WESTERN POWER DISTRIBUTION

Serving the Midlands, South West and Wales

Business Plan 2023 - 2028

SA-11 Supplementary Annex
Investment Appraisal

July 2021

westernpower.co.uk

SA-11 Investment Appraisal Content

1. Introduction

1.1. The next regulatory price control review period, known as RIIO-ED2, is a five year period and is the second for electricity distribution to be determined using Ofgem's Revenue = Incentives, Innovation and Outputs framework. This price control period runs from 1st April 2023 to 31st March 2028.

1.2. Western Power Distribution (WPD) is required to submit a 200 page main Business Plan document, Supplementary Annexes, detailed cost tables, financial information and a range of other documents which form our submission under RIIO-ED2 to Ofgem, which will be used to determine allowed revenues for the price control period.

1.3. Our RIIO-ED2 Business Plan has been produced and compiled in line with the following key principles:

- Co-created with our stakeholders and supported by them
- Our plan – 'prepared with our stakeholders for delivery by us'
- Aligned with WPD's purpose and values
- Affordable for all of our customers
- Sustainable and will enable net zero before 2050

1.4. The diagram below (figure SA-11.0) shows the structure of the full Business Plan submission with the red box showing where this document fits into the overall suite of documents.

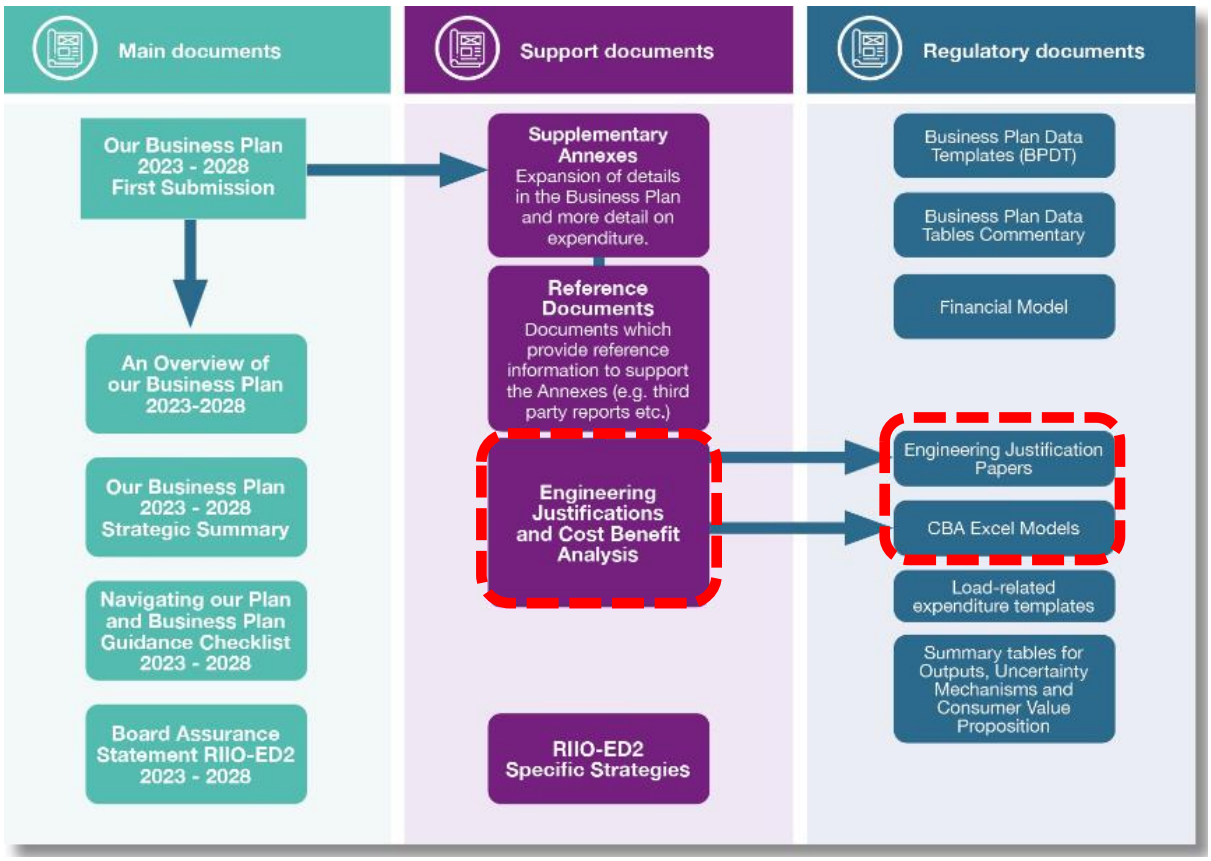

Figure SA-11.0 Business Plan submission structure

1.5. Chapter 6 – Expenditure of Our Business Plan 2023 -2028 First Submission details the expenditure plans we will deliver through the period from 2023 to 2028, for the four WPD distribution licences of West Midlands, East Midlands, South Wales and South West.

1.6. This document is a Supplementary Annex that provides an overview of our investment appraisal process, and the justification behind our investment proposals.

1.7. We appreciate that the readers of the WPD RIIO-ED2 Business Plan suite of documents will range from regulatory experts and well-informed stakeholders through to new customers who may have had little previous knowledge of WPD.

1.8. This document is aimed at readers who require a more detailed understanding of the commitments that will be delivered. A less detailed description of the outputs can be found in the Our Business Plan 2023-2028 First Submission or An Overview of Our Business Plan 2023–2028 documents.

1.9. This document is subdivided into the following sections:

Section	Title	Content
2	Investment Appraisal	This section provides an overview of this document
3	Investment Appraisal approach	This section sets out in greater detail our approach to the investment appraisal for our various proposals.
4	Investment Appraisal toolbox and decision rule	This section outlines the various appraisal tools we have used to ensure that there is a robust business case behind all our co-created RIIO-ED2 proposed investment.
5	Engineering Justification Papers	This section outlines how we have pulled together our EJPs to ensure a robust appraisal. We also clearly set where the main justification for each of our proposed investment can be found.
6	'Business as usual' activities	This section outlines some of the business as usual activities where we have simply adopted a reactive do minimum approach.
7	Cost Benefit Analysis	This section provides an overview to our approach to the cost benefit analysis.
8	A full list of EJPs and CBAs	A table listing our Engineering Justification Papers and Cost Benefit Analysis.
9	Conclusion	This section provides a succinct summary of this document.

