Secondary Substations

ED2 Engineering Justification Paper Addendum

ED2-NLR(A)-SPEN-001-SWGTX-EJP-ADD

Issue	Date	Comments
Issue 0.1	Aug 2022	Internal Draft for Review
Issue 0.2	Aug 2022	Internal Draft with Comments Addressed
Issue 1 0	Aug 2022	First Issue Draft Determination Response

Scheme Name	RIIO ED2 Secondary Substation
PCFM Cost Type	Non-Load Related - Asset Replacement
Activity	Switchgear Condition Modernisation
Primary Investment Driver	Risk reduction as measured through NARMS
Reference	ED2-NLR(A)-SPEN-001-SWGTX-ADD
Output Type	Asset Modernisation
Cost	SPD: £21.796m SPM: £33.761m
Delivery Year	2023-2028
Reporting Table	CV7a, CV7b, CV7c, CV8, CV9
Outputs included in ED1	Yes/No
Business Plan Section	Ensuring a Safe and Reliable Electricity Supply
Primary Annex	Annex 4A.10: Substations and Switchgear Strategy; EHV to LV

Spend Apportionment	ED1	ED2	ED3
	£m	£55.557m	£m

	Proposed by	Endorsed by	Approved by
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Signature	*ARCampbell*		*David Cupples*
Date	23.08 2022	23 08.2022	23.08.2022

1 Purpose

This addendum has been prepared to provide additional information and justification to ED2-NLR(A)-SPEN 001-SWGTX EJP Secondary Substation EJP following receipt of RIIO ED2 Draft Determination The content of this addendum is in response to comments and feedback provided by Ofgem as to the "Partial Justification" status of the EJP. The purpose of this document is to support Ofgem's assessment for Final Determination including supporting any associated impact on engineering adjustments within Ofgem's financial modelling.

2 Ofgem Comments & Feedback

2.1 RIIO-ED2 Draft Determinations SPEN Annex

The following comments are taken from Table 27 of *"RIIO-ED2 Draft Determination SPEN Annex"*.

Ofgem Comment - Partially Justified. We agree with SPEN's needs case for the proposed investment However, we note that for the LV Switchgear interventions proposed, ED1 planned interventions have not been taken into account We consider the actual volumes in ED2 will decrease. SPEN also propose to phase in the use of SF6-free SWG and RMUs, assuming they will be commercially available from 2025. This comes at an additional unit cost.

Ofgem Identified Risks - The EJP does not consider the planned ED1 interventions, therefore there is a risk to the proposed volumes.

2.2 Draft Determination SQs

Following the receipt of Draft Determination, SPEN submitted SQs including *'SPEN_DD_016 EJP Clarification'* which contain detail relevant to this EJP The relevant content of the SQ has been included below for reference.

SPEN Submitted SQ_DD_016 (25/07/2022)

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We agree with SPEN's needs case for the proposed investment. However, we note that for the LV Switchgear interventions proposed, ED1 planned interventions have not been taken into account. We consider the actual volumes in ED2 will decrease SPEN also propose to phase in the use of SF6-free SWG and RMUs, assuming they will be commercially available from 2025 This comes at an additional unit cost The EJP does not consider the planned ED1 interventions, therefore there is a risk to the proposed volumes.

Volume adjustments have been made within the disaggregated modelling for LV switchgear assets covered by this EJP, can Ofgem clarify if these adjustments been made solely on the basis of requiring evidence that ED1 interventions have been considered when developing the RIIO-ED2 strategy?

SPEN will provide further evidence that the RIIO-ED1 remaining intervention volumes have been considered when developing the RIIO-ED2 forecast, including detailing the forecast asset health profiles at the end of RIIO-ED1 and RIIO-ED2, both including forecast interventions. We will elaborate on our Network Asset Risk strategy of identifying assets for intervention using a range of inputs, not just basing decisions on CNAIM v2.1 Health Index.

Will the above approach ameliorate Ofgem's concerns over the volume of LV switchgear assets proposed for intervention in RIIO-ED2? Are there any additional points that Ofgem would expect to see to provide further clarification on SPEN's submitted volumes for LV Pillar (ID) and LV Pillar (OD at substation)?

