REG/002/006 - Methodology - Annual Process for Identifying Worst Served Customer (WSC) Projects

1. Purpose

The purpose of this document is to document the methodology that is used for identifying Worst Served Customer (WSC) Projects to reduce the number of interruptions WSCs experience, including the approach to optioneering and how they are costed.

This document does not supersede any previous documents.

2. Scope

This document applies to all customers that experience interruptions (of at least three minutes duration), caused by higher voltage interruptions that meet the criteria below.

Worst Served Customer (WSC):

means a Customer of the licensee who experiences 12 or more unplanned Incidents of a duration of three minutes or longer at Distribution Higher Voltage, over a three Regulatory Year period with a minimum of two such Incidents per Regulatory Year.

Note: The above definition is the electricity distribution network regulator's (Ofgem) definition.

3. Methodology

3.1. Background

Worst Served Customers (WSCs) became a defined group of customers during previous price control periods and continues in the RIIO-ED2 price control period (with an amended definition). This classification is aimed at supplementing the Interruption Incentive Scheme (IIS) as it was recognised that for some customers, intervention to address network performance issues wouldn't be captured by the traditional IIS mechanism as they may fail the economic test of IIS.

During the previous (RIIO-ED1) price control period the mechanism allowed Distribution Network Operators (DNOs) to invest where customers experienced 12 or more higher voltage faults over a three-year period with a minimum of three faults in each of the three years. For the RIIO-ED2 price control period, Ofgem worked with DNOs to review the WSC mechanism.

As a result, the mechanism for RIIO-ED2 has been improved. The qualifying threshold has been modified by reducing the minimum number of higher voltage faults in each year to two (whilst retaining the overall number of faults within the three-year window at 12). In addition, the mechanism has been enhanced by making less prescriptive and more flexible which allows more scope to develop schemes with more significant benefits.

3.2. Assessment of Schemes to Benefit WSCs

Appendix 1 summarises the process by which we determine those customers that meet the criteria of a WSC as below.

3.2.1. Identification of WSCs

- Following the finalisation of all customer interruption records at regulatory year-end (31st March), a list of all interruptions due to higher voltage incidents over the last three regulatory years is compiled.
- From the above list the customers that meet the criteria of a WSC (using Ofgem's definition of a WSC for the RIIO-ED2 period) are determined.

3.2.2. Analysis of the Root Causes of Interruptions Experienced by WSCs

- Using historical customer interruption records an analysis is made of the root causes of the interruptions experienced by the WSCs. This analysis is required to inform engineering staff so that they can develop several alternative appropriate improvement scheme proposals for consideration to reduce the number of incidents experienced by WSCs.

3.2.3. Development of WSC Schemes to Reduce the Number of Interruptions Experienced

- Differing approaches may be required depending on the topologies of the affected parts of the electrical network, which can be a significant contributory factor, and the nature of the root causes. For example, overhead circuits in rural locations with low population densities may have limited alternative supply sources readily available, should a fault occur, due to issues including limited available interconnection to other circuits (which restricts the prompt restoration of supply). Also note that customers supplied by overhead lines, in general, have a higher probability of faults occurring during periods of adverse weather. A further factor that limits restoration of supplies in a timely manner is the availability of automation on switchgear which means that faults cannot be isolated and unaffected customers supplies restored relatively quickly by use of remote control / automatic power restoration technology.
- Scheme proposals to improve the interruption performance of WSCs may therefore propose the installation of circuit interconnections or to install automatic restoration switching equipment. Alternative solutions may be also proposed. For example, for overhead lines in locations that are

vulnerable to wildlife interference proposals may be put forward to install equipment to deter such interference.

- Worst served customer, in general, tend to be small numbers of customers grouped together on poorer performing parts of the electrical network. In such cases this enables engineering staff to develop design scheme proposals that will benefit a group of WSCs within a particular demand group.
- WSC scheme proposals are therefore undertaken by consideration of each demand group.

3.2.4. Estimated Benefits of WSC Schemes

- For each proposed WSC scheme an estimation of the benefits (in terms of the reduction in the number and duration of interruptions) is made.

3.2.5. Cost of WSC Schemes

- For each proposed WSC scheme the costs to implement the scheme are assessed.

3.2.6. Cost-benefit Analysis of WSC Schemes

- For each proposed WSC scheme the costs to implement the scheme are assessed is terms of the cost per WSC to implement that scheme.

3.2.7. Optioneering Process for WSC Schemes

- For each group of WSCs each proposed improvement scheme (or group of schemes) will be compared to determine the most cost-effective solution per WSC for the group.
- It may also be determined that a cost-effective solution is not available at the present time.