2. Investment Appraisal

2.1. This document is a Supplementary Annex to the Western Power Distribution (WPD) RIIO-ED1 Business Plan for the five year period from 1st April 2023 to 31st March 2028. It provides an overview of our robust investment appraisal approach to our RIIO-ED2 Business Plan and an outline of our investment appraisal toolbox.

2.2. Comprehensive investment appraisal has been at the heart of all our proposed RIIO-ED2 investments. While we have made extensive use of Engineering Justification Papers (EJPs) and Cost Benefit Analysis (CBAs) for investment appraisals and justifications, where relevant, these were just some of the tools applied from those available in our appraisal toolbox.

2.3. For absolute clarity, we also provide a high level summary of the key justification rationale for each of our investments at C1 activity level.

2.4. We also provide some clarity on our decision-making process behind the various investments and the role that stakeholder engagement played in this.

2.5. Where possible, we have tried not to duplicate any of the analysis in the various documents of our Business Plan suite, but this has sometimes been necessary for convenience or context.

2.6. All our EJPs were produced in line with Ofgem's Engineering Justification Papers for RIIO-ED2 guidance document (9th February 2021). However, we have gone over and above the Ofgem £2 million threshold and produced EJPs for all major capex investment areas above £1 million for enhanced transparency.

2.7. While Ofgem's Engineering Justification Papers for RIIO-ED2 guidance document (9th February 2021) largely covers only load-related and non load-related investments that are aimed at reinforcing the network, improving asset health or network performance, we have also adopted this framework for other investment areas in the absence of any specific Ofgem guidance for these. We have therefore adopted the use of EJPs for the following areas:

- Data and digitalisation.
- Distribution System Operator (DSO).
- Information Technology (IT).
- Non-Operational property.
- PowerOn-IT.
- Telecoms.
- Transport.

2.8. We have produced 202 EJPs across 13 different investment areas. A detailed list of all the EJPs and their corresponding CBAs, where applicable, is shown in section 7.

2.9. We have also received independent assurance of our CBAs and EJPs from the Strategic Consulting and Power Engineering Teams of the Jacobs Engineering Group.

3. Investment appraisal approach

3.1. Although our investment proposals have been developed and co-created with our stakeholders using a bottom-up approach, they were nevertheless subjected to a robust appraisal process to ensure that the business case for each proposal was solid. Where this was not the case, revisions were proposed and stakeholders re-engaged accordingly.

3.2. We therefore firmly believe that the outcome from our robust investment appraisal process is an optimised co-created RIIO-ED2 Business Plan with an indubitable business case.

3.3. A dedicated independent central team was set up to appraise all the RIIO-ED2 investment proposals to ensure all the proposals were subjected to consistent, independent and robust challenge. Business owners were required to demonstrate the need case, and that the scope and timing of the investment proposals were optimal.

3.4. The investment proposals were also benchmarked against wider company goals and strategies to ensure that these aligned with the medium and long term objectives rather than simply focusing on the narrower RIIO-ED2 period.

3.5. Any identified risks of premature or sub-optimal investments, which could result in asset stranding or underutilisation, were addressed by revisions or ultimately withdrawn altogether as part of the appraisal cycle.

3.6. This central appraisal not only provided senior business owners with peer review, but also enabled identification of opportunities for investment synergies across the different business streams.

3.7. We adopted a simple, consistent and systematic approach in our appraisal, which is reflected in the structure of the EJPs:

- Verification of business needs.
- Identification of the various options.
- Appraisal of the options, including a CBA where relevant.
- Detailed costing.
- Selection of the volumes, where relevant.
- Optimisation of the timing of the programme (with deferral as the default position).
- Delivery assessment.

3.8. For load-related investments, the need was also substantiated against a range of plausible planning scenarios.

4. Investment appraisal toolbox and decision rule

4.1. The investment appraisals have been done on a discrete project basis, where appropriate, or at aggregated programme level.

4.2. Our investment proposals have been appraised and justified using a blend of different tools. The four main items in our investment appraisal toolbox are:

- Econometric analysis.
- Network Asset Risk Metric (NARM).
- Cost Benefit Analysis (CBA).
- Engineering Justification Papers (EJP).

4.3. While the four tools above were an important component in establishing the business case of the various investment proposals, our investment decision process involved another fundamental component that fed into the decision process; this was the **Stakeholder Views and Priorities**, in line with our commitment to a co-created RIIO-ED2 Business Plan. Our decision rule is summarised below:

Decision Rule = Business Case + Stakeholder Views & Priorities

Where the business case is established by one or more tool(s) from our investment appraisal toolbox.

Stakeholder engagement

4.4. Stakeholder engagement has been central to the creation of every investment programme in our RIIO-ED2 Business Plan. We have outlined our approach to this in detail in Supplementary Annex SA-03 ‘Enhanced Engagement’.

4.5. While investment timings and volumes have been largely driven and optimised on a business needs basis, stakeholder feedback has also been a key influence in our decisions. Stakeholders have, on multiple occasions, driven the need case, optioneering, final volume selections and/or proposed timings of the investments. The central role played by stakeholders was a key objective when we set out to co-create our Business Plan in partnership with our stakeholders.

4.6. As a result of stakeholder engagement, we have increased the ambitions of at least 35 of our 45 core commitments, since our first draft RIIO-ED2 Business Plan in January. This is documented in section 4.25 of our main RIIO-ED2 Business Plan document.

4.7. We have also reflected in the EJPs, where relevant, when stakeholders have driven our volume or proposed investment timings.

4.8. In order to avoid replication or duplication of any analysis contained in other areas of our RIIO-ED2 Business Plan where practicable, our justifications for the various investment proposals are detailed in a number of different documents, including:

- Our core Business Plan document.
- RIIO-ED2 Business Plan Supplementary Annex. We have submitted six annexes that provide expanded justification for the proposals in our Business Plan:
  - SA-03 Enhanced engagement
  - SA-04 Our commitments
  - SA-05 Delivering a smart and flexible electricity network
  - SA-06 Expenditure
  - SA-06a Load-related expenditure
  - SA-07 Managing uncertainty

- RIIO-ED2 Specific Strategies, We have provided seven strategy documents that provide expanded justification for the proposals in our Business Plan:

  - Digitalisation Strategy
  - Digitalisation Action Plan
  - DSO Strategy
  - Innovation Strategy
  - Climate Resilience Strategy
  - Workforce Renewal Strategy
  - Environmental Action Plan.

We have also supplied the following documents:

- Cost Benefit Analysis (CBAs): we have submitted 18 CBAs.
- Engineering Justification Papers (EJPs): we have submitted 202 EJPs.