Ofgem Response to SQ SPEN_DD_016 (08/08/2022)

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Volume adjustments were made within the disaggregated modelling for LV switchgear assets covered by this EJP for two reasons. (1) ensuring remaining intervention volumes have been considered when developing the RIIO-ED2 forecast, as outlined by SPEN above. (2) The EJP states that "The general increase in LV switchgear interventions from RIIO ED1 to RIIO-ED2 is due to improved condition data for our assets, allowing better informed decision on intervention years" We are not satisfied that SPEN has provided sufficient explanation to justify this statement and considered there was insufficient supporting evidence to demonstrate this within the EJP. We will consider any further information provided.

2.3   Other Ofgem Feedback

Engineering Justification Paper Letter (05/08/2022)

The submitted EJP did not take the final two years of ED1 planned interventions into consideration for the ED2 LV switchgear proposal Asset management decisions work across regulatory periods. SPEN did not provide sufficient supporting information to regarding the narrative around ED1 to ED2 transition and integration

We are aware that SPEN has collected additional data on LV equipment during the ED1 period. We support this. The submitted EJP identified the new data collection as a means to justify an increase in annual volume. However, we are not satisfied that SPEN has provided enough detail and support information to explain this.

3   Additional Justification

3.1   Summary of Ofgem SQs

SPEN responded to SQ (SPEN075) Issued by Ofgem on the 15/03/22 and the response has been appended in Section 4 for reference. SPEN's response to the SQ provided further detail on the following points:

- Unit costs within our CV7 submission

3.2   Additional Supporting Information

3.2.1   ED1 Track Record

The table below gives a summary of the remaining RIIO-ED1 volumes and forecast RIIO-ED2 volumes for LV switchgear replacements. Note this does not take into account the latest RRP data and still uses assumed volumes for the last two years of RIIO-ED1.

The RIIO-ED2 volumes have been forecast through analysis of the condition of the total asset population, factoring in the remaining programme until the end of RIIO-ED1 As shown by the risk matrices in Table 2.2 of the EJP (and repeated in Table 1 below using the same data), there are a high volume of future HI4 and HI5 LV switchgear assets expected by the end of RIIO-ED2 (assuming no further intervention). The remaining RIIO-ED1 volumes will reduce these volumes marginally, but there is still a clear condition-driven need for the proposed RIIO-ED2 programme for each asset type to intervene on the remaining volumes. The proposed RIIO-ED2 volumes will also reduce the volume of future HI4 and HI5 assets, though not to zero. This highlights the need for an ongoing, risk-prioritised asset replacement programme to manage network risk at lowest cost to customers

Table 1 Forecast LV Switchgear Volumes (RIIO-ED1 and RIIO ED2)

Licence	Asset Category	RIIO-ED1 Last 2 years (forecast)	RIIO ED2 Total	Total Forecast (7 years)	Future HI4 & HI5 assets
SPD	LV Pillar (ID)	42	25	67	83
	LV Pillar (OD at Substation)	35	422	457	4,239
	Total	**77**	**447**	**524**	**4,322**
SPM	LV Pillar (ID)	20	370	390	1,009
	LV Pillar (OD at Substation)	6	76	82	287
	LV Board (WM)	41	10	51	134
	LV Board (X Type) (WM)	0	89	89	136
	Total	**67**	**545**	**612**	**1,556**

Table 2 below gives the volume of additions from our 7th year (2021/22) RIIO-ED1 RRP reporting. Most of these volumes are within the remaining RIIO-ED1 volume forecast from our RIIO ED2 submission Where we have done more interventions than forecast, there is still a significantly higher volume of future HI4 and HI5 assets which can be prioritised for intervention within RIIO-ED2

Table 2. RRP Year 7 Actuals

Licence	Asset Category	7th Year RRP addition
SPD	LV Pillar (ID)	16
	LV Pillar (OD at Substation)	88
SPM	LV Pillar (ID)	14
	LV Pillar (OD at Substation)	16
	LV Board (WM)	0
	LV Board (X-Type) (WM)	3

3.2.2   LV Switchgear Network Asset Risk

Following on from Table 2.2 in the EJP, the table below shows the forecast health data at the end of RIIO-ED1 and RIIO-ED2 for LV switchgear assets **with and without proposed interventions**. This has been taken from our BPDT NARM3 submission.

