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Customer Load Active System Services Customer Survey Initial Summary Report

18 June 2015

CLASS
Customer Load Active System Services

CONTENTS

VERSION HISTORY

Version	Date	Author	Status	Comments
1	18 June 2015	T Kennelly	Interim executive summary	Interim executive summary

GLOSSARY

Abbreviation	Term
CATI	Computer Aided Telephone Interviews
CCC	Customer Contact Centre
CEP	Customer Engagement Plan
CLASS	Customer Load Active System Services
DNO	Distribution Network Operator
ECP	Engaged Customer Panel
ENWL	Electricity North West Limited
GSP	Grid Supply Point
HV	High Voltage
I&C	Industrial & Commercial
LCNF	Low Carbon Networks Fund
MPAN	Meter Point Administration Number
PSR	Priority Services Register
SDI	Short Duration Interruption
SDRC	Successful Delivery Reward Criteria
SMS	Short Message Service

1 BACKGROUND AND OBJECTIVES

As Great Britain (GB) moves to a low carbon future, electricity demand and the level of renewable and low carbon generation is expected to increase significantly. This will introduce a number of challenges and significant cost implications for the operators of GB electricity distribution networks.

DNOs would historically have employed traditional reinforcement to address these challenges but this is no longer appropriate due to the decarbonisation agenda, the high cost and associated disruption of asset replacement.

Customer Load Active System Services (CLASS) is a Low Carbon Networks (LCN) Fund initiative which seeks to maximise the use of existing assets using innovative technology and voltage regulation techniques to manage peak demand on a DNO's network, which is transferable and will help manage the generation and demand balance on the wider GB electricity network.

The CLASS Method was trialled on 60 primary substations serving approximately 485,000 customers, representing 15% of Electricity North West's network. The Trial circuits were chosen to be representative of the broad domestic and industrial and commercial (I&C) customer demographic, across urban and rural geographic regions with primary assets and configuration typical of the DNO's region and that of the wider GB distribution network.

CLASS Trials were designed to ensure customers' supply voltage remained well within statutory limits when these innovative techniques were applied. Given that the small variations in voltage used by the Method are already routinely experienced by customers many times each day, Electricity North West did not expect customers to be negatively affected.

To prove the hypotheses that "CLASS would be indiscernible to customers and they would not observe any adverse impact on power quality", Electricity North West and its market research provider, Impact Research, have repeatedly engaged with a carefully selected customer survey population throughout the life of the CLASS Project.

This document represents the initial summary of the main findings from the customer surveys arising from the CLASS Trials and is the culmination of an 18 month customer engagement exercise involving consultation with 496 domestic and 200 I&C customers, from across Electricity North West's distribution region.

The final customer survey report will provide more granular detail of the findings and will comprehensively document the customer engagement activities; survey methodology; the data analysis protocol and lessons learned. This report will be published in September 2015 and incorporated into the Project's closedown report.

The customer survey from which this report is derived was jointly designed by Electricity North West and Impact Research. The research methodology and sampling approach was externally validated by an independent peer reviewer, Professor Ken Willis of Newcastle University.

2 CLASS TRIALS

Summary of Trial types requiring associated customer survey

The CLASS Trials fall under the categories of load modelling, demand response and frequency response. A detailed explanation of all Trials and the testing methodology are provided in the 'Design approach to CLASS Trials and associated test schedules'. Customer surveys encapsulated the following demand and frequency response Trials. Load modelling tests were not subject to customer surveys.

Trial 2: Peak demand reduction: (enabled in 14 primary substations)

The remote reduction of voltage via the control centre dashboard involved two rounds of tests, reducing voltage incrementally by 3% and 5%. The highest concentration of surveys were associated with this Trial to ensure sufficient data was captured to provide robust evaluation of any change in customer perception at the various levels of voltage reduction.

Trial 3a Stage 1 frequency response by demand management: (automatically enabled in 10 primary substations)

These tests were unplanned and involved the disconnection of one of a parallel pair of primary transformers, triggered within two seconds of automatic on-site detection of a National Grid Electricity Transmission (NGET) low frequency signal.

Trial 3b Stage 2 Type 2 frequency response by demand management: (automatically enabled in 60 primary substations)

These tests involved decreasing the transformer tap position and as a consequence the level of network demand, in response to either the automatic detection or an instruction.