3.2.8. Prioritisation of WSC Scheme Delivery

- As part of Northern Powergrid's business plan engagement group, work was progressed ahead of RIIO-ED2 commencing to gather stakeholder's views on how WSC Projects should be prioritised. Four options were developed with stakeholders, the options being:
    - by the number of WSCs in each demand group;
    - by the frequency of interruptions experiences in each demand group;
    - by the total length of the interruptions experienced by the WSCs and
    - by using indicators of multiple depravation.

The stakeholders' preferred delivery profile of WSC project investments was to prioritise by the duration of supply interruptions experienced.

- Given the above, the prioritisation of WSC schemes' implementation will be based upon WSCs who have been experiencing the longest duration interruptions.

3.3. Documentation

The above process will be documented annually and by 31 October each regulatory year (commencing in 2024) Northern Powergrid will publish on its website information with respect to projects being undertaken to address WSCs.

3.4. Review

The realised benefits of WSC schemes will be reviewed annually.

4. References

4.1. External Documentation

Reference	Title
Northern Powergrid (Northeast) plc Electricity Distribution Licence Special Conditions	Northern Powergrid (Northeast) plc Electricity Distribution Licence Special Conditions
Northern Powergrid (Yorkshire) plc Electricity Distribution Licence Special Conditions	Northern Powergrid (Yorkshire) plc Electricity Distribution Licence Special Conditions
Ofgem: RIIO-ED2 Regulatory Instructions and Guidance: Annex B Costs, Volumes and Revenue Publication Date 9 May 2023	Ofgem: RIIO-ED2 Regulatory Instructions and Guidance: Annex B Costs, Volumes and Revenue
Ofgem: Worst Served Customers Guidance Document v0.4 Publication Date : 17 February 2023	Ofgem: Worst Served Customers Guidance Document (version 1)

4.2. Internal Documentation

Reference	Title
N/A	N/A

4.3. Amendments from Previous Version

Reference	Amendment
N/A	N/A

5. Definitions

Reference	Title
Demand Group	Groups of WSCs with a common source of supply.
Higher voltage	Any distribution voltage above 1kV, up to and including 132kV
IIS	Interruption Incentive Scheme
Interruption	A customer interruption of 3 minutes or longer.
OMS	Outage Management System
WSC Project	A project that is expected to reduce the number of Incidents at Distribution Higher Voltage experienced by WSC. This covers both capital investments and operational changes.

6. Authority for Issue

6.1. CDS Assurance

I sign to confirm that I have completed and checked this document and I am satisfied with its content and submit it for approval and authorisation.

		Date
Liz Beat	Governance Administrator	24/05/2023

6.2. Author

I sign to confirm that I have completed and checked this document and I am satisfied with its content and submit it for approval and authorisation.

Review Period - This document should be reviewed within the following period.

Standard CDS review of 3 years	Non-Standard Review Period & Reason	
No	Period: 1 year	Reason: Ofgem requirement
Should this document be displayed on the Northern Powergrid external website?		Yes
		Date
Neil Dunn-Birch	System Planning Engineer	Date

6.3. Technical Assurance

I sign to confirm that I am satisfied with all aspects of the content and preparation of this document and submit it for approval and authorisation.

		Date
Mark Marshall	Reliability Manager	Date

6.4. Authorisation

Authorisation is granted for publication of this document.

		Date
Paul Black	Head of System Engineering	Date

Appendix 1 – Annual process for identifying Worst Served Customer (WSC) Projects to reduce the number of interruptions WSCs experience, including the approach to optioneering and how they are costed

Following the end of the previous regulatory year extract all higher voltage interruptions (by distribution substation transformer / customer connection point) from the OMS for the previous 3 regulatory years.

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For each distribution substation transformer / customer connection point count the number of interruptions in each of the 3 regulatory years.

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Identify which substation transformer / customer connection points have connected customers that have experienced 12 or more interruptions over the 3-year period with at least 2 outages in each year of the 3-year period.

All customers connected to the substation transformers / customer connection points identified above are deemed as WSCs for the current regulatory year.

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For each substation transformer / customer connection point identified above identify the root cause of the interruptions.

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Determine the corrective action options available to reduce the number of interruptions for WSCs

Examples of corrective actions are as below.

- Equipment repair
- Equipment replacement/upgrade.
- Circuit rerouting/undergrounding.
- Installation automatic supply restoration equipment

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For each identified option determine the cost to implement that option.

For each identified option estimate the expected reduction in the number of interruptions that will be experienced by the WSCs.

For each identified option determine the cost per WSC to implements that option.

Justify the optimal corrective action by comparing the required costs per WSC to the estimated reduction in the number of interruptions that will be experienced by the WSCs. Prioritise by WSCs experiencing the longest interruption durations.

Implement the optimal corrective action.

By 31 October each regulatory year (commencing 2024) publish on Northern Powergrid's website information about the WSC Projects being undertaken in respect of WSCs, in such a format that stakeholders can easily understand, and the activities Northern Powergrid is carrying out to improve outcomes for its WSCs.

Review the realised benefits of WSC corrective actions annually.