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Annex 18: Our approach to Engineering Justification Papers (EJPs) & Cost Benefit Analysis (CBAs)

How we have completed the key supporting technical detail to our RIIO-ED2 Business Plan

December 2021

Contents

1 Executive Summary

Our proposals for RIIO-ED2 are broad and ambitious as we seek to address the challenges of the Net Zero transition, the appetite for new services and outcomes from our customers and stakeholders and a range of new requirements.

These plans require significant investment on our network and this Annex lays out the supporting detail behind these proposals. These take two forms; Engineering Justification Papers (EJPs) and Cost Benefit Analysis (CBA).

EJPs are a new requirement introduced by Ofgem for RIIO-ED2 which build on an equivalent used in the RIIO-GD & T2 price controls. Their main aim is to set out the technical detail of our individual proposals and the options we have considered in their development.

As a new requirement, we have sought to understand the intent behind it to ensure we get best value from the process.

These EJPs have been added to a CBA process which we utilised in RIIO-ED1, but which has been developed through the period. The key aim of a CBA is to assess the costs & benefits of options against a standard monetised framework to demonstrate that the best value options and decisions are being made in each case.

Included within this Annex are the listings of our EJPs & CBAs, cross-referenced both to each other and the relevant Business Plan Data Template (BPDT) tables in which the relevant data on outcomes resides.

We welcome feedback on these proposals, both in terms of their content and presentation.

2 Engineering Justification Papers (EJPs)

2.1 Role of an EJP

Engineering Justification Papers were introduced by Ofgem as part of the RIIO-GD & T2 price control reviews. Their main purpose as set out in the relevant published guidance for RIIO-ED2 is;

'…to provide justifications for investments and act as decision support tool, which is open to scrutiny and challenge, in conjunction with other appropriate means of justification for investment decisions.'[1]

As such, they form part of the portfolio of evidence for justifying future investment forecasts. As this is the first time that EJPs have been required as part of an Electricity Distribution price control, we have engaged with Ofgem in understanding their intent and purpose to ensure that they are a valuable addition to the process.

This has included understanding some of the lessons learned from their initial application in RIIO-GD & T2 and working with our technical advisors WSP on the appropriate form and content of the EJPs themselves.

Electricity Distribution investment is different in character from the equivalent on Gas and particularly so from Transmission. Most of our network investment comprises ongoing programmes of work and relatively small discrete projects due to the highly dispersed nature of the network we operate. As such, the full scope of the forward programme is necessarily not known in detail at the point of submission and continually changes through the period of a price control to adapt to changing circumstances and requirements.

2.2 Ofgem Guidance

The principle of generating reports to support the business plan submission was established in the Transmission and Gas Price control reviews. In the Sector Specific Methodology Consultation for the Electricity Sector their use for the RIIO-ED2 period was included in the proposals.

As part of the Sector Specific Methodology Determination (SSMD) guidance was issued as to where an Engineering Justification Paper (EJP) should be used to support the licensees' business plan for the RIIO-ED2 period. Section 8 (Ensuring Long-term Safety and Resilience) provides the rationale as to where and how an EJP should be used to provide support for the specific proposals in the business plan submission.

In the RIIO-ED2 Business Plan Guidance Document (Section 5 Paragraphs 5.34 to 5.36) the decision to implement the need for EJP was confirmed and that further guidance would be published. On 9 February 2021 full guidance as to the requirements for EJPs in the Electricity Distribution sector was published.

[1] Paragraph 1.2, https://www.ofgem.gov.uk/publications-and-updates/riio-ed2-engineering-justification-paper-guidance

2.2.1 As published

The 'Engineering Justification Papers for RIIO-ED2' document sets out the specific requirements for the creation and content of EJPs. The five principles in the document are:

- The framework for EJPs
- The Purpose of the papers
- General requirements for the creation of EJPs
- Examples and Structure and
- Requirements to support the assessment of the Licensees submission.

Additionally, the paper sets out in sections 2.6 to 2.8 the criteria where an EJP is required as part of the submission. This section provides the overarching guidance to produce Engineering Justification Papers (EJPs), sets out the key principles and criteria, sets out the assessment framework the Authority will apply and some of potential assessment outcomes.

