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RIIO-ED2 methodology for identifying network investment projects for worst-served customers

May 2023

1 Context of our ED2 investment plans

In RIIO-ED2, Ofgem has defined a worst-served customer (WSC) as being one who has experienced 12 or more unplanned HV interruptions over a 3-year period with no less than 2 interruptions in any one year. To address the issue of WSCs, Ofgem has provided us with a Use-It-Or-Lose-It allowance of £20.9m (20/21 prices) and we will use this money to improve the performance of the network as appropriate.

To give Ofgem and our stakeholders confidence we're applying a structured and cost-efficient approach to designing solutions for WSCs, the ED2 licence requires us under SpC 3.4 to comply with the WSC Governance Document. This requires us to publish our ED2 WSC methodology on our website, setting out our approach to identifying WSC projects, the options considered and the how they've been costed.

2 Network performance data analysis

We've recently analysed the high voltage (HV) network performance data, applying Ofgem's ED2 WSC definition to each 3-year period from 2015 through to 2023. This reveals 2,782 customers have qualified as worst-served. These customers are spread across 30 HV feeders and there are 38,517 overall connected customers.

Key numbers:

- 2,782 qualifying WSCs
- 30 HV feeders
- £20.9m use-it-or-lose it allowance in ED2

3 Scope of work

In ED2 Ofgem has relaxed the restrictive efficacy constraints of ED1 meaning we're better able to develop a more comprehensive range of solutions to the underlying performance issues affecting qualifying HV feeders.

We will prepare a WSC network investment project for each of the qualifying HV feeders, and where appropriate its associated backfeed, and deliver this investment in ED2. Subject to detailed design which we will start in early summer 2023, the investment project will comprise a mix of HV feeder reconfiguration, i.e. moving normally open points, undergrounding or refurbishing of poorly performing or fault prone feeder sections, and, in a limited number of instances and to reduce customer risk, the creation of new underground HV cable feeders out of associated primary substations. In many instances, enhanced network automation and additional protection zones will be considered. Secondary network switchgear replacement may be required to facilitate the fitting of automation on some feeders.

However, while the total allowance for WSC in ED2 is significant the high number of qualifying feeders and the high potential cost of associated network investments requires that we undertake an holistic assessment of the programme to ensure that the proposed interventions are suitably prioritised on the HV feeders likely to provide for optimised outcomes, i.e. a greater proportion of the overall allowance will be targeted on those feeders which benefit most WSCs through improvement in overall network performance.

Based on high-level, preliminary studies, each of the HV feeders has been assigned to one of the following four investment prioritisation categories:

1. **High –** Expected cost of individual scheme: £0.6m to £1.2m

   These solutions will involve longer HV cable laying and network reconfiguration, i.e. >4km, possibly including new feeders out of the Primary via a Primary board extension.

2. **Medium** – Expected cost of individual scheme: £0.25m to £0.6m

   Similar to high but with smaller amounts of cable laying (<4km). These solutions are to concentrate on OHL undergrounding / refurbishment of poorly performing sections. Secondary network switchgear replacement will be required to facilitate the fitting of automation.

3. **Low** – Expected cost of individual scheme: up to £0.25m

   Similar to the range of interventions we used in ED1, solutions in the low category will include those with minimal cable lay or network reconfiguration.

4. **No additional work required** – No additional cost

   Feeders in this category are expected to have benefited from network investments we carried out in ED1, thereby avoiding the need for further investment in ED2, or the network performance has improved considerably in recent years.

In categories 1, 2 and 3, secondary network switchgear replacement will be required to facilitate the fitting of automation and we will consider additional network automation alongside modification or enhancement of existing HV feeder protection.

4 Co-ordination with other ED2 proposals

To ensure for efficient delivery of the work and to minimise the impact of the works of customers and local residents, we will co-ordinate our WSC projects with other planned works on the feeder. This will include any planned reinforcement, refurbishment and other capital investment projects. To facilitate this, the outline scope of work will be shared with our delivery teams at the earliest possible opportunity.

5 Reactive programme

In our ED2 business plan, we have committed to having no qualifying WSC on our network by 2028. We will achieve through both the proactive projects as above, which aim to make substantive and sustained improvements in performance to previously-qualified circuits, alongside a tactical intervention programme which seeks to address any newly-emerging WSC performance issues.

Our analysis shows that large numbers of customers are at a performance level just below the ED2 WSC qualifying threshold. Owing to the inherent variability in performance year on year, it is not possible to predict if these customers will, during ED2, qualify as worst-served. During RIIO-ED1, we adopted a reactive approach to work on WSCs, establishing a notional provision in our investment plan of £500k to allow work on these feeders.

To allow us to address these customers, it is proposed to maintain the approach introduced in ED1 which will sit alongside the main programme in ED2. This option proposes to maintain this throughout the whole of ED2, provisioning £250k in each year for tactical interventions in response to new or emergent WSC issues.

6 ED2 WSC network investment proposals

The table below lists the proposed ED2 WSC feeders. Each has undergone a high-level assessment to determine the potential scope of work and assigned to a high, medium of low investment prioritisation category. High level costs are determined using our agreed ED2 unit rates. It should be noted that as detailed studies are still to be done the assumed scope of work may change.

