Scottish & Southern Electricity Networks

RIIO-ED2 Engineering Justification Paper (EJP)

Dismantlement

Investment Reference No: 325_SSEPD_NLR_DISMANTLEMENT

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Investment Summary Table

Table 1: Investment Summary below provides a high level summary of the key information relevant to this Investment Decision Pack (IDP) and the strategy and expected performance for Dismantlement.

Table 1: Investment Summary

Name of Programme	Dismantlement						
Primary Investment Driver	Non Load – Safety and Resilience						
Investment Reference	325_SSEPD_NLR_DISMANTLEMENT						
Output Reference	Dismantlement of Redundant Equipment						
Cost	£2.15m						
Delivery year	RIIO-ED2						
Reporting Table	The following Cost and Volume (CV) table correlate to the primary investment drivers for the asset category covered by the IDP: • CV32: Dismantlement						
Outputs included in RIIO-ED1 Business Plan	No						
Spend Apportionment	**Licence Area**	**ED1**		**ED2**		**ED3+**	
	SEPD	-		2.0		-	
	SHEPD	-		0.15		-	
RIIO-ED2 Spend (£m) – Dismantlement							
CV32 Dismantlement RIIO-ED2 Spend Profile (£m)	**Licence Area**	**2024**	**2025**	**2026**	**2027**	**2028**	**Total**
	SEPD	0.4	0.4	0.4	0.4	0.4	**2.0**
	SHEPD	0.03	0.03	0.03	0.03	0.03	**0.15**

1 Executive Summary

Our ***Safe and Resilient (Annex 7.1)*** sets out the methodology used to determine the Non-Load baseline for capital expenditure. The primary driver for this category is safety. This paper identifies the need to provide a baseline to allow intervention on redundant assets.

From time-to-time parts of the Power System's network becomes redundant. This can arise for a variety of reasons but in every case the situation requires a risk assessment to ensure the safety of the public and our staff is maintained.

Our assets are strategically located at commercial, public and private residential areas and as such, some are highly vulnerable to vandalism. Interference to the electricity distribution system can result in associated safety consequences. The safety of the distribution network for both the public and our employees and contractors is of the utmost priority and substations must be secure to trespass and potential theft which can result in serious harm to members of the public. It is important that appropriate measures are put in place when substations are no longer supplying customers.

The cost to deliver the required solution is **£2.15m** and the works are planned to be completed throughout the ED2 regulatory period.

2 Introduction

This Engineering Justification Paper (EJP) describes our proposed non-load related investment plan for Dismantlement works across our network during RIIO-ED2. The primary driver considered within this paper is safety.

Section 3 provide high-level background information for this investment that will explain why we have a need to have funds available within Table CV32 and provides an overview of the investment strategy used for the RIIO-ED2 plan.

Section 4 establishes an overview of our primary drivers associated with this investment category.

Section 5 sets out the chosen RIIO-ED2 investment strategy that has been informed through our stakeholder engagement activities.

Section 6 provides detailed analysis confirming the volumes of assets we plan to target during RIIO-ED2 and the associated costs of these activities, and the deliverability of the plan with respect to our ability to replace the volume of civils assets indicated within this paper during RIIO-ED2 for the cost allowance requested.

Section 7 concludes the EJP and confirms the overall strategy that we plan to drive during RIIO-ED2 to manage our redundant assets.

3 Background Information

This section of the EJP provides background information on our Dismantlement strategy. This includes an overview of the investment, a description of redundant assets and the investment strategy proposed for RIIO-ED2. All of which has informed our CV32 investment strategy.

3.1 Overview

Dismantlement is described as '*the activity of de-energising, disconnecting and removing (where appropriate) Network Assets where the cost of dismantlement is not chargeable to a third party and no new assets are to be installed*.'

From time-to-time parts of the power system's network becomes redundant. This can arise for a variety of reasons but in every case the situation requires a risk assessment to ensure the safety of the public and our staff is maintained, and to minimise the environmental risk of unnecessary oil leaks occurring. In deciding the procedure to adopt, there is a balance between the safety of others and the 'health' of the network. We need to ensure that the risk assessment approach is adequate such that we can determine if the risks are low and can be managed through routine inspection or are high and require the equipment to be potentially removed.