> *2.6. EJPs will be required for high value load related and non-load related investment programs, where the investment proposals forecast cost exceeds £2m.*
>
> *This includes discrete projects and programmes of projects with common drivers. Programs could include activities to address common reliability or obsolescence issues, where an individual intervention, is unlikely to meet the criteria or threshold.*
>
> *2.7. EJPs will also be required for load related and non-load related investment programs where the asset replacement volume proposals have increased by more than 33% when compared to RIIO-ED1 price control periods and the forecast cost exceeds £500k. This does not include investments that fall within the High Value category (2.6).*
>
> *2.8. Where the investment cost is less than £2m, DNOs may consider producing an EJP to enhance transparency and/or provide additional evidence. This may be considered for proposals that include complex or novel solutions, or the chosen option moves beyond minimum requirements to meet the needs case.*

2.2.2 Our interpretation

To comply with the requirements in the guidance provided we undertook a full review of all the tables provided in the BPDT, to identify where there were programmes or specific projects of work which would potentially meet the three criteria. An initial list of 78 potential areas which could require an EJP was developed. This was then tested against the potential values of the submissions we proposed to make. This further review resulted in the list being reduced to 45 EJPs to support the Draft Business Plan (BP) submission made in July 2021.

Post the Draft BP submission we have further reviewed our programme and increased the number to 49. These are split 32 programme-related and 17 project-related. Additionally, we have created revised templates to guide the completion of the papers, reflecting feedback on those submitted as part of our Draft BP. These provide advice to the author so that the other specific requirements of the guidance are communicated and included within the papers.

In creating our list of EJPs the we have applied the following specific interpretations:

- >£2m the cost of the project or programme is equal to or exceeds this value;

- >133% of the ED1 programme. We have applied this on a pro rata basis (5 years compared to 8 years) and applied it to the costs of the ED1 Final Determination; and
- Where the DNO believes an EJP is required to support the proposal.

2.3 Our EJP schedule

Our EJP schedule has developed since the publication of the Ofgem Guidance in February 2021. From an original list of 78 potential reports we have identified the 49 areas which require supporting EJPs. This has been achieved by iteratively reviewing the drivers for the investment as well as the value of the programmes of work, this has continued post the draft submission of July 2021 and therefore our list of papers is different from that originally submitted. This variance has been driven by the identification of projects that meet the guidance criteria and revision of the scope of some areas which align the proposed programme to current levels of activity and hence no longer meet the criteria specified in the guidance.

This table is the complete list of EJPs we are submitting in support of our December 2021 Final Business Plan. It identifies which table in the BPDT the costs and volumes are entered and the name of the project or programme. Most of these papers support specific projects or programmes associated with ongoing asset replacement, refurbishment and reinforcement activities.

Reporting Table	Driver	Programme or Project	EJP Reference
M21	Bespoke Activities	11kV OHL Safety Management System (LineSIGHT)	BA EJP 1
CV22	Environment	Net Zero Carbon in ENWL Depots	ENV EJP 3
M13 (Costs) and CV22 (Memo Volumes)		PCB removal programme	ENV EJP1
CV22		SF_6 mitigation programme	ENV EJP2
CV14	Legal & Safety	Borrowdale transformers	L&S EJP 2
CV14		LV Earthing Upgrades	L&S EJP 4a
CV14		Transformer mounted Auto-recloser units	L&S EJP 5
CV14		132kV Sealing End replacement	L&S EJP 6
CV14		Enhancements due to Fire Risk Assessments	L&S EJP 7
CV14		Enhanced Low Frequency Demand Disconnection Programme	L&S EJP 8
CV1	Primary Reinforcement	Little Hulton	LRE EJP 1
CV1		Lower Darwen 132 kV Voltage Step Mitigation	LRE EJP 13
CV1		132kV Harmonic Filter at Bredbury	LRE EJP 14
M30		Motorway Service Area EV Enablement - North	LRE EJP 15
M30		Motorway Service Area EV Enablement - South and Central	LRE EJP 16
M30		Cumbria Ring Reinforcement	LRE EJP 17
CV1		Frederick Rd BSP	LRE EJP 2
CV1		Southern Gateway	LRE EJP 3
CV1		Northern Gateway / South Heywood	LRE EJP 4