High Investment category

Primary CB Ref.	Primary Circuit	Total WSCs	HV Feeder Customer no.	High Level Cost (£m)	Potential HV Cable (km)
6090584CW12	AMBLESIDE - BORRANS CT	198	613	1.04	6.2
6090574CF12	WINDERMERE – HEATHWAITE	145	4,242	0.99	5.5
6090434CW01	KIRKBY MOOR - WALL END VIA LOCAL RMU	135	1,040	1.10	6.8
6090414CF23	HAVERTHWAITE - HAVERTHWAITE ABS	307	643	1.21	8
6090564CW06	WHASSET - DUGG HILL	67	1,345	0.91	5.4
4000784CW93	RIBBLESDALE - WADDOW PK	25	746	0.94	5.7
6090404CW10	GRANGE - LINGARTH/HAMPSFIELD ABS	120	601	0.6	4
6093064CW07	HDA NO1 - LAMPLUGH RD/DEANCROSS GVR	155	1,168	0.83	5
6093064CW08	HDA NO1 - WINSCALES AVE/LANDFILL GENERATION	70	2,210	0.78	4.5
6093044CW10	ASPATRIA - HALL BANK ABS	156	682	0.73	4
3016714CW10	GOWHOLE - NEW ST/SIGNAL BOX MARSH LN	111	3,625	0.71	4.1
6099204CW03	PREESALL - LITTLE TONGUES LN	49	754	0.92	5.6
6099204CW10	PREESALL - PILLING STN	70	677		
	Totals	**1608**	**18,346**	**10.76**	**64.8**

** It is assumed that the two feeders out of Preesall will be combined into one WSC project as they are currently interconnected at Pilling Sw Stn.*

Medium investment category

Primary CB Ref.	Primary Circuit	Total WSCs	HV Feeder Customer no.	High Level Cost (£m)	Potential HV Cable (km)
6090544CW05	MINTSFEET - KINGDOM HALL	1	893	0.47	3
6090384CF03	ASKAM - DRUM CLOSURES SW STN	44	972	0.43	2
6099644CW05	INGLETON - INGLETON INDUSTRIAL	43	1,022	0.31	1.5
6090084CW13	DALTON - GREYSTONES LN/WOOD HEAD ABS	16	872	0.45	2.2
4002064CF12	HANGING BRIDGE - BANKS FM SOLLOM/RUFFORD MARINA	29	365	0.48	3.2
4002104CW03	ORMSKIRK - GREEN LN	2	1,316	0.50	3.1
6093084CW12	KESWICK – LAIRTHWAITE	12	741	0.53	3
6096024CF35	WILLOWHOLME - SPORTS PAV SHEEPMOUNT	9	2,254	0.59	3.6
3026604CW05	SOUTH WEST MACC – IVYMEADE	58	2,665	0.59	3.5
	Totals	**214**	**11,100**	**4.35**	**25.1**

Low investment category

Primary CB Ref.	Primary Circuit	Total WSCs	HV Feeder Customer no.	High Level Cost (£m)	Potential HV Cable (km)
4002134CW17	TARLETON - BOUNDARY LN/NEW HS NURSERIES	554	870	0.04	--
6096164CW05	SILLOTH - CHERITEX/SILLOTH AIRFIELD	45	130	0.05	--
2004083CW21	GIDLOW – QUEENSWAY	282	1641	0.12	0.5
	Totals	**881**	**2,641**	**0.21**	**0.5**

** Note that all three low investment category circuits have undergone recent reinforcement schemes that should significantly improve future network performance. However, recent fault rates suggest that some additional refurbishment work will be beneficial to improve WSC fault performance.*

No additional work required

Primary CB Ref.	Primary Circuit	Total WSCs	HV Feeder Customer no.	Performance Ranking	Comments
4000053CW23	CLAYTON - BLACKBURN RD	15	1548	190	Recent works on this WSC spur include installation of a new GVR, ASLs and bird diverters. It is envisaged that this will significantly improve fault performance.
6096174CF20	WESTLINTON - HOPESYKE SW STN	3	165	336	This circuit qualified between 2017/19 and has seen only 2 faults in the last 3 years.
3000063CW12	SHAW - SHAW PRY NETWORK	7	1740	402	This circuit qualified between 2015/17 and has seen only 4 faults in the last 3 years.
4002204CF37	SCARISBRICK - SCARISBRICK LOCAL	35	503	429	This circuit qualified between 2015/17 and has seen only 1 fault in the last 3 years.
3070083CW04	HOLLINWOOD - ALFORD ST PUMPING STN	19	2474	1194	This circuit qualified between 2017/19 and has seen only 2 faults in the last 3 years.
	Totals	**79**	**4,882**	--	--

Current position as of May 2023 – not including backfeeds (design work is ongoing so numbers likely to change)

Number of qualifying HV feeders	Total WSCs	HV Feeder Customer no.	High Level Cost (£m)	Potential HV Cable - New Circuitry (km)	Potential HV Cable - Undergrounding OHL (km)
30	**2,782**	**38,517**	**15.3**	**65**	**25**