This option involves laying a 500 mm² (35 MVA) subsea cable rather than the like for like replacement in option 2. This cable has a higher initial cost. The advantage this has over option 2 is that it would provide greater capacity on this feeder, but the Mainland Orkney - Hoy Centre feeder is 400mm², and that would be the limiting factor for an interruption on the new cable.

The capital cost of this option would be £[redacted].

6.4 Option 4: Augmentation with a similar sized cable.

This option is similar to option 2, laying a similar rated cable to the existing 400mm², but retaining the existing cable until it faults. This would incur additional costs for connection into the 33kV network on Mainland Orkney and Hoy.

This would provide an additional circuit to the current Mainland Orkney – Hoy Centre and South feeders, until the existing cable became faulty, at which time the supply would revert to the current two circuit arrangement with the two new feeders. The existing circuit is 22 years old but is classed as HI5 / C2. The 33kV overhead and

underground connections to the cables would limit any benefit from the additional subsea cable remaining in service, and there would need to be additional switchgear on Hoy and Mainland Orkney increasing the costs, which would be redundant once the existing cable fails.

The existing cable would continue to operate until it develops a fault, at which point there would be another evaluation as to the possible options for that cable, however at the time of the fault the supplies would still be maintained through the new cable.

The cost of this option is as option 2 plus the added cost of connection into the network. The cost of this option is £[redacted].

6.5 Option 5: Augmentation with a larger cable.

This option is similar to option 4 but utilising a 500mm² cable instead of the 400mm².

This would provide increased capacity on this circuit (35MVA), however the current Mainland Orkney - Hoy Centre cable is being replaced with the 400mm² cable (30 MVA). This would provide an additional circuit to the current Mainland Orkney - Centre and South feeders until the existing cable became faulty at which time the supply would revert to the current two circuit arrangement with the two new feeders.

The existing circuit is 22 years old but is classed as HI5 C2. The 33 kV overhead and underground connections to the cables would limit any benefit from the additional subsea cable remaining in service, and there would need to be additional switchgear on Hoy and Mainland Orkney increasing the costs, which would be redundant once the existing cable fails.

The cost of this option would be £[redacted].

6.6 Option 6: Installation of two new cables on the existing route

This was considered as an opportunity to provide capacity and reliability benefits with an additional new circuit. This option would be to install 2 new 400mm² cables and connect into the existing network and decommission the existing cable. This would provide enhanced reliability with the two new circuits in addition to the replaced Mainland Orkney - Hoy Centre cable. The laying of the two cables together under the same contract is expected to allow cost saving of 15% on the second cable compared to the first.

This has been estimated on 400 mm² cables and would provide a firm N-1 capacity on the cable section but would remain limited by the Pentland Firth circuits and overland circuits on Hoy and Orkney.

The overall cost of this option was £[redacted]. This option was rejected as there was a significantly higher initial cost with limited benefit given the onshore network.

7 Summary of Cost Benefit Analysis (CBA)

This section of the report provides an overview for each option from the Cost Benefit Analysis (CBA). A detailed exercise has been undertaken to support the investment strategy that is described within this EJP for the six options, as described below:

7.1 Option Costs

Our RIIO-ED2 Business Plan costs are derived from our outturn RIIO-ED1 expenditure. For our Subsea cable projects, our Unit Costs have been derived from analysing costs pertaining to delivered projects completed during RIIO-ED1 and are therefore based on actual costs. For cable installation activities the delivered projects were competitively tendered utilising our Subsea Cable Installation Framework and cable costs have been benchmarked against recently completed tender events. By tying our costs back to reported, outturn, real life data this approach provides multiple data points and provides a high level of cost confidence in our Business Plan cost forecast for RIIO-ED2.

As our Business Plan has developed, project scopes and costs have been refined, especially with the input of valuable stakeholder feedback on our draft proposals. This final Business Plan submission cost forecast contains that refinement, and the changes are captured within our supporting plan documentation. The generic Unit Cost rates used in the draft Business Plan have now been revised following extensive analysis. This is further defined within ***Scottish Islands (Annex 8.1).***

A summary of the costs for each option is given in the table below.

Table 3: Summary of Capital Costs

Options	Unit	2023/24	2024/25	2025/26	2026/27	2027/28	Total
1. Do Minimum	£m	0	0	0	0	[redacted]	[redacted]
2. Replace	£m	0	[redacted]	0	0	0	[redacted]
3. Replace with larger cable	£m	0	[redacted]	0	0	0	[redacted]
4. Augmentation	£m	0	[redacted]	0	0	0	[redacted]
5. Augmentation larger cable	£m	0	[redacted]	0	0	0	[redacted]
6. Two new cables existing route	£m	0	[redacted]	0	0	0	[redacted]

7.2 Cost Benefit Analysis comparisons

The results of the 45 year NPV from the CBA for the different options are presented in Table 4 below.

Table 4: NPV costs over 45 years for all options

Options	NPV After 45 Years (£m)
Option 1 – Do Minimum	137.45
Option 2 – Replace	166.77
Option 3 – Replace Larger Cable	166.57
Option 4 – Augment	166.71
Option 5 – Augment Larger Cable	166.51
Option 6 – Replace Two New Cables Along Existing Route	167.24

Although there is little difference between options 2 to 6 on NPV over 45 years, option 4 is the proposed option to mitigate the risk.

The NPV for option 4 assumes that the existing cable would fail in 2028, however it is possible that the existing cable would remain in service past 2028, in which case the benefits of operating the existing and the new cables in parallel would continue to be accrued and the NPV would end up being higher than indicated in the table above.