Reporting Table	Driver	Programme or Project	EJP Reference
CV1		Mayfield Re-gen	LRE EJP 5
CV2	Secondary Reinforcement	Service Unlooping programme	LRE EJP 8
CV11		Monitoring programme	LRE EJP 9
CV7a and b and CV9	NARMs Asset Interventions	Transformers Intervention Programme	NARM EJP 1
CV7a and b and CV9		LV Switchgear	NARM EJP 2
CV7a and b and CV9		HV Switchgear	NARM EJP 2A
CV7a and b and CV9		EHV Switchgear	NARM EJP 3
CV7a & b, CV8 and CV9		Overhead Lines (Woodpoles)	NARM EJP 4
CV7a & b, CV8 and CV9		Overhead Lines (Towers)	NARM EJP 5
CV7a and b and CV9		Oil Assisted Cables (EHV and 132kV)	NARM EJP 7
CV7a and M8, plus CV14/M8		Link Box Programme (LV UGB)	NARM EJP 8
CV7b	Non-NARMs Replacement	Cables (LV)	NNARM EJP 3
CV7b		Cables (HV)	NNARM EJP 4
CV8/M7	Non- NARMs Refurbishment No SDI	Protection refurbishment	NNARM EJP 6
CV7b	Non-NARMs Replacement	Condition based mural wiring	NNARM EJP 7
M13	UM HVP	South Manchester	PRO EJP 1
CV7a	NARMs Asset Interventions - Project Specific	Agecroft - Frederick Rd GT1 and GT2	PRO EJP 10
CV7a and CV9		HL HA HC 33kV OHLs Refb/Repl	PRO EJP 11
CV7a		Padiham GSP 132kV Switchgear replacement	PRO EJP 12
CV25a		Harker - To include the Reinforcement requirements	PRO EJP 2
CV7a		Lancaster - Spring Garden - Burrowbeck 33kV T11 & T12 FFC Replacement	PRO EJP 4
CV7a and CV9		AF line Roosecote - Sellafield - Barrow	PRO EJP 5

Reporting Table	Driver	Programme or Project	EJP Reference
CV7a and CV9		V line	PRO EJP 6
CV7a		Whitegate - Greenhill GT2 and GT3	PRO EJP 8
C3	Physical Security	HV Control Room Relocation	PS EJP 1
CV15	QoS	Vulnerable customer improvement programme	QOS EJP1
CV17	Rising & Lateral Mains	RLM	RLM EJP1
M21	Bespoke Activities	Smart Street	SS EJP 1
CV29 (Business and usual activities) and M13 (Ash die back)	Vegetation Management	Tree Management	TREE EJP 1
CV19	Worst Served Customers	Worst-Served Customer programme	WSC EJP 1

2.3.1 Specific projects

17 of our submitted EJPs relate to specific projects which exceed the £2m materiality threshold specified by Ofgem. Of these, six relate to Reinforcement schemes and eight to Asset Replacement/Refurbishment. One project relates to achieving Zero Carbon objectives and two further projects relate to the connection of EV charging associated with motorway service areas.

Two of these projects refer to sites we share with National Grid, where we are liaising with them regarding the optimum shared solutions for the equipment on those sites – South Manchester and Harker. These projects have significant spend although below the High Value Project threshold (£25m) used in ED1 but about our proposed threshold for uncertainty mechanism of £18m where there is an interdependence with third parties, National Grid for both and additionally Scottish Power Electricity Networks at Harker. These papers explain the projects and the issues we will need to overcome with these partner organisations.

As noted, our programme is not identified down to the lowest level of detail up to seven years in advance due to the nature of the equipment we operate and our need to adapt to changing circumstances. Only in exceptional circumstances do the planning horizons of our projects extend to more than two or three years so even our largest projects planned for 2026-2028 are still in the early design stages. As such, the EJPs will detail options under consideration; however, some will only give an indication of the likely preferred option at this stage.

2.3.2 NARMs interaction

Our NARMs proposal forms a significant element of our RIIO-ED2 plans and is covered in detail in Annex 17. We have prepared EJPs for each of the major asset families within the NARMs framework – eight in total. These set out in more detail our proposals for each of these major asset groupings, including consideration of replacement and refurbishment options where appropriate.