4.9. To provide absolute clarity on the main justification for each of the investments, we have provided a summary table highlighting this in figure SA-11.2 at investment level (we have analysed investment categories in line with the reporting categories in Ofgem's BPDT C1 cost matrix).

5. Engineering Justification Papers

5.1. We have gone over and above Ofgem's £2 million materiality threshold and produced EJPs for investments above £1 million to provide enhanced transparency on our proposed RIIO-ED2 investments.

5.2. Additionally, we have also produced EJPs for load and non-load-related investment programmes where the asset volumes or investments have increased by more than 33% when compared to RIIO-ED1.

5.3. Whenever possible, we have aggregated common investment programmes and produced a WPD group level EJP. We have, however, outlined the disaggregated investments (monetary and asset volumes, where relevant) into the four licence areas within the EJPs to facilitate clear and direct comparisons against the details in the four separate Business Plan Data Tables (BPDTs).

5.4. A summary page at the start of each EJP also details where we have reported the relevant volumes, costs and outputs in the BPDT, to allow for any cross checking.

5.5. Although Ofgem's Engineering Justification Papers for RIIO-ED2 guidance document (9th February 2021) largely covers only load-related and non-load-related investments that are aimed at reinforcing the network, improving asset health or network performance, we have also adopted this framework for other investment areas in the absence of any specific Ofgem justification guidance for these. We have therefore also adopted this frame for the following areas:

- Data and Digitalisation.
- Distribution System Operator (DSO).
- Information Technology (IT).
- PowerOn-IT(OT)
- Telecoms.
- Non-Operational Property.
- Transport.

5.6. In line with section 2.22 of Ofgem's Engineering Justification Papers for RIIO-ED2 guidance document (9th February 2021), we have for clarity set out in the table below (figure SA-11.2) our high level assessment of the investment areas that require EJP. We have also confirmed where the primary investment justification sits for each of these areas, mindful that EJPs are amongst a number of appraisal tools in our toolbox.

		WPD Total Expenditure £m at 2020/21 prices				EJPs produced	RIIO-ED2 Justification Document						
	BPDT C1 Cost Level	Total RIIO-ED2	Average per year in RIIO-ED1	Average per year in RIIO-ED2	% Change (Annual) RIIO-ED2	No of EJPs	Main Investment Justification	Main RIIO-ED2 Business Plan Document	RIIO-ED2 Business Plan Supplementary Annex	RIIO-ED2 Specific Strategy Document	EJP(s)	CBA(s)	BPDT Commentary
Load Related Investment	Connections*	£177	£25	£35	42%	-	BPDT Commentary	Y	Y				Y
	Primary Reinforcement*	£165	£35	£33	-6%	92	EJPs	Y	Y		Y	Y	Y
	Secondary Reinforcement*	£192	£26	£38	50%	1	EJPs	Y	Y		Y		Y
	Fault level Reinforcement	£54	£6	£11	85%	8	EJPs	Y	Y		Y	Y	Y
	New Transmission Capacity Charges	£6	£0	£1	1011%	**	EJPs	Y	Y		Y		Y
Non-Load network investment	Diversions	£231	£38	£46	21%	1	EJPs	Y	Y		Y		Y
	Diversions (rail electrification)	£0	£2	£0									Y
	Asset Replacement	£1,116	£196	£223	14%	28	EJPs	Y	Y		Y		Y
	Refurbishment	£133	£23	£27	14%		BPDT Commentary	Y	Y				Y
	Civil works Condition driven	£68	£15	£14	-9%		BPDT Commentary	Y	Y				Y
	Operational IT and Telecoms	£233	£16	£47	200%	21	EJPs	Y	Y		Y		Y
	Black Start	£0	£3	£0									Y
	BT21CN	£0	£1	£0									Y
	Legal and Safety	£45	£5	£9	69%	1	EJPs	Y	Y		Y		Y
	Quality of supply	£19	£6	£4	-42%			Y	Y				Y
	Flood mitigation	£12	£1	£2	117%	1	EJPs	Y	Y		Y		Y
	Physical security	£0	£0	£0									Y
	Rising and lateral mains	£2	£0	£0									Y
	Overhead line clearances	£122	£18	£24	33%		BPDT Commentary	Y	Y				Y
	Worst served customers	£4	£1	£1	60%		BPDT Commentary	Y	Y				Y
	Visual Amenity	£7	£1	£1	15%	1	EJPs	Y	Y		Y		Y
	Losses	£5	£1	£1	-8%		BPDT Commentary	Y	Y				Y
	Environmental Reporting	£20	£3	£4	19%		BPDT Commentary	Y	Y				Y
Other Areas***	IT and Telecoms (Non-Op)	£277	£23	£55	144%	40	EJPs				Y	Y	Y
	Property (Non-Op)	£63	£12	£13	9%	6	EJPs				Y	Y	Y
	Vehicles and Transport (Non-Op)	£129	£14	£26	80%	3	EJPs				Y	Y	Y
	Small Tool, Plant and Equipment (Non-Op)	£52	£11	£10	-9%		BPDT Commentary						Y
Total Capital Investment		£3,133	£483	£627	30%	203							

* WPD Certainty view

*** covered by the Primary Reinforcement EJPs

**Areas not covered by Ofgem's Engineering Justification Papers for RIIO-ED2 guidance document (9th February 2021)

Figure SA-11.2: Investment Justification mapping.

EJP general structure

5.7. We have structured our EJPs in line with the Ofgem recommended structure in section 3 of Ofgem's Engineering Justification Papers for RIIO-ED2 guidance document (9th February 2021). Each EJP is principally composed of eight sections:

- 'Project on a page' dashboard
- Summary table
- Introduction
- Background information;
- Optioneering
- Analysis and cost
- Deliverability and risk
- Conclusion.

5.8. We have included a '**project on a page summary dashboard**' at the start of each EJP that provides a high level succinct summary of each of EJP including whether that investment is WPD-wide investment or applicable to one or more of our four licence areas. A sample 'project on a page' dashboard from one of our EJPs is shown in figure SA-11.3 below.