This table shows that there is still a large volume of HI4 and HI5 switchgear assets remaining on the network even after the proposed RIIO-ED1 and RIIO-ED2 volumes The RIIO ED2 volumes for intervention have been limited based on deliverability and prioritisation of assets to intervene on those with highest risk. This has been discussed in Section 5.1 of the EJP.

Table 3 below shows that delivery of volumes in RIIO-ED1 will not reduce the volumes of interventions required in RIIO-ED2, as there are multiple candidates that would be justified for intervention in RIIO-ED2 based on Health Index alone. Therefore, there is not a risk surrounding our proposed RIIO-ED2 volumes and the full volume of replacements will be delivered in this period for fully justified and prioritised assets

Table 3. Risk Profiles of LV Switchgear *

Asset Class	Risk	SPD					SPM				
		HI1	HI2	HI3	HI4	HI5	HI1	HI2	HI3	HI4	HI5
LV Pillar (ID)	End of ED1 (with intv)	3,042	44	75	5	8	5,091	5,055	1,018	299	168
	End of ED2 (no intv)	2,961	113	17	59	24	4,532	4,317	1,597	806	379
	End of ED2 (with intv)	2,979	110	14	57	14	5,001	4,282	1,550	798	0

LV Pillar (OD at Substation)	End of ED1 (with intv)	4,770	3,856	3,348	719	457	705	211	172	108	53
	End of ED2 (no intv)	3,715	3,835	1,386	3,160	1,054	635	221	80	157	156
	End of ED2 (with intv)	4,129	3,824	1,377	3,088	732	711	221	80	157	80

* note there are some minor differences in HI breakdown between Table 1 and Table 3 – this is because there were condition updates between data extracts which have marginally affected the future HI profile. The volume of intervention cannot be directly observed in Table 3 as some HI1 assets have been identified for replacement, which would not show a HI movement. These volumes have been included as they are necessary works associated with a HV asset change.

Table 3 is based on the most accurate data that we have collected to date on our LV assets. We have undertaken a significant data collection exercise throughout RIIO-ED1 to allow our RIIO-ED2 plan to be built up using accurate condition data. We have collected detailed information on LV assets to feed in to the CNAIM v2.1 health index calculation. This data is collected through substation inspections, in which a detailed question set is used to identify condition scores against a range of factors and measurement points, such as corrosion and visible leaks. Each of these measurement points relates to an input within the CNAIM v2 1 methodology for calculating health index or criticality

DNOs were not required to report LV switchgear condition using CNAIM methodology in RIIO-ED1, therefore a comparison of how this data impacted asset health profiles is not possible. However, we can observe the increase in data points, consistency across inspections and validity of our health profiles since this data collection exercise commenced.

As we have not previously had this level of data for our LV switchgear assets, RIIO-ED2 is the first price control where our asset plan is truly reflective of the total asset population condition, which has led to the increase in proposed asset replacements

3 2 3   Selected Option Summary

It is worth raising that through the strategy outlined in this EJP, assets identified for intervention in RIIO-ED2 are not all Future Health Index HI5. Whilst this will not provide the maximum NARMs risk point benefit, this ensures that assets are included for intervention where there is a business and operational need rather than to maximise NARMs outputs. This is a fundamental part of our Asset Management strategy in RIIO-ED1 and RIIO-ED2, managing network risk, improving efficiency through alignment of work at sites, and taking consideration of factors which may not be captured under CNAIM v2 1 methodology

This is discussed further in Section 6 2 of this EJP, and in Section 8 of Annex 4A 4 Network Asset Risk Strategy.

3.2.4   Losses / Sensitivity to Carbon Prices

We note that in Draft Determination, Ofgem have suggested they will accept our SF6 proposal (Section A17 of Core Methodology Document), also outlining that DNOs have committed to exploring SF6 alternatives and procuring non-SF6 emitting alternatives where commercially available. Ofgem have applied a single unit cost for switchgear assets in the CV7 disaggregated model, which is based on an SF6-filled asset cost and does not account for a likely increased unit cost for SF6-free alternatives.

We have included the incremental cost of installing SF6-free assets in M26 BPDTs based on our Unit Cost Manual We acknowledge that installing SF6-free assets will cost more than the SF6-filled alternative and are concerned that this cost will not be covered by the proposed Ofgem unit cost

4   Appendix

The content of this appendix has been redacted.