Collectively, these EJPs give 99% coverage of our NARMs submission. One category (132kV Switchgear) is neither material enough nor sufficiently changed in its quantum from RIIO-ED1 to merit inclusion under Ofgem's Guidance.

As noted in section 3, we have not prepared accompanying CBAs for these EJPs. This is because the NARMs framework is populated through use of the Common Network Asset Indices Methodology (CNAIM), which quantifies the impacts on future network risk of different intervention options. As the categorisation and calibration of lifetime risk factors within the CNAIM model is identical to that of the Benefits within the CBA template, CNAIM effectively acts as its own CBA.

2.3.3 Specific programmes

A total of 24 of our submitted EJPs relate to specific programmes. Of these;

- Four apply to replacement of refurbishment of assets not included within the NARMs framework;
- Five relate to specific safety programmes; and
- 15 relate to a variety of other programmes, often supporting specific proposals in our Business Plan.

The following are given as examples of the diversity of proposal covered by this category of EJP. In these cases, there are often limited intervention options and hence the main discussion relates to establishment of the need and the proposed timing or phasing of the solution.

LRE EJP 9 – LV Monitoring. This programme looks to extend our monitoring activities to a wider area of the network to facilitate improved decision making on capacity availability in future.

SS EJP 1 – Smart Street. In RIIO-ED1 we received additional income to roll out our innovative project "Smart Street" on to our network. This programme looks to reduce electricity consumption and therefore bills for customers. We have re-justified the continued application of the technology, aiming it to areas of the network where we have higher levels of fuel poverty.

LRE EJP 7 – LFDD. Following the incident associated with the simultaneous loss of two power station nodes, the requirement to modernise the Low Frequency Demand Disconnection schemes has been identified by Government. This EJP details our approach to the work and the associated costs.

L&S EJP 2 Borrowdales – These small transformers (mainly in the rural positions in the Lake District) are at the end of their life expectancy. Due to their design and method of connection they present a safety risk to staff as well as needing replacement due to their condition. This is a new workstream and commitment for the RIIO-ED2 period.

L&S EJP 6 132kV Sealing ends – There is a national issue with the disruptive failure of a particular type of 132kV sealing ends that presents a danger to staff and public alike. This programme will mitigate these risks by replacing the assets. This is a new requirement for RIIO-ED2.

QOS EJP 1 and WSC EJP 1 These programmes target work to improve the resilience and reliability of our networks to provide improved customer service.

L&S EJP 5 – Transformer LV Auto Reclose Units. To remove the possibility of slow operation of fuse protection on long LV overhead mains feeders we propose to replace fuses with a modern circuit breaker with reclosing capabilities to clear faults quickly and mimic the HV network in restoring

customers without the need to attend site. It also ensures better compliance with the ESQCR requirements.

ENV EJP 1 PCBs. To comply with statute, we need to remove transformers and other plant and equipment containing PCBs. This new requirement for RIIO-ED2 and how we intend to ensure compliance is explained in the paper with our projected costs.

2.4 Our EJP development & review process

2.4.1 Template development

As Ofgem did not prescribe a template for EJPs, we developed an initial template in conjunction with our technical partners, WSP. This built on precedents & learning from the RIIO-GD & T2 submissions, together with our own experience of presenting business cases for internal approval.

It was clear at an early stage that the thought process relating to projects and programmes was subtly different, with the former focused on establishing a discrete need and selection of the appropriate option; whereas the latter needed to focus more on the justification for any proposed changes in activity levels for ongoing programmes of work. Therefore, the project and programme-based templates were subtly different, for adaptation to the specific case under consideration as required.

2.4.2 Options development

Each EJP identifies several options, including a 'do nothing' approach. The details are as appropriate to the engineering case being made; ie in some cases, the need is a given but options over timing & phasing are explored whereas in other case, there are multiple viable technical solutions to the same discrete issue.

In a handful of cases, limited options are identifiable but the EJP format allows for a more detailed explanation of investment driver and scope than in (say) a BPDT table commentary.

2.4.3 Development process

The lessons learned from the RIIO-GD & T2 processes showed the importance placed on EJPs in assessing the technical aspects of the final Business Plan. As per other aspects of our submission, we have followed a DAG[2]-based review process. Through this, we can show that the EJPs meet the stated requirements in the guidance provided and provide a consistent approach to the creation of the reports.

