HV and LV Network Reinforcement

ED2 Engineering Justification Paper Addendum

ED2-LRE-SPEN-002-CV2-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	Aug 2022	First Issue - Draft Determination Response

Scheme Name	HV and LV Network Reinforcement			
PCFM Cost Type	Load Related			
Activity	Secondary Reinforcement			
Primary Investment Driver	Thermal and Voltage Constraints			
Reference	ED2-LRE-SPEN-002-CV2-EJP-ADD			
Output Type	CV2			
Cost	**SPD**	£66.743m	**SPM**	£52.381m
Delivery Year	2023-2028			
Reporting Table	CV2			
Outputs included in ED1	~~Yes~~/No			
Business Plan Section	Develop the Network of the Future			
Primary Annex	Annex 4A.2: Load Related Expenditure Strategy: Engineering Net Zero Annex 4A.6: DFES			
Spend Apportionment	**ED1**	**ED2**	**ED3**	
	£m	**£119.124m**	**£m**	

	Proposed by	Endorsed by	Approved by
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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-LRE-SPEM-002-CV2-EJP-ADD HV and LV Network Reinforcement 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 25 of *"RIIO-ED2 Draft Determination SPEN Annex"*.

Ofgem Comment - Partially Justified. We agree with the needs case and optioneering presented by SPEN. We have confidence in SPEN's proposed intervention volumes as their baseline scenario is at the lower end of net-zero compliant scenarios, and SPEN anticipate non-linear delivery aligned to forecast constraints.

Ofgem Identified Risks - Flexibility at the time of the submission is sufficient to defer 19% of substation interventions. We consider that the planned re- tendering of flexibility may allow further interventions to be deferred, resulting in cost savings.

3   Additional Justification

3.1   Summary of any Ofgem SQs

SPEN responded to four related SQs (SPEN 009, SPEN 014, SPEN 018 & SPEN 104). These responses have been appended in Section 0 for reference. SPEN's responses to these SQs are summarised as follows:

On 20th December 2021, Ofgem sought further explanation on the following (ref SPEN 009):

- Total projected flexibility services spend (excluding ANM)

- Load related flex service projected volumes (MW)

- Projected ANM volumes (MW)

- Projected load-related flexibility costs as a percentage of total projected flexibility services costs (£m)

- Avoided reinforcement resulting from projected load related flexibility (MW and £m)

SPEN provided a full response, details of which are included in Section 4.

On 12th January 2022, Ofgem sought further explanation on the following (ref SPEN 014):

- Clarification of the assumed unit costs for forecast flexibility procurement in ED2

SPEN provided a full response, which also included more information on the flexibility tender response Full details are included in Section 4

On 24th January 2022, Ofgem sought further explanation on the following (ref SPEN 018):

- SPEN breakdown of the capacity released by the proposed works at both HV and LV.
- Confirmation if capacity release could be limited by upstream or downstream constraints.
- SPEN methodology to ensure that where oversizing occurs, it's because it's the most efficient outcome.
- Confirmation that deferral of investment, due to flexibility, at 675 substations, is in addition to the baseline volumes.
- SPEN breakdown of conventional reinforcement volumes and flexibility shortfall, where flexibility insufficient flexibility is available, and we have had to assume the use of network reinforcement.

SPEN provided a full response, details of which are included in Section 4

On 4th April 2022, Ofgem sought further explanation on the following (ref SPEN 104):

- SPEN examples of how the mixed-integer linear optimisation engine was used to determine the most economic combination, sequence, and timing of proposed solutions.

SPEN provided a full response, details of which are included in Section 4.

3.2   Additional Supporting Information

Our Load Related baseline plan is built to address individual known constraints using market tested solutions. This is based on our detailed forecasting, and power system modelling to identify where, when, and how much capacity our customers are expected to require. This precise knowledge meant we were able to tender for flexibility for every RIIO ED2 constraint we identified   over 1,500 sites in total.