The monetised risk value for the Mainland Orkney – Hoy South 33kV subsea cable is currently £1,848,225 and without intervention may increase to £7,977,160 at the end of ED2. With the intervention proposed in this EJP the monetised risk value will reduce to zero while both cables are in service commission, and £204,858 after the failure of the existing cable.

7.3 Volume of Preferred Option

The option selected requires a new cable to be laid along the existing cable route and connect into the current 33 kV network. The volumes of new assets needed for this option are indicated in Table 5.

Table 5: Volume of Assets for Preferred Option

Asset Category	Unit	2023/24	2024/25	2025/26	2026/27	2027/28	Total
33kV Subsea Cable	km	-	[redacted]	-	-	-	[redacted]
33kV Switchgear	No	-	[redacted]	-	-	-	[redacted]
33kV Switch (PM)	No	-	[redacted]	-	-	-	[redacted]
33kv Switchgear Other	No	-	[redacted]	-	-	-	[redacted]
33kV Pole	No	-	[redacted]	-	-	-	[redacted]
33kV OHL Conductor	km	-	[redacted]	-	-	-	[redacted]
33kV UG Cable (Non Pressurised)	km	-	[redacted]	-	-	-	[redacted]

8 Deliverability & Risk

Our ***Deliverability Strategy (Annex 16.1)*** describes our approach to evidencing the deliverability of our overall plan as a package, and its individual components. Testing of our EJPs has prioritised assessment of efficiency and capacity, and this has ensured that we can demonstrate a credible plan to move from SSEN's RIIO-ED1 performance to our target RIIO-ED2 efficiency.

We have also demonstrated that SSEN's in house and contractor options can, or will through investment or managed change, provide the capacity and skills at the right time, in the right locations. This assessment has been part of the regular assessment of our EJPs, IDPs and BPDTs. For the investment proposed under our subsea cable related EJPs, we have been developing our RIIO-ED2 Commercial & Deliverability Strategy and engaging with our supply chain to ensure we can deliver the solutions proposed, while identifying and managing the risks presented by the complex and challenging nature of the projects.

Our deliverability testing has identified major strategic opportunities which is relevant to all subsea EJPs.

- In RIIO-ED2, SSEN will change the way Capital Expenditure is delivered, maximising synergies within the network to minimise disruptions for our customers. This is particularly relevant for a Price Control period where volumes of work are increasing across all work types.
- The principle is to develop and deliver programmes of work, manage risk and complexity at programme level and to develop strategic relationships with our suppliers and partners to enable efficiency realisation. This potentially includes refining our contracting strategies to improve our risk profiles.
- Transparency with the supplier in terms of constraints, challenges, outage planning and engineering standards will capitalise on efficiencies, supported by a robust contracting strategy.

The delivery programme for all subsea cables in RIIO-ED2 will be determined through detailed planning and engagement with marine installation contractors and cable procurement opportunities. In addition, early stakeholder engagement will significantly de-risk project schedules and deliver value.

We are already identifying opportunities for improved efficiency and improved risk management of our projects and associated programmes. As part of the planning for our final Business Plan submission, we have explored subsea cable project 'bundling' by cable type and geographic location. Our delivery year for each EJP is based on this initial assessment, which will be further explored and then refined with our supply chain in early 2022 to identify the optimal equilibrium of project deliverability and risk management.

9 Conclusion

The purpose of this Engineering Justification Paper (EJP) has been to provide the investment justification and option selection for the 33kV subsea cable from Mainland Orkney to Hoy South.

Due to the number of subsea cable faults in RIIO-ED1, the approach taken for EIIO-ED2 has been to pre-empt failures where possible. The creation of the monetised risk CBA model allows for the circuits which are likely to have the biggest impact, should a failure occur, to be addressed. This approach considers the subsea population within the generic CBA model to help identify the appropriate circuits to be replaced.

The monetised risk value for the Mainland Orkney to Hoy South 33 kV subsea Cable is £1.84 million at the start of ED2 and without intervention will increase to £7.98 m at the end of ED2. With the intervention proposed in this EJP the value will reduce to will reduce to zero while both cables are in service commission, and £0.205m after the failure of the existing cable.

6 options were considered as shown:

- Option 1: Do Minimum – replace on failure
- Option 2: Replace the cable with the same size cable
- Option 3: Replace the cable with a larger cable
- Option 4: Augment by laying a similar sized cable and retaining the existing cable.
- Option 5: Augment by laying a larger cable and retaining the existing cable.
- Option 6: Lay two new cables along the existing route

The preferred option is option 4, augmentation with a second similar sized cable at a cost of [redacted]. While this option does not have the lowest cost, nor the best NPV, it does provide an improvement to the security of supply and allows the existing cable to continue to operate, maximising the possible benefits achieved from that cable.

There is a proposed transmission link from the Scottish mainland to Orkney involving a 220 MW link to cater for renewable generation tied to the CfD. This is being considered by Ofgem and conditional acceptance has been granted with the final outcome to be made known within 12 months. It is anticipated that this will cater for the expected growth in demand and generation on Orkney.

Option 4 provides enhanced reliability which will ensure security of supply whilst offering optionality for future investment at a distribution level if required following the outcome of the Transmission link.

CV7 Asset Replacement	Asset Category	ED2 (£m)
CV7 RIIO ED2 Spend (£m)	33kV Subsea	[redacted]
CV7 RIIO ED2 Spend (£m)	33kV Switch (PM)	[redacted]
CV7 RIIO ED2 Spend (£m)	33kV Switchgear Other	[redacted]
CV7 RIIO ED2 Spend (£m)	33kV Pole	[redacted]
CV7 RIIO ED2 Spend (£m)	33kV OHL Conductor	[redacted]
CV7 RIIO ED2 Spend (£m)	33kV UG Cable (Non Pressurised)	[redacted]