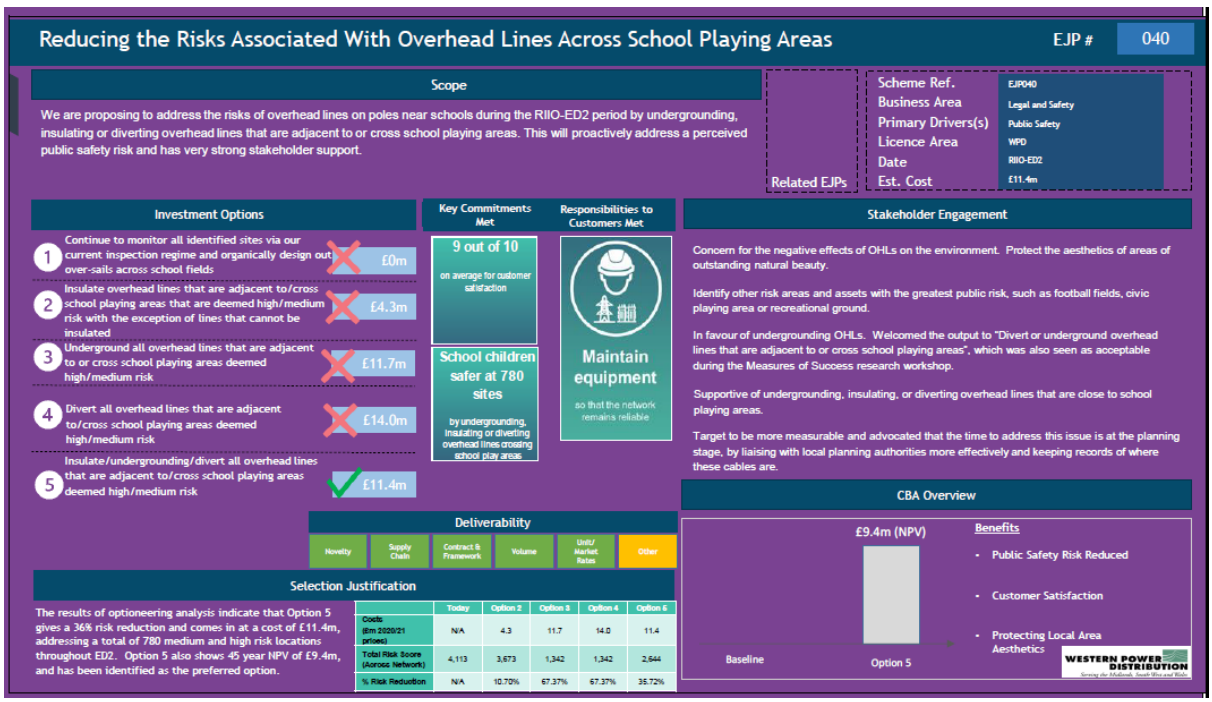

Figure SA-11.3: EJP Project on a page dashboard sample.

5.9. **Summary Table** - There is also a summary table at the start of each EJP, in line with Ofgem's guidance, that provides clear signposting of the investment in question and the relevant costs, volumes or output data as well as where they sit in the BPDTs.

5.10. For common WPD-wide investments, we've used this summary table to show the disaggregation of that investment across our four licence areas, which reflects the relevant costs, volumes or output data in the four discrete BPDTs. A sample summary page from one of our EJPs is shown in figure SA-11.4 below.

1. Summary Table

EJP Summary			
Name of Scheme/Programme	Visual Amenity		
Primary Investment Driver	Environmental		
Scheme reference/ mechanism or category	N/A		
Output references/type	N/A		
Cost	£7.2m		
Delivery Year	RIIO-ED2		
Reporting Table	CV20 - Visual Amenity		
Outputs included in RIIO ED1 Business Plan	No		
Spend apportionment	RIIO-ED1	RIIO-ED2	RIIO-ED3
	0	£7.2m	0

By License Area	(£m)
West Midlands	2.2
East Midlands	1.4
South Wales	1.2
South West	2.5

Our cost confidence for this scheme is high (100%)

Figure SA-11.4: EJP summary table sample.

5.11. Any links between the EJP and the Business Plan outputs, other supporting submissions, such as Business Plan Data Tables, CBAs, NARMs data, asset management plans, other supporting annexes and strategy documents are explained within the EJPs, using the BPDT references as the primary index, in all cases.

5.12. **Introduction section** – This sets out a high level overview of the contents of the EJP.

5.13. **Background information** – This provides the relevant context to the investment i.e. activity driving the investment and the need case for the investment. For load-related investments, the need case is also tested against the three Electricity System Operator (ESO) compliant net zero future energy scenarios (FES).

5.14. **Optioneering** – We provide an outline of all the options considered, including the 'do nothing' or minimal approach. An initial assessment of all the options is then carried out in order to shortlist the compliant options.

5.15. **Analysis and cost** – A detailed analysis is made of all the compliant options technically and financially. Where necessary, a CBA is undertaken against the baseline option.

5.16. CBAs have not been carried out mechanically, but largely in cases where the compliant options are both technically and financially competitive and/or we have not adopted the complaint baseline (minimum) option.

5.17. **Deliverability and risk** – In this section, we set out our deliverability assessment of the proposed investment, risk assessment and why we are confident we can deliver the proposed investment.

5.18. **Conclusion** – The final section is largely an executive summary of the EJP, summarising the need case, preferred solution and deliverability of the investment.

Network reinforcement EJPs

5.19. Network reinforcement EJPs form the largest category of our EJPs, accounting for almost 50% of our total EJPs.

5.20. The network reinforcement expenditure at £595 million represents 19% of our proposed RIIO-ED2 capital expenditure. Figure SA-11.5 below shows the forecast network reinforcement for each of our licence areas compared to the RIIO-ED1 expenditure. Network reinforcement includes connections, general and fault level reinforcement investment, as well as new transmission capacity charges.

Reinforcement of the network					
£m, 20/21 prices	West Midlands	East Midlands	South Wales	South West	WPD Total
RIIO-ED1 Annual Average	31	39	8	13	92
RIIO-ED2 Annual Average (forecast)	31	42	21	24	119
RIIO-ED2 Total (5 years)	153	212	107	122	595

Figure SA-11.5: EJP RIIO-ED2 Network Reinforcement expenditure comparison with RIIO-ED1.

5.21. We have produced 102 reinforcement related EJPs, all at individual project level for EHV and 132kV schemes, for all schemes over £1 million with the exception of the secondary reinforcement for which we have a single EJP.

5.22. The secondary reinforcement programme consists of a very high volume of relatively low value schemes, which is why we have a single EJP, EJP108 Secondary Reinforcement Programme, covering the aggregated programme.

5.23. We have substantiated and detailed the need for the proposed reinforcement investments against a range of plausible planning scenarios for each of the schemes and detailed this in the relevant EJPs.