Our distribution substations are strategically located at commercial, public and private residential areas and as such, some are highly vulnerable to vandalism. Interference to the electricity distribution system can result in associated safety consequences. The safety of the distribution network for both the public and our employees and contractors is of the utmost priority and substations must be secure to trespass and potential theft which can result in serious harm to members of the public. It is important that appropriate measures are put in place when substations or other essential supplies are no longer supplying customers.

The HSE's statistics for third party trespass and vandalism incidents for our license areas show there were 11 reports in 2020 targeting ground mounted substations (as shown in Table 2). We need to make sure that our energised substations no longer supplying customers are managed appropriately. The statistics described in the table below are predominantly centred on the 11kV distribution network, which is generally expected due to a high proportion of sites being in urban areas.

Year	2015	2016	2017	2018	2019	2020	Total
SEPD	31	56	14	35	24	11	**171**
SHEPD	0	2	2	0	0	0	**4**
Total	**31**	**58**	**16**	**35**	**24**	**11**	**175**

Table 2: HSE Statistics for Non-Injury Ground Mounted Substations

3.2 Redundant Assets

Targeted dismantlement work is generally associated with redundant HV secondary sites and includes both ground mounted and pole mounted sites. Redundant assets pose a significant safety risk as often they are left on abandoned industrial sites and it is not possible to check the location is continuously secure. These sites run the risk of trespassing, vandalism and unauthorised interference. There are also costs associated with redundant substations; in addition to inspection and maintenance costs associated with these assets,

redundant substations that are no longer feeding customers incur technical losses and there may be additional environmental clearance costs through vandalism and remediation.

Substation plant must not be left out-of-service, even temporarily, without carrying out a risk assessment to determine the reason for disuse and the likelihood of return to service. Plant considered high risk should be removed along with associated cable and overhead line after it is identified as being redundant or out-of-service. Retention will be only after considering the potential risks identified by a full risk assessment carried out in accordance with this procedure and the efficacy of mitigating measures.

Although dismantlement is generally associated with HV ground or pole mounted secondary sites, there may be instances where redundant underground cable and overhead line needs to be removed:

- **Underground Cables** – cables no longer supplying customers or required to provide an alternative supply should be disconnected from the live network as near as reasonably practicable to the point of supply or common connection. For example, a tee'd HV cable to a substation that has been removed should be pot ended at the tee-off, the disconnected cable may be sealed and retained on records as out-of-use.
- **Overhead Lines** - redundant overhead lines will be disconnected from the system and dismantled unless a case for retention can be made, based on a risk assessment.

Where there is any doubt about ongoing safety and security of the equipment from theft or unauthorised interference, then the equipment should be removed.

3.3 Investment Strategy

There are a number of reasons why plant may be out of service either temporarily or permanently. These include:

- The occurrence of a fault;
- Isolated due to a transformer noise complaint;
- Isolated at the request of the customer;
- Isolated due to an Operational Restriction in place;
- Through network alterations;
- Pending land development; or
- The plant is no longer required to supply a customer.

To identify the sites for investment, a number of potential sources of information were evaluated. These include the following:

- Plant that is recorded as de-energised in our network control system PowerOn;
- Feedback from routine inspections;
- Requests for disconnection that would result in plant remaining on site but supplying no customers;
- Fortuitous information that arise from metering staff, members of the public or land owners/occupiers.

To identify the sites for investment, a risk-based approach was carried out on plant that was de-energised in PowerOn, as provided by network control. This included taking into consideration the following:

- The site is classified as high risk,
- There has been evidence of vandalism;
- The site is described as being redundant or derelict; or
- Electrical assets are classified as being in poor health (i.e., as per the investment criteria listed in our ***Safe and Resilient*** (***Annex 7.1)***

In addition, feedback from routine inspections and requests for disconnection that would result in plant remaining on site but supplying no customers was included. A number of checks were carried out on a sample of sites proposed for removal and feedback on the accuracy of the data and the scope of work involved was provided (e.g. by calculating the number of spans that would need to be removed along with the corresponding pole mounted transformer).