Because of the highly technical nature of the EJP process we also identified the need for additional engineering support. We have done this by the addition of an external expert review and internal technical expert review. The external expertise has been provided by WSP who have provided technical support to several aspects to our Business Plan. Internally, many of the reports have been written by Investment and Asset Managers, who have needed to consult with our internal experts on specific subjects. Their input to the reports have ensured high levels of accuracy on engineering matters.

[2] Data Assurance Guidance – Ofgem's published requirements for the assurance of any data submitted under the terms of the Electricity Distribution licence

In line with the DAG requirements we have undertaken a risk assessment for each of the EJPs and determined that they are all classed as high-risk documents. Because of this classification we have implemented a process whereby each report is scrutinised by our external consultants to ensure consistency and compliance with the required guidance, before undergoing three stages of review and revision (if necessary) before the report is ultimately signed off by a member of the Executive Leadership Team with knowledge of the topic area.

Our process has the following stages:

Role	Knowledge	Task	Responsibility
Lead Author	Has knowledge about the subject area or has developed the programme of work	Create the EJP and revise as various reviews are carried out. Align with overall submission of the BPDT.	Creation of the EJP
Technical Review	Subject Expert	Provide feedback to Lead Author as to the accuracy of the document	Technical content
Second Person Reviewer	High levels of technical knowledge on a wide range of engineering issues	Review and check that the data being presented in the report is factually correct and accurate	Ensure accuracy of the report
External Assurance	Engineering Consultant	Assure the EJP meets minimum standards as required by Ofgem Guidance for EJPs	Ensure the standards required by Ofgem are complied with. Provide additional feedback if revisions are identified.
Senior Manager Reviewer	Business Expert	Review the paper and ensure it complies with company requirements	Recommend acceptance to the Executive Leader for Sign off.
Executive Leadership Member	Company Executive team member	Final review of proposal and agree release to External bodies	Sign-off of document for final release.

3 Cost Benefit Analyses (CBAs)

3.1 Ofgem Guidance

The principle of generating a Cost Benefit Analysis (CBA) report to support elements of the Business Plan submission was established as part of the RIIO-ED1 price control.

As part of the Sector Specific Methodology Decision (SSMD), guidance was issued as to where a CBA should be used to support the licensees' business plan for the RIIO-ED2 period. This was subsequently followed by issuance of the template and associated Guidance which were evolved from their RIIO-ED1 equivalents.

3.1.1 As published

The latest CBA guidance published by Ofgem on 8 October 2021[3] provides the following guidance as to where a CBA is expected to be provided and what its purpose is, specifically:

- The guidance sets out the framework for the provision of CBAs as a tool to aid Ofgem decision making;
- The CBA should enable Ofgem to understand a particular strategy or proposal;
- The document sets out how the Licensee should set out the various options modelled;
- How to treat Societal Benefits, Uncertainty and sensitivity analysis;
- The use of the Spackman principles in the modelling;
- A list of topic areas where a CBA may be appropriate; and
- The need to keep the use of CBAs proportionate when compiling the submission.

The scope of the CBAs should generally be at either Asset Category or class level or for an individual project. In addition, the modelling has been aligned to the requirements of the HM Treasury Green Book.

3.1.2 Our interpretation

We have reviewed the guidance from Ofgem and have developed the list of CBAs in the same manner as described for EJPs. As part of this we have adopted the following principles.

- We have not created CBAs to support NARMs EJPs as NARMs acts as own CBA analysis through having same categorisation of risks/benefits, with the exception of NARMS assets which are subject to replacement or refurbishment options.
- Where a single option is the only practical solution to the identified problem we have not created a CBA.

3.2 Our CBA schedules

We have applied the guidance in the development of our CBA schedule and, as per EJPs, this has evolved through the development process with CBAs being added to and removed from the list when

[3] https://www.ofgem.gov.uk/sites/default/files/2021-10/RIIO-ED2%20Cost%20Benefit%20Analysis%20Guidance.pdf

tested in individual detail, eg some proposals fell below the threshold when developed in detail whilst other programme areas emerged which were added to the list.