5.24. Further details of our robust overall approach to network reinforcement during RIIO-ED2, and the measures we have put in place to address risks of asset stranding or premature investments that could lead to underutilisation of assets, can be found in Supplementary Annex SA-06a 'Load-related expenditure'. We believe this approach plays a pivotal role in helping achieve the UK's ambition to achieve net zero carbon emissions by 2050 while offering value for our customers and stakeholders.

Asset replacement EJPs

5.25. Asset replacement EJPs form the second largest category of our EJPs. They represent just over 13% of our total EJPs volume.

5.26. Figure SA-11.6 shows the proposed asset replacement expenditure for each of our licence areas compared to the RIIO-ED1 expenditure.

Asset Replacement					
£m, 20/21 prices	West Midlands	East Midlands	South Wales	South West	WPD Total
RIIO-ED1 Annual Average	57	52	32	55	196
RIIO-ED2 Annual Average (forecast)	64	62	33	65	223
RIIO-ED2 Total (5 years)	318	310	166	323	1,116

Figure SA-11.6: RIIO-ED2 Asset Replacement expenditure comparison with RIIO-ED1.

6. ‘Business as Usual’ activities

6.1. There are a small number of investment areas for which we have not produced EJPs mainly because they would not necessarily add any value. These are largely in areas where we have adopted a reactive ‘do minimum’ approach and also have generic, rather than specific, programme of works. This therefore does not easily lend itself to our detailed EJP appraisal approach as outlined in section 2.7. This also include areas where it is too early to identify the relevant programme or scope of works, such as those relating to Worst Served Customers.

6.2. In these cases, econometric analysis has been the main tool used for the justification which are largely summarised within Supplementary Annex SA-06 ‘Expenditure’ and the relevant BPDT commentary. This includes the following investments:

- Civils works (condition driven)
- Overhead line clearances
- Worst served customers.

7. Cost Benefit Analysis

7.1. We have not produced CBAs mechanically for each of our EJPs, but only where they add value to the decision-making progress. This is largely in scenarios where we have more than one ‘compliant’ option following the initial optioneering analysis. Compliant options are consistent with our legal and licence obligations as well as our internal WPD policies. We have outlined within each of the EJPs whether or not we have carried out a CBA.

7.2. We have also not carried out CBAs for most asset replacement investments as the Network Asset Risk Metrics (NARMs) are applicable for around two thirds of the asset replacement programme.

7.3. NARMs are used to calculate the future risk associated with an asset and to prioritise those assets which need to be changed. We have used these wherever applicable to identify the relevant replacement programme for the assets.

7.4. We believe that the NARM represents a robust decision-making framework that allows DNOs to carry out CBA and to transparently and mechanistically quantify monetised risk benefits for the proposed programme.

7.5. Whenever a CBA has been completed, the relevant outputs have been included and summarised within the relevant EJP.

7.6. We have also adopted a CBA naming convention that largely aligns and matches the EJP, making it easier to identify the CBA associated with each EJP. So, for instance, the CBA for *EJP123 ABC* is *CBA123 ABC*.

8. A full list of EJPs and CBAs

8.1. Summary table of the Engineering Justification Papers (202) submitted.

EJP Reference	EJP Name	Business Area	Licence Area
EJP001	Fleet Electrification	Transport	WPD Wide
EJP002	Mobile Generator Replacement Programme	Transport	WPD Wide
EJP003	*Not Used (previous programme combined with another EJP)*		
EJP004	Exeter Depot Refurbishment	Property Non Op	WPD Wide
EJP005	Torquay Depot Refurbishment	Property Non Op	WPD Wide
EJP006	Plymouth Depot Refurbishment	Property Non Op	WPD Wide
EJP007	*Not Used (previous programme combined with another EJP)*		
EJP008	*Not Used (previous programme combined with another EJP)*		
EJP009	General Buildings Refurbishment Programme	Property Non Op	WPD Wide
EJP010	*Not Used (previous programme combined with another EJP)*		
EJP011	Incorporating Solar PV and Battery Storage in our non-operational sites	Property Non Op	WPD Wide
EJP012	EV Fleet Charging Infrastructure	Transport	WPD Wide
EJP013	*Not Used (previous programme combined with another EJP)*		
EJP014	Replacement of Bunkered Fuel Tanks	Property Non Op	WPD Wide
EJP015	Visual Amenity	Wayleaves	WPD Wide
EJP016	Diversions (excluding Rail Electrifications)	Wayleaves	WPD Wide
EJP017	*Not Used (previous programme combined with another EJP)*		
EJP018	New Fibre Deployment Programme	Telecoms	WPD Wide
EJP019	Fibre Refurbishment Programme	Telecoms	WPD Wide
EJP020	New Communication Fibre Sites Programme	Telecoms	WPD Wide
EJP021	New Radio Communication Sites Programme	Telecoms	WPD Wide
EJP022	Communication Towers Replacement & Refurbishment Programme	Telecoms	WPD Wide
EJP023	Communication Site Buildings Replacement & Refurbishment Programme	Telecoms	WPD Wide
EJP024	Communication Sites Battery & Charger Replacement Programme	Telecoms	WPD Wide
EJP025	Communication Sites Generator Replacement Programme	Telecoms	WPD Wide
EJP026	Communication Sites Physical Security Upgrade Programme	Telecoms	WPD Wide
EJP027	Securing Telecommunication Equipment at 3rd Party Facilities	Telecoms	WPD Wide
EJP028	Communication Site Link Resilience Programme	Telecoms	WPD Wide
EJP029	IP & Firewall Network Replacement Programme	Telecoms	WPD Wide
EJP030	Microwave Upgrade & Replacement Programme	Telecoms	WPD Wide
EJP031	DWDM Network Upgrade Programme	Telecoms	WPD Wide
EJP032	LTE Network Build and Growth Programme	Telecoms	WPD Wide
EJP033	Automation Communications Equipment Migration Programme	Telecoms	WPD Wide
EJP034	Protection Circuits Communications Equipment Replacement Programme	Telecoms	WPD Wide
EJP035	*Not Used (previous programme combined with another EJP)*		
EJP036	Readiness for the PSTN Switch Off Programme	Telecoms	WPD Wide
EJP037	RTU Replacement Programme	Telecoms	WPD Wide
EJP038	RTU Growth Programme	Telecoms	WPD Wide
EJP039	*Not Used (previous programme combined with another EJP)*		