Distribution System Operator (DSO) must be consulted to determine if there have been any enquiries, quoted jobs or projects requiring retention of the site. If the site will not be re-commissioned within four weeks of the identification of a project or job to re-use the plant, measures to mitigate the risk must be undertaken in addition to enhancing signage or security. The cost to restore the plant to a useable state will have to be borne by the re-using customer. By collating this information, we can provide a list of substations that are deemed redundant and potentially at risk from interference or theft.

3.4 Fault Throwers

Fault throwers are a type of switchgear installed as part of a protection scheme. Fault throwers are used as part of transformer protection at sites which are remote from their source circuit breakers. When protection schemes detect a fault in the transformer, they need to send a trip signal to all associated circuit breakers to stop the flow of fault current. Where the associated circuit breaker is remote from the transformer, it is necessary to send an intertrip signal to the remote site or to use a fault thrower. A fault thrower connects the incoming circuit (usually 33kV or above) directly to earth creating a circuit earth-fault and causing a high fault current to flow. This high fault current is seen by the protection associated with the source circuit breaker and causes the source circuit breaker to trip. A fault thrower operation causes a high rise-of-earth-potential, introducing a safety hazard, and causes stress on the network by forcing high fault currents. We therefore only deploy fault throwers as a last resort protection, and we remove them when the opportunity arises.

Intertrip signals require a communications link. As part of our ED2 business plan, we are providing new communications links to primary and grid substations as part of our Optical Transport Network (OTN) Rollout (as per 422_SSEPD_OT_OTN Rollout). We are also refurbishing protection schemes where protection relays are no longer reliable (as per 424_SSEPD_NLR_Protection). Where a site has fault throwers and we are providing a new communications route and we are refurbishing protection, then we will also dismantle the fault throwers and replace them with an intertripping scheme. All costs associated with the replacement of the fault thrower are included within the protection refurbishment.

We are proposing to replace fault throwers at 15 sites in each of SEPD and SHEPD over ED2 (i.e. a total of 30 faults throwers to be dismantled in each of SEPD and SHEPD at a rate of 6 per annum over the RIIO-ED2 period).

4 Investment Drivers

This Engineering Justification Paper (EJP) is intended to inform the proposed interventions of our Dismantlement programme **for non-load related purposes** during RIIO-ED2. The primary investment drivers include the following:

- **Safety –** Investment decisions are driven by Electricity Safety, Quality and Continuity Regulations (ESQCR) commitments to ensure the safety of the public and staff is maintained.
- **Defects** – Defects are captured during routine inspection and maintenance or through general network operations.

The primary investment drivers described above correlate to the Cost and Volumes (CV) table 32 within our RIIO-ED2 Business Plan Data Tables (BPDT).

5 Stakeholder Engagement

In preparation for our RIIO-ED2 business plans several stakeholder engagement exercises have been undertaken to better understand what will be important to our network customers during RIIO-ED2 and to ensure the views of our stakeholders are reflected in the cost and volumes we are proposing for each asset category in line with our ***Enhanced Engagement*** Chapter ***(Chapter 3)***.

Below is a summary of the key outcomes from this engagement from some of our critical stakeholders. The summary below provides details of our stakeholder feedback on our ***Safe and Resilient (Annex 7.1)*** and their views on the importance of improving network reliability.

Consumer Feedback

- 88% of stakeholders in SEPD and 72% in SHEPD either agreed or strongly agreed with our asset management proposal to target assets with the highest probability of failure for ED2.
- 71% consumers thought it was very important SSEN are committed to reliability, which was the second highest priority for them (after affordability).
- In terms of reliability, domestic and SME customers' top priorities were 'Restoring the electricity supply as quickly as possible in the event of a power cut' (particularly for those aged 65+ or in vulnerable situations) and 'Keeping my power on with minimal power cuts'.

Local Authority and Government

- Stakeholders strongly urged us to strike a balance between maintain a reliable network by simply fixing older assets now and replacing assets (at a higher cost now) so that the network is ready for future use.
- SSEN needs to ensure reliability and disruptions are minimised, suggesting proactive actions such as providing generators during bad weather and new technologies to 'master' the network.
- Resilience partnerships are a good start for mitigating issues.