Our CBA schedule essentially splits into two;

- 27 CBAs support specific EJPs and can be viewed as part of the same justification. The role of the CBA here is to take the options discussed within the EJP and run them through the model to demonstrate the appropriate decision-making process within the EJP;
- 10 support the losses strategy. These CBAs test very specific questions, typically regarding upsizing options to determine where this is and isn't cost-justified. The results of these CBAs are incorporated in the losses strategy – Annex 14 of our Business Plan.

The following table shows where we have created CBAs to support our EJPs and the relevant BPDTs.

Reporting Table	Programme or Project	EJP Reference	CBA Reference
M21	11kV OHL Safety Management System (LineSIGHT)	BA EJP 1	Not submitted
CV22	Net Zero Carbon in ENWL Depots	ENV EJP 3	Not submitted
M13 (Costs) and CV22 (Memo Volumes)	PCB removal programme	ENV EJP1	ENV CBA 1A ENV CBA 1B ENV CBA 1C
CV22	SF_6 mitigation programme	ENV EJP2	Not submitted
CV14	Borrowdale transformers	L&S EJP 2	
	Pad Transformer Uprating 25 to 50 KVA		LS CBA 2A
	Pad Transformer Uprating 50 to 100 KVA		LS CBA 2B
CV14	LV Earthing Upgrades	L&S EJP 4a	Not submitted
CV14	Transformer mounted Auto-recloser units	L&S EJP 5	LS CBA 4
CV14	132kV Sealing End replacement	L&S EJP 6	Not submitted
CV14	Enhancements due to Fire Risk Assessments	L&S EJP 7	Not submitted
CV14	Enhanced Low Frequency Demand Disconnection Programme	L&S EJP 8	Not submitted
CV1	Little Hulton	LRE EJP 1	LRE CBA 1
CV1	Lower Darwen 132 kV Voltage Step Mitigation	LRE EJP 13	PRO CBA 13
CV1	132kV Harmonic Filter at Bredbury	LRE EJP 14	Not submitted
M30	Motorway Service Area EV Enablement - North	LRE EJP 15	Not submitted
M30	Motorway Service Area EV Enablement - South and Central	LRE EJP 16	Not submitted
M30	Cumbria Ring Reinforcement	LRE EJP 17	Not submitted
CV1	Frederick Rd BSP	LRE EJP 2	LRE CBA 2
CV1	Southern Gateway	LRE EJP 3	LRE CBA 3

Reporting Table	Programme or Project	EJP Reference	CBA Reference
CV1	Northern Gateway / South Heywood	LRE EJP 4	LRE CBA 4
CV1	Mayfield Re-gen	LRE EJP 5	LRE CBA 5
CV2	Service Unlooping programme	LRE EJP 8	LRE CBA 7
CV11	LV Monitoring programme	LRE EJP 9	LRE CBA 8
CV7a and b and CV9	Transformers Intervention Programme	NARM EJP 1	
	33kV Transformers		NARM CBA 1A
	132kV Transformers		NARM CBA 1B
CV7a and b and CV9	LV Switchgear	NARM EJP 2	Not submitted
CV7a and b and CV9	HV Switchgear	NARM EJP 2A	
	6.6/11 kV RMU		NARM CBA 2B
	HV Primary CB		NARM CBA 2A
CV7a and b and CV9	EHV Switchgear	NARM EJP 3	Not submitted
CV7a & b, CV8 and CV9	Overhead Lines (Woodpoles)	NARM EJP 4	Not submitted
CV7a & b, CV8 and CV9	Overhead Lines (Towers)	NARM EJP 5	Not submitted
CV7a and b and CV9	Oil Assisted Cables (EHV and 132kV)	NARM EJP 7	Not submitted
CV7a and M8, plus CV14/M8	Link Box Programme (LV UGB)	NARM EJP 8	Not submitted
CV7b	Cables (LV)	NNARM EJP 3	Not submitted
CV7b	Cables (HV)	NNARM EJP 4	Not submitted
CV8/M7	Protection refurbishment	NNARM EJP 6	Not submitted
CV7b	Condition based mural wiring	NNARM EJP 7	NNARM CBA 6
M13	South Manchester	PRO EJP 1	PRO CBA 1
CV7a	Agecroft - Frederick Rd GT1 and GT2	PRO EJP 10	PRO CBA 7
CV7a and CV9	HL HA HC 33kV OHLs Refb/Repl	PRO EJP 11	PRO CBA 8