EJP Reference	EJP Name	Business Area	Licence Area
EJP040	Reducing Risks Associated with Overhead Lines Across School Playing Areas	Legal and Safety	WPD Wide
EJP041	Flood Mitigation	Flood Mitigation	WPD Wide
EJP042	*Not Used (previous programme combined with another EJP)*		
EJP043	LV Underground Cable Replacement Programme	Asset Replacement	WPD Wide
EJP044	HV Underground Cable Replacement Programme	Asset Replacement	WPD Wide
EJP045	EHV & 132kV Underground Cable Replacement Programme including Fluid Filled Cable Replacement	Asset Replacement	WPD Wide
EJP046	132kV Switchgear Replacement Programme	Asset Replacement	WPD Wide
EJP047	LV Overhead Pole Line Replacement Programme	Asset Replacement	WPD Wide
EJP048	HV Overhead Pole Line Replacement Programme	Asset Replacement	WPD Wide
EJP049	EHV Overhead Conductor Replacement Programme	Asset Replacement	WPD Wide
EJP050	EHV Overhead Tower Line Replacement Programme	Asset Replacement	WPD Wide
EJP051	132kV Overhead Tower Line Conductor Replacement Programme	Asset Replacement	WPD Wide
EJP052	Batteries Replacement Programme	Asset Replacement	WPD Wide
EJP053	LV Pillars Replacement Programme	Asset Replacement	WPD Wide
EJP054	HV Circuit Breaker Replacement Programme	Asset Replacement	WPD Wide
EJP055	33kV Circuit Breaker Replacement Programme	Asset Replacement	WPD Wide
EJP056	132kV Switchgear Replacement Programme	Asset Replacement	WPD Wide
EJP057	HV Transformers Replacement Programme	Asset Replacement	WPD Wide
EJP058	EHV Transformers Replacement Programme	Asset Replacement	WPD Wide
EJP059	132kV Transformers Replacement Programme	Asset Replacement	WPD Wide
EJP060	HV Switchgear (Other) Replacement Programme	Asset Replacement	WPD Wide
EJP061	132kV Overhead Tower Line Replacement Programme	Asset Replacement	WPD Wide
EJP062	EHV Switchgear (Other) Replacement Programme	Asset Replacement	WPD Wide
EJP063	66kV Circuit Breaker Replacement Programme	Asset Replacement	WPD Wide
EJP064	EHV Overhead Poles Replacement Programme	Asset Replacement	WPD Wide
EJP065	LV UGB Replacement Programme	Asset Replacement	WPD Wide
EJP066	LV Cut Outs Replacement Programme	Asset Replacement	WPD Wide
EJP067	HV RMU Replacement Programme	Asset Replacement	WPD Wide
EJP068	132kV Overhead Tower Line Towers and Fittings Replacement Programme	Asset Replacement	WPD Wide
EJP069	LV Services Replacement Programme	Asset Replacement	WPD Wide
EJP070	LV Network Monitoring	Reinforcement	WPD Wide
EJP071	Directional Power Flow at Primary Substations	DSO	WPD Wide
EJP072	*Not Used (previous programme combined with another EJP)*		
EJP073	Power Quality Monitoring (Open LV part)	DSO	WPD Wide
EJP074	Planning Data for Smart Meters	Data & Digitalisation	WPD Wide
EJP075	System Voltage Optimisation Rollout (SVO) SP5	PowerOn - IT	WPD Wide
EJP076	PowerOn Core IT Server Hardware refresh	PowerOn - IT	WPD Wide
EJP077	PowerOn Application Enhancements	PowerOn - IT	WPD Wide
EJP078	Cyber security controls and proactive monitoring (LAN Segregation & Enhancements)	PowerOn - IT	WPD Wide
EJP079	Cyber security controls and proactive monitoring (Other NIS Actions)	PowerOn - IT	WPD Wide

EJP Reference	EJP Name	Business Area	Licence Area
EJP080	Cyber security controls and proactive monitoring (SCADA Protocol Support)	PowerOn - IT	WPD Wide
EJP081	Cyber security controls and proactive monitoring (IPv6 Enablement)	PowerOn - IT	WPD Wide
EJP082	Distributed Energy Resource SCADA Monitors	PowerOn - IT	WPD Wide
EJP083	LV Geo-schematic Representation in PowerON	PowerOn - IT	WPD Wide
EJP084	Technology Refresh of early ANM systems	PowerOn - IT	WPD Wide
EJP085	DERMS Hardware	PowerOn - IT	WPD Wide
EJP086	ICCP and visibility portal	PowerOn - IT	WPD Wide
EJP087	Homogenisation of PowerON	PowerOn - IT	WPD Wide
EJP088	Development of Future Network Viewer Forecasting System	PowerOn - IT	WPD Wide
EJP089	Further Development of TSDS and Introduction of Historian Analysis Systems	Data & Digitalisation	WPD Wide
EJP090	Customer Facing Connection Self-Serve	Data & Digitalisation	WPD Wide
EJP091	Machine Learning Applications and Data Analytic Services	Data & Digitalisation	WPD Wide
EJP092	Planning State Estimation	Data & Digitalisation	WPD Wide
EJP093	Low Voltage Integrated Network Model	Data & Digitalisation	WPD Wide
EJP094	Internal Data Platform	Data & Digitalisation	WPD Wide
EJP095	*Not Used (previous programme combined with another EJP)*		
EJP096	Open Cloud Data Platform	Data & Digitalisation	WPD Wide
EJP097	Online work schedule viewer	Data & Digitalisation	WPD Wide
EJP098	Automated Data Mastering Solution	Data & Digitalisation	WPD Wide
EJP099	Automatic Work Scheduling for Maintenance and New Connections	Data & Digitalisation	WPD Wide
EJP100	DSR Replacement and scaling up	DSO	WPD Wide
EJP101	Hardware for DSO systems	DSO	WPD Wide
EJP102	Strategic Analysis and Investment Planning Software	DSO	WPD Wide
EJP103	Stability Analysis	DSO	WPD Wide
EJP104	DFES Data Architecture and Systems	DSO	WPD Wide
EJP105	Secondary trading of flexibility system/architecture	DSO	WPD Wide
EJP106	*Not Used (previous programme combined with another EJP)*		
EJP107	*Not Used (previous programme combined with another EJP)*		
EJP108	Secondary Reinforcement Programme	Secondary Reinforcement	WPD Wide
EJP109	Innovation Hub	Data & Digitalisation	WPD Wide
EJP110	Derby South to Spondon 132kV Circuit Reinforcement	Reinforcement	East Midlands
EJP111	Holbeach and Long Sutton Reinforcement	Reinforcement	East Midlands
EJP112	Northampton Group 132kV Circuit Reinforcement	Reinforcement	East Midlands
EJP113	Coventry 132kV Fault level Reinforcement	Reinforcement	East Midlands
EJP114	Loughborough BSP Reinforcement	Reinforcement	East Midlands
EJP115	Willington 132kV Fault level Reinforcement	Reinforcement	East Midlands
EJP116	Coventry West BSP Reinforcement	Reinforcement	East Midlands
EJP117	Atherstone Primary Reinforcement	Reinforcement	East Midlands
EJP118	Rugby 33kV Fault level Reinforcement	Reinforcement	East Midlands
EJP119	ANM Zones Rollout	Reinforcement	East Midlands
EJP120	Hawton BSP Reinforcement	Reinforcement	East Midlands
EJP121	Sneinton 33/11kV Substation Reinforcement	Reinforcement	East Midlands
EJP122	Cardiff East BSP Reinforcement	Reinforcement	South Wales