Community Energy Groups and Interest Groups

- Both old and new communities need to be resilient - must ensure the transition does not leave people behind.
- SSEN needs to think about current and future populations in areas now in order to plan its investments most effectively.

Summary of Findings

A wide range of stakeholders confirmed that they strongly support our proposed approach of prioritising assets with a higher likelihood of failure as part of the ***Safe and Resilient (Annex 7.1).*** In addition, stakeholders also highlighted that network reliability was a high priority, greater than sustainability but below value for money.

Stakeholders communicated that reliability is expected as they depend on electricity for so many things in everyday life, and this is increasing, for example, with more households working from home and the electrification of heating and transport. These expectations and views validate Ofgem's IIS targets and Guaranteed Standards, so on this basis we have set our ambition to meet these levels of network performance.

6 Detailed Analysis

This section of the report provides further detail on the investment strategy that we propose for the dismantlement programme over RIIO-ED2.

Analysis carried out on SEPD data shows that 112 HV ground mounted substations will require dismantlement during RIIO-ED2 and 62 HV pole mounted sites. Similarly, the same approach was used to calculate volumes for SHEPD, showing that 57 HV pole mounted sites require dismantlement during RIIO-ED2.

We have limited historic reporting for dismantlement and have therefore based our unit rates on the most typical example of the removal of a unit substation, built using our quoting software (i.e. Promis). This would include one HV shutdown, eight metres of cable plus trenching, two joint bays and straight joints and the dismantlement of the unit. The cost is estimated to be approximately £[redacted] per site.

For pole mounted sites, the proposals can vary from a straight forward pole mounted transformer removal to the removal of a pole mounted site with numerous spans of overhead line equipment. Using our quoting software on a typical site, the average cost to remove a pole mounted transformer and two spans would be approximately £[redacted] per site.

6.1 Proposed RIIO-ED2 Investment for CV32 Dismantlement

The primary investment driver detailed within this EJP is to ensure the safety of the public and staff is maintained which correlates to the CV32 table within our BPDTs. Table 3 and Table 4 define our total RIIO-ED2 investment for dismantlement for SEPD and SHEPD, respectively. Table 5 and Table 6 define the breakdown of our volumes for both licence areas.

Table 3: CV32 Dismantlement Expenditure for RIIO-ED2 – SEPD

Licence Area	Asset Category	Unit	2024	2025	2026	2027	2028	Total
SEPD	Dismantlement	£m	0.4	0.4	0.4	0.4	0.4	2.0

Table 4: CV32 Dismantlement Expenditure for RIIO-ED2 – SHEPD

Licence Area	Asset Category	Unit	2024	2025	2026	2027	2028	Total
SHEPD	Dismantlement	£m	0.03	0.03	0.03	0.03	0.03	0.15

Table 5: CV32 Dismantlement Volumes for RIIO-ED2 – SEPD

Licence Area	Asset Category	Unit	2024	2025	2026	2027	2028	Total
SEPD	LV Circuit Breaker	#	0	1	1	1	1	4
SEPD	LV Pillar (ID)	#	5	5	5	5	5	25
SEPD	LV Pillar (OD at Substation)	#	4	4	6	4	4	22
SEPD	6.6/11kV OHL (Conventional Conductor)	km	1.9	1.9	1.9	2.1	2.1	10
SEPD	6.6/11kV Poles	#	24	24	24	26	26	124
SEPD	6.6/11kV UG Cable	km	0.2	0.2	0.2	0.2	0.2	1
SEPD	6.6/11kV Switch (GM)	#	5	5	6	6	6	28
SEPD	6.6/11kV RMU	#	8	9	9	9	9	44
SEPD	6.6/11kV Transformer (PM)	#	22	22	22	23	23	112
SEPD	6.6/11kV Transformer (GM)	#	12	12	12	13	13	62
SEPD	33kV Switchgear - Other	#	6	6	6	6	6	30