Where the market has indicated that flexibility services are not yet available, and we have had to assume the use of network reinforcement, we have committed[1] to re-tender for flexibility within RIIO-ED2 before the reinforcement starts to ensure we are using the most efficient intervention

Whilst this planned re-tendering of flexibility could result in further flexibility services being offered, we consider the level of deferment (19%) to be an ambitious proposal based on the uncertainty of a nascent flexibility market at LV.

We view that the likelihood of cost-reductions from re-tendering for flexibility is significantly outweighed by the likelihood of a higher uptake scenarios triggering an increased level of interventions. This is because our baseline scenario is already at the lower end of the net-zero compliant scenario range   The LRE uncertainty mechanism package, including the secondary reinforcement volume drivers need to be agile and accessible to cater for changes in LCT uptakes whilst complimenting the DSO incentive in promoting the application of flexibility where appropriate.

Our planned level of flexibility is ambitious as the flexible capacity we intend to procure comprises of 95% (by volume/MW) of assets that are planned to connect to the network or be available by the time they are required in RIIO-ED2 (as stated in SQ SPEN 014). We anticipate that a proportion of these assets will transpire not to be available in the required timeframes. Therefore, achieving the planned levels of flexibility already relies upon additional flexibility services becoming available and being procured in future The management of network risk is discussed further in SQ SPEN 014

The strong response to our spring 2021 tendering round enabled us to be particularly ambitious in our plan for LV flexibility services. However, this response was achieved following extensive engagement with Flexibility Service Providers (FSPs), particularly aggregators, conducted after a limited market response at LV in autumn 2020. In the Autumn 2021 tendering round, no further bids for LV flexibility services were received, with FSPs confirming that they were not yet in a position to offer any additional capacity[2] This is an important indication that further availability of suitable flexibility services (though either more technical availability or cost reduction) will take time at the lower voltages.

Our plans for LV flexibility need to consider that there is a significant risk associated with using flexibility to manage secondary network constraints, as compared to managing constraints at higher voltage levels. To manage constraints at LV, flexibility must be highly localised to manage local demand

[1] Main BP Narrative, Section 4A (pg. 40); BP Commitment # 3; Annex 4A.2 Section 8.6
[2] https://www.spenergynetworks.co.uk/userfiles/file/April%2022%20-%20Procurement%20Report.pdf

profiles and risks. At LV there is no N-1 capacity, and this puts networks approaching limits at increased risk of asset failure or voltages outside statutory limits if flexibility was not available. We plan to use flexibility only where it is economically efficient and where the network risks can be sufficiently managed

Using flexibility at sites which are approaching ratings will form an important tool to manage the pace of the Net Zero transition. By managing utilisation before assets are at risk of being overloaded gives us time to ensure the right enduring solution is in place and is delivered at the optimal time. Flexibility services can manage these high loadings through the RIIO-ED2 period, potentially deferring investments associated with higher uptake scenarios from RIIO ED2 into RIIO-ED3.

In the baseline scenario, there are 731 sites that are due to be overloaded by the end of ED2 Of these, reinforcement of 141 sites (19%) can be deferred to the next price control by using flexibility services. However, flexibility is also being used in 459 of the remaining sites to manage high loadings or delay reinforcement within the period. Only 131 (18%) sites had no market response and hence there are no current plans for flexibility services to be employed. (Further details provided in SQ SPEN 018.). This means that only a relatively small proportion of our plans to defer reinforcement were limited by the availability of market bids. As presented in SQ SPEN 014, we received a market response for of 563.8MW   far more than our tender capacity of 454 4MW (Further details provided in SQ SPEN 009 and SQ SPEN 014) These bids were assessed in detail, in line with the CEM, with a technical and commercial assessment which considered the reinforcement counter-factual costs from our ENZ Model (see SQ SPEN 104 for further details) as well as the individual site-based risk duration. We only use flexibility where it is the most efficient solution   either as a standalone solution or in combination with other solutions.

4   Appendix

The content of this appendix has been redacted.