EJP Reference	EJP Name	Business Area	Licence Area
EJP123	Cardiff North 33kV Network Reinforcement	Reinforcement	South Wales
EJP124	Haverfordwest to Fishguard 33kV Circuit Reinforcement	Reinforcement	South Wales
EJP125	Haverfordwest to Brawdy 33kV Circuit Reinforcement	Reinforcement	South Wales
EJP126	Penblewin 33/11kV Substation reinforcement	Reinforcement	South Wales
EJP127	Exeter Main GSP 132kV Fault level reinforcement	Reinforcement	South West
EJP128	Witheridge 33/11kV Substation Reinforcement	Reinforcement	South West
EJP129	Camborne/Hayle BSP Group Reinforcement	Reinforcement	South West
EJP130	Folly Bridge 33/11kV Substation Reinforcement	Reinforcement	South West
EJP131	Morwenstow 33/11kV Substation Reinforcement	Reinforcement	South West
EJP132	*Not Used (previous programme combined with another EJP)*		
EJP133	Gunnislake Primary 33/11kV Substation Reinforcement	Reinforcement	South West
EJP134	Mullion 33/11kV Substation Reinforcement	Reinforcement	South West
EJP135	Stentaway 33/11kV Substation Reinforcement	Reinforcement	South West
EJP136	Hayle to Penzance 33kV Circuit reinforcement	Reinforcement	South West
EJP137	Countess Wear 33/11kV Substation Reinforcement	Reinforcement	South West
EJP138	Enderby to Leicester 132kV Circuit Reinforcement	Reinforcement	East Midlands
EJP139	Indian Queens GSP 132kV Fault Level Reinforcement	Reinforcement	South West
EJP140	Alverdiscott/Indian Queens GSP Group Reinforcement – New GSP and BSP	Reinforcement	South West
EJP141	Fixed Power Quality Monitoring Equipment Installation Programme	Reinforcement	West Midlands
EJP142	Ludlow to Presteigne 66kV Circuit Reinforcement	Reinforcement	West Midlands
EJP143	Wolverhampton 33kV Switchgear Reinforcement	Reinforcement	West Midlands
EJP144	Stockton 33/11kV Substation Reinforcement	Reinforcement	West Midlands
EJP145	Gnosall 33/11kV Substation Reinforcement	Reinforcement	West Midlands
EJP146	Hill Chorlton 33/11kV Substation Reinforcement	Reinforcement	West Midlands
EJP147	*Not Used (previous programme combined with another EJP)*		
EJP148	Ironbridge to Star Aluminium 33kV Circuit Reinforcement	Reinforcement	West Midlands
EJP149	Shrewsbury Group 33kV Circuit Reinforcement - New 33/11kV Substation	Reinforcement	West Midlands
EJP150	Bayston Hill to Malehurst 33kV Circuit Reinforcement	Reinforcement	West Midlands
EJP151	Chipping Sodbury BSP Reinforcement	Reinforcement	West Midlands
EJP152	Bustleholm 132kV Fault Level Reinforcement	Reinforcement	West Midlands
EJP153	Halesowen 132/11kV Reinforcement	Reinforcement	West Midlands
EJP154	Sutton Coldfield 132/11kV Reinforcement	Reinforcement	West Midlands
EJP155	Tividale 11kV Fault Level Reinforcement	Reinforcement	West Midlands
EJP156	Kitwell 132kV Fault Level Reinforcement	Reinforcement	West Midlands
EJP157	Lye 132/11kV Substation Reinforcement	Reinforcement	West Midlands
EJP158	Stowfield 33/11kV Substation Reinforcement	Reinforcement	West Midlands
EJP159	Clipstone 33kV network Reinforcement	Reinforcement	East Midlands
EJP160	Rhos BSP reinforcement	Reinforcement	South Wales
EJP161	*Not Used (previous programme combined with another EJP)*		
EJP162	Newport Pagnell 33/11kV substation Reinforcement	Reinforcement	East Midlands
EJP163	Alderton 66/11kV Substation Reinforcement	Reinforcement	West Midlands
EJP164	Bishops Wood to Hereford 132kV Circuit Reinforcement	Reinforcement	West Midlands
EJP165	Coseley 132/11kV Substation Reinforcement	Reinforcement	West Midlands
EJP166	Usk Way 33/11kV Substation	Reinforcement	South Wales