Table 6: CV32 Dismantlement Volumes for RIIO-ED2 – SHEPD

Licence Area	Asset Category	Unit	2024	2025	2026	2027	2028	Total
SHEPD	6.6/11kV OHL (Conventional Conductor)	km	1.8	1.8	1.9	1.9	1.8	9
SHEPD	6.6/11kV Poles	#	22	22	24	24	22	114
SHEPD	6.6/11kV Transformer (PM)	#	11	11	12	12	11	57
SHEPD	33kV Switchgear - Other	#	6	6	6	6	6	30

6.2 Deliverability of Proposed Volumes

Between our draft and final Business Plans we have carried out a more detailed deliverability assessment of our overall plan as a package and its component investments. Using our draft Business Plan investment and phasing as a baseline we have followed our deliverability assessment methodology. We have assessed any potential delivery constraints to our plan based on:

- In-house workforce capacity and skills constraints based on our planned recruitment and training profile and planned sourcing mix as well as the efficiencies we have built into our Business Plan (detailed in ***Ensuring Deliverability and a Resilient Workforce (Chapter 16)***)
- Assessment of the specific lead and delivery timelines for the asset classes in our planned schemes
- We have evaluated our sourcing mix where there were known delivery constraints to assess opportunities to alleviate any constraints through outsourcing
- We have engaged our supply chain (detailed in ***Ensuring Deliverability and a Resilient Workforce Chapter 16)*** to explore how the supply chain could support us to efficiently deliver greater volumes of work and how we could implement a range of alternative contracting strategies to deliver this

- We have also engaged with the supply chain on the delivery of work volumes that sit within Uncertainty Mechanisms to ensure we have plans in place to deliver this work if and when the need arises
- We have assessed the synergies between our planned load, non-load and environmental investments to most efficiently plan the scheduling of work and minimise disruption to consumers
- Based on our assessment of delivery constraints and potential solutions to resolve them, we have revised our investment phasing accordingly to ensure our Business Plan is deliverable, meets our consumers' needs and is most cost efficient for our consumers.

7 Conclusion

The purpose of this Engineering Justification Paper (EJP) has been to describe the overarching investment strategy that we intend to take during RIIO-ED2 for the non-load related management of the dismantlement programme.

The safety of the distribution network for both the public and our employees and contractors is of the utmost priority and substations must be secure to trespass and potential theft which can result in serious harm to members of the public. It is important that appropriate measures are put in place when substations are no longer supplying customers. As described within Section 3, we identified the sites for investment by evaluating a number of potential sources of information such as plant recorded as de-energised in PowerOn and feedback from routine inspections. Plant considered high risk should be removed along with associated cable and overhead line after it is identified as being redundant or out-of-service.

In total, **112** HV ground mounted substations will require dismantlement in SEPD during RIIO-ED2 and **62** HV pole mounted sites. Similarly, the same approach was used to calculate volumes for SHEPD, showing that **57** HV pole mounted sites require dismantlement during RIIO-ED2. The dismantlement of sites has been coordinated with wider substation intervention to ensure there is no double counting within the business plan data tables.

This investment represents a total spend of **£2.15m** and the works are planned to be completed throughout the ED2 regulatory period.

Appendix 1: Acronym Glossary

Acronym	Description
BPDT	Business Plan Data Table
CV32	Dismantlement Cost and Volume Table for ED2
DSO	Distribution System Operator
EJP	Engineering Justification Paper
ESQCR	Electricity Safety, Quality and Continuity Regulations
HSE	Health & Safety Executive
HV	High Voltage
IDP	Investment Decision Pack
RIIO-ED2	Electricity Distribution Price Control Period 2 (2023-28)
SEPD	Southern Electric Power Distribution
SHEPD	Scottish Hydro Electric Power Distribution
SSEN	Scottish and Southern Electricity Networks

Appendix 2: Relevant Policy, Standards, and Operational Restrictions

The policies, manuals and standards and operational restrictions which govern the management of Dismantlement are listed below in Table 7.

Table 7: Dismantlement Relevant Documents

Policy Number	Policy Name / Description
TG-NET-NPL-010	Planning Standards for 11kV and 6.6kV Distribution Networks