Reporting Table	Programme or Project	EJP Reference	CBA Reference
CV7a	Padiham GSP 132kV Switchgear replacement	PRO EJP 12	Not submitted
CV25a	Harker - To include the Reinforcement requirements	PRO EJP 2	Not submitted
CV7a	Lancaster - Spring Garden - Burrowbeck 33kV T11 & T12 FFC Replacement	PRO EJP 4	PRO CBA 3
CV7a and CV9	AF line Roosecote - Sellafield - Barrow	PRO EJP 5	PRO CBA 4
CV7a and CV9	V line	PRO EJP 6	PRO CBA 5
CV7a	Whitegate - Greenhill GT2 and GT3	PRO EJP 8	PRO CBA 6
C3	HV Control Room Relocation	PS EJP 1	Not submitted
CV15	Vulnerable customer improvement programme	QOS EJP1	Not submitted
CV17	RLM	RLM EJP1	Not submitted
M21	Smart Street	SS EJP 1	STR CBA 1
CV29 (Business and usual activities) and M13 (Ash die back)	Tree Management	TREE EJP 1	Not submitted
CV19	Worst-Served Customer programme	WSC EJP 1	Not submitted

This table provides a list of all the CBAS we have created to support our submission:

Reporting Table	Programme or Project	CBA Reference	EJP Reference
CV14	Borrowdale transformers		L&S EJP 2
	Pad Transformer Uprating 25 to 50 KVA	LS CBA 2A	
	Pad Transformer Uprating 50 to 100 KVA	LS CBA 2B	
CV14	Transformer mounted Auto-recloser units	L&S CBA 4	L&S EJP 5
CV1	Little Hulton	LRE CBA 1	LRE EJP 1
CV1	Lower Darwen 132 kV Voltage Step Mitigation	PRO CBA 13	LRE EJP 13
CV1	Frederick Rd BSP	LRE CBA 2	LRE EJP 2
CV1	Southern Gateway	LRE CBA 3	LRE EJP 3
CV1	Northern Gateway / South Heywood	LRE CBA 4	LRE EJP 4

Reporting Table	Programme or Project	CBA Reference	EJP Reference
CV1	Mayfield Re-gen	LRE CBA 5	LRE EJP 5
CV2	Service Unlooping programme	LRE CBA 7	LRE EJP 8
CV7a and b and CV9	Transformers Intervention Programme		NARM EJP 1
	33kV Transformers	NARM CBA 1A	
	132kV Transformers	NARM CBA 1B	
CV7a and b and CV9	HV Switchgear		NARM EJP 2A
	6.6/11 kV RMU	NARM CBA 2B	
	HV Primary CB	NARM CBA 2A	
CV7b	Condition based mural wiring	NNARM CBA 6	NNARM EJP 7
M13	South Manchester	PRO CBA 1	PRO EJP 1
CV7a	Agecroft - Frederick Rd GT1 and GT2	PRO CBA 7	PRO EJP 10
CV7a and CV9	HL HA HC 33kV OHLs Refb/Repl	PRO CBA 8	PRO EJP 11
CV7a	Lancaster - Spring Garden - Burrowbeck 33kV T11 & T12 FFC Replacement	PRO CBA 3	PRO EJP 4
CV7a and CV9	AF line Roosecote - Sellafield - Barrow	PRO CBA 4	PRO EJP 5
CV7a and CV9	V line	PRO CBA 5	PRO EJP 6
CV7a	Whitegate - Greenhill GT2 and GT3	PRO CBA 6	PRO EJP 8
M21	Smart Street	STR CBA 1	SS EJP 1
	LV Monitoring Programme	LRE CBA 8	LRE EJP 9
	PCB Removal		ENV EJP 1
	25 – 50kVA	ENV CBA 1A	
	50 – 100kVA	ENV CBA 1B	
	100 – 200kVA	ENV CBA 1C	
CV21	Losses Strategy 1 33kV 0.2 copper cables replace with 400 triplex	Loss CBA 1	See Annex 14
CV21	Losses Strategy 5 HV 95PICAS replace with 300 triplex	Loss CBA 6	See Annex 14
CV21	Losses Strategy 8 LV 95 consac replace with 300 waveform	Loss CBA 8	See Annex 14
CV21	Losses Strategy 10 Transformer 50 PM like for like replacement	Loss CBA 10	See Annex 14
CV21	Losses Strategy 11Transfromer 100 PM like for like replacement	Loss CBA 11	See Annex 14
CV21	Losses Strategy 12 Transformer 200 PM like for like replacement	Loss CBA 12	See Annex 14
CV21	Losses Strategy 13 Transformer 315 GM like for like replacement	Loss CBA 13	See Annex 14