EJP Reference	EJP Name	Business Area	Licence Area
EJP167	Pembroke to Golden Hill 132kV Circuit Reinforcement	Reinforcement	South Wales
EJP168	Pembroke to Milford Haven 132kV circuit Reinforcement	Reinforcement	South Wales
EJP169	St Davids 33/11kV Substation Reinforcement	Reinforcement	South Wales
EJP170	*Not Used (previous programme combined with another EJP)*		
EJP171	Milford Haven 33/11kV Substation Reinforcement	Reinforcement	South Wales
EJP172	St Tudy- Davidstow 33kV Circuit Reinforcement	Reinforcement	South West
EJP173	Pyworthy 33kV Circuit reinforcement	Reinforcement	South West
EJP174	Shebbear 33/11kV Substation Reinforcement	Reinforcement	South West
EJP175	Newton Abbot BSP Reinforcement	Reinforcement	South West
EJP176	St Mawgan 33/11kV Substation Reinforcement	Reinforcement	South West
EJP177	Cyber resilience OT plan	IT	WPD Wide
EJP178	IT Applications (IT New Application software & upgrade)	IT	WPD Wide
EJP179	IT Desktop Computing	IT	WPD Wide
EJP180	Computer Infrastructure (IT)	IT	WPD Wide
EJP181	IT Communications - Voice and Data	IT	WPD Wide
EJP182	Cyber Security (IT)	IT	WPD Wide
EJP183	*Not Used (previous programme combined with another EJP)*		
EJP184	Demand Disaggregation, Consumer Behaviour & Flexibility	DSO	WPD Wide
EJP185	Shepshed 33/11kV Substation Reinforcement	Reinforcement	East Midlands
EJP186	Woodbeck 33/11kV Substation Reinforcement	Reinforcement	East Midlands
EJP187	Ellesmere Avenue 33/11kV Substation Reinforcement	Reinforcement	East Midlands
EJP188	Wise Street 33/11kV Substation Reinforcement	Reinforcement	East Midlands
EJP189	Winster BSP Reinforcement	Reinforcement	East Midlands
EJP190	Sharnbrook 33/11kV Substation Reinforcement	Reinforcement	East Midlands
EJP191	West Bridgford 33/11kV Substation Reinforcement	Reinforcement	East Midlands
EJP192	Stamford 33/11kV Substation Reinforcement	Reinforcement	East Midlands
EJP193	Quorn 33/11kV Substation Reinforcement	Reinforcement	East Midlands
EJP194	Ilkeston 33/11kV Substation Reinforcement	Reinforcement	East Midlands
EJP195	Langdale Drive 33/11kV Substation Reinforcement	Reinforcement	East Midlands
EJP196	Woodford Halse 33/11kV Substation Reinforcement	Reinforcement	East Midlands
EJP197	Toton 33/11kV Substation Reinforcement	Reinforcement	East Midlands
EJP198	Holme Carr 33/11kV Substation Reinforcement	Reinforcement	East Midlands
EJP199	Hallcroft Road 33/11kV Substation Reinforcement	Reinforcement	East Midlands
EJP200	Staythorpe GSP Reinforcement	Reinforcement	East Midlands
EJP201	Eckington 33/11kV Substation Reinforcement	Reinforcement	East Midlands
EJP202	Moira 33/11kV Substation Reinforcement	Reinforcement	East Midlands
EJP203	Bretby 33/11kV Substation Reinforcement	Reinforcement	East Midlands
EJP204	Staythorpe to Hawton 132kV Circuit Reinforcement	Reinforcement	East Midlands
EJP205	Pengam 132/11kV Substation Reinforcement	Reinforcement	South Wales
EJP206	Abergavenny 132/66kV Substation Reinforcement	Reinforcement	South Wales
EJP207	Llanfoist GSP	Reinforcement	South Wales
EJP208	Hirwaun GSP Reinforcement	Reinforcement	South Wales
EJP209	Northern Ring (Abergavenny) 66kV Circuit Reinforcement	Reinforcement	South Wales
EJP210	Llandrindod Wells 33/11kV Substation Reinforcement	Reinforcement	South Wales
EJP211	Ferryside GSP	Reinforcement	South Wales

EJP Reference	EJP Name	Business Area	Licence Area
EJP212	Upper Boat - Mountain Ash, Dowlais and Merthyr East 132kV Circuit Reinforcement	Reinforcement	South Wales
EJP213	Llanfyrnach 33/11kV substation Reinforcement	Reinforcement	South Wales
EJP214	Ravenhill 33/11kV substation Reinforcement	Reinforcement	South Wales
EJP215	Hirwaun to Aberdare 33kV Circuit Reinforcement	Reinforcement	South Wales
EJP216	Llandeilo 33/11kV substation Reinforcement	Reinforcement	South Wales
EJP217	Aberdare Town 33/11kV substation Reinforcement	Reinforcement	South Wales
EJP218	Lampeter to Pont Ar Annell 33kV Circuit Reinforcement	Reinforcement	South Wales
EJP219	Llandovery to Pont Ar Anell 33kV Circuit Reinforcement	Reinforcement	South Wales
EJP220	Llanarth/Rhos BSP Group SCO Reinforcement	Reinforcement	South Wales

8.2. A summary table of the Cost Benefit Analysis undertaken.

CBA Reference	CBA Name	Business Area	Licence Area
CBA001	Fleet Electrification	Transport	WPD Wide
CBA002	Mobile generator replacement programme	Transport	WPD Wide
CBA004	Exeter Depot Refurbishment	Property Non Op	South West
CBA005	Torquay Depot Refurbishment	Property Non Op	South West
CBA006	Plymouth Depot Refurbishment	Property Non Op	South West
CBA009	General Buildings Refurbishment Programme	Property Non Op	WPD Wide
CBA011	Incorporating Solar PV and Battery Storage in our non-operational sites	Property Non Op	WPD Wide
CBA012	EV Fleet Charging Infrastructure	Transport	WPD Wide
CBA018	New Fibre Deployment Programme	Telecoms	WPD Wide
CBA019	Fibre Refurbishment Programme	Telecoms	WPD Wide
CBA020	New Communication Fibre Sites Programme	Telecoms	WPD Wide
CBA021	New Radio Communication Sites Programme	Telecoms	WPD Wide
CBA022	Communication Towers Replacement & Refurbishment Programme	Telecoms	WPD Wide
CBA023	Communication Site Buildings Replacement & Refurbishment Programme	Telecoms	WPD Wide
CBA027	Securing Telecommunication Equipment at 3rd Party	Telecoms	WPD Wide
CBA032	LTE Network Build and Growth Programme	Telecoms	WPD Wide
CBA071	Directional Power Flow at Primary Substations	Reinforcement	WPD Wide
CBA100	DSR Replacement and scaling up	DSO	WPD Wide
CBA102	Strategic Analysis and Investment Planning Software	DSO	WPD Wide
CBA103	Stability Analysis	DSO	WPD Wide
CBA105	Secondary trading of flexibility system architecture	DSO	WPD Wide

9. Conclusion

9.1. The energy sector is currently experiencing an exciting and challenging period of significant change as the UK works towards achieving a net zero carbon future.

9.2. This is an ambitious co-created RIIO-ED2 Business Plan that has undergone a robust appraisal process, and represents good value for money and includes least regret investment proposals that help propel the UK's ambition to achieve net zero carbon emissions by 2050.

9.3. The plan will support local authorities, industries, businesses and our own local communities to realise their net zero ambitions.

9.4. We have set out and outlined our comprehensive investment appraisal of our RIIO-ED2 business plan, and provide a clear signpost of where the main justification for each of our proposals can be found.

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