Reporting Table	Programme or Project	CBA Reference	EJP Reference
CV21	Losses Strategy 14 Transformer 500 GM like for like replacement	Loss CBA 14	See Annex 14
CV21	Losses Strategy 15 Transformer 800 GM like for like replacement	Loss CBA 15	See Annex 14
CV21	Losses Strategy 16 Transformer 1000 GM like for like replacement	Loss CBA 16	See Annex 14

3.2.1 NARMs interaction

As noted, no CBAs have been prepared to support NARMs EJPs (except those noted above) as NARMs acts as own CBA analysis through having same categorisation of risks/benefits into the following categories:

- Network Performance
- Financial Impacts
- Safety
- Environment

With the move to quantifying network risk on a lifetime risk basis for RIIO-ED2, the CNAIM methodology supporting the NARMs framework

3.3 Our CBA development & review process

3.3.1 Template development

Unlike EJPs, CBAs must be completed within a prescribed template which has been evolved from the RIIO-ED1 equivalent and formally issued by Ofgem[4] together with the accompanying guidance.

The template has been updated with contemporary values for key factors and other parameters have been inflated to reflect current price base.

3.3.2 Options development

For those CBAs which accompany EJPs, the options mimic those in the EJP. These will typically include a 'BAU' or 'Do Nothing' options to give a baseline for comparison.

For losses, the CBAs essentially assess the 'do we upsize or not?' question. Additionally, we have created two further CBAs to support uprating our Borrowdale transformers when an intervention takes place to support increased load due to Low Carbon technology uptake and reduced losses.

Where EJP development has revealed a binary choice, a CBA has not been prepared and the discussion on the phasing of the proposed solution is covered within the EJP.

[4] https://www.ofgem.gov.uk/sites/default/files/2021-11/RIIO-ED2_Cost%20Benefit%20Analysis_Template_0.xlsx

3.3.3 Development process

Our CBA development followed the same DAG-based review process, as per other elements of the submission. Company experts in the relevant field developed the options and associated CBA data inputs prior to review by the central team.

Unlike EJPs, we are required to complete CBAs to support specific elements of our annual returns to Ofgem (eg the innovation benefits element of RIGs Annex J – Environment & Innovation) and so we have expertise in the routine completion of the CBA template.

In addition to the roles & responsibilities set out for the EJP development process, we also used this expertise to develop an internal Best Practice Guide for CBA completion and options analysis that was used to support the compilation process.

4 Smart Street

Smart Street is one of our most significant programmes in our RIIO-ED2 Submission and looks to roll out proven innovation at scale to benefit up to 250,000 customers through energy efficiency measures, targeted at areas of high vulnerability and network constraint.

Due to its scale, we retained WSP to assist with the creation of the Smart Street CBA which forms part of our overall schedule.

Note that Smart Street is also being submitted as a Consumer Value Proposition (CVP) in our Business Plan. Our proposal is detailed in Annex 15A which sets out the CBA results and discusses the calculation of wider benefits outside of the CBA model.

5 Conclusions

We have followed a rigorous process in completing the EJPs and CBAs that accompany our Business Plan submission which shows the depth of engineering & technical assessment behind our proposals.

By its nature, work on electricity distribution assets is not detailed in advance for the full duration of a price control hence several the EJPs identify likely preferred options in advance of detailed analysis work being completed nearer the time. This is particularly the case for projects which may still be five years away from execution at the time of submission. Nevertheless, they should provide useful information on the network needs we are seeking to address and the decision-making process to identity the appropriate efficient and effective intervention.

We welcome feedback on our EJPs and CBAs and will continue to work with the Ofgem team to ensure they are valuable additions to the Business Plan.