Customer surveys were scheduled to coincide with the different CLASS Trials and tests scheduled by Electricity North West.

3 CUSTOMER ENGAGEMENT METHODOLOGY

Before launching the survey, an engaged customer panel (ECP) was convened to establish an effective communication plan and to develop and pilot the survey instrument.

Guided by the ECP a general awareness leaflet was produced and distributed to all customers on the Trial circuits. This provided a Project overview and invited customers to register an interest in taking part in the customer surveys. The leafleting campaign generated expressions of interest from over 3,500 individuals.

The ECP was also influential in guiding the development of the survey instrument, ensuring it was sufficiently robust; easy to understand and administer; provided a framework to maximise the learning outcome and detect any customer impact that could potentially be attributed to the CLASS Method.

The customer survey

The full survey methodology was set out in the CLASS customer engagement plan (CEP) submitted to Ofgem on 31 July 2013. The main objective of the customer surveys was to test the hypothesis through two research objectives:

- To determine if CLASS had any discernible effect on customers on Trial networks who participated in the monitoring survey throughout the testing period;
- To determine if CLASS had any discernible effect on a control group of customers who participated in the monitoring survey throughout the duration of the Trial tests.

The customer survey population was carefully recruited from both the voluntary registrations and by telephone to reflect the diverse socio-geographic demographic across the Trial areas. A cash incentive was offered to customers after completing each survey, which served to maintain interest and encourage survey participation throughout the Trial period.

The tables below show the balance of interviews achieved across all waves by key groups.

Table 1a: Responses for each monitoring season

	Percentage of interviews by season	Number of interviews
Summer	14%	184
Autumn	17%	231
Winter	55%	735
Spring	14%	184
All seasons	**100%**	**1334**

The CLASS Trial regime was designed to vary the type of Trials taking place by season. None of the tests were expected to have any notable customer impact or detriment to service. However, to prove the hypothesis, the customer surveys were designed to shadow the Trial schedule and capture customers' perception of power quality within a few days of a test taking place. This methodology ensured robust analysis was achieved at both an aggregated level and by the following sub-groups:

- Season;
- Trial type;
- Customer type;
- Test and control cells.

Given the importance of testing the CLASS Method at times of peak demand the largest proportion of surveys took place over the winter season.

Weighting was also applied to I&C customer survey data to ensure the results were reflective of differing business profiles including type, sector and size.

The overall survey sample size was determined by assuming that every customer in the sample would each complete a pre-Trial baseline survey in spring 2014 along with a maximum of four subsequent monitoring surveys conducted during the Trial phase, between summer 2014 and spring 2015.

The baseline survey served as a benchmark for any possible changes to power quality observed or perceived by customers during the monitoring surveys, which focussed on the customers' perception of power quality and operation of appliances in the seven days preceding a test.

Test and control monitoring interviews

The power quality monitoring surveys were designed to identify genuine changes to customers' perceptions of supply quality. Therefore, a robust test and control survey methodology was adopted to validate the findings, as it was recognised that survey customers, questioned about power quality, had a heightened sensitivity to changes and this might potentially elicit false reporting.

Further measures were embedded to assure the credibility of results and to understand the placebo effect of sensitising customers before a test. This was achieved by notifying half the test group prior to a planned test and half the control group (where no test actually took place).

Table 1.b indicates that the proportion of test and control surveys varied significantly for the two variants of Trial 2 (3% and 5% voltage reduction). Nevertheless, a statistically robust sample of test and control surveys was achieved across all Trial types and the test and control groups were broadly similar.

Table 1b: Control group responses by Trial type across all monitoring seasons

Percentage of total no of interviews	Test	Control	Notified	Not notified	Total
Trial 2: 3%	14%	32%	26%	22%	**24%**
Trial 2: 5%	41%	26%	32%	32%	**32%**
Trial 3a Stage 1 auto enable	14%	11%	10%	15%	**12%**
Trial 3b Stage 2 Type 2	32%	31%	32%	31%	**31%**
Total (n)	**564**	**770**	**625**	**709**	**1334**

4 INTERIM ANALYSES AND RESULTS

The qualitative and quantitative evidence collected during the customer surveys prove the hypothesis that: "*Customers within the CLASS Trial areas will not see/observe/notice an impact on the power quality when these innovative techniques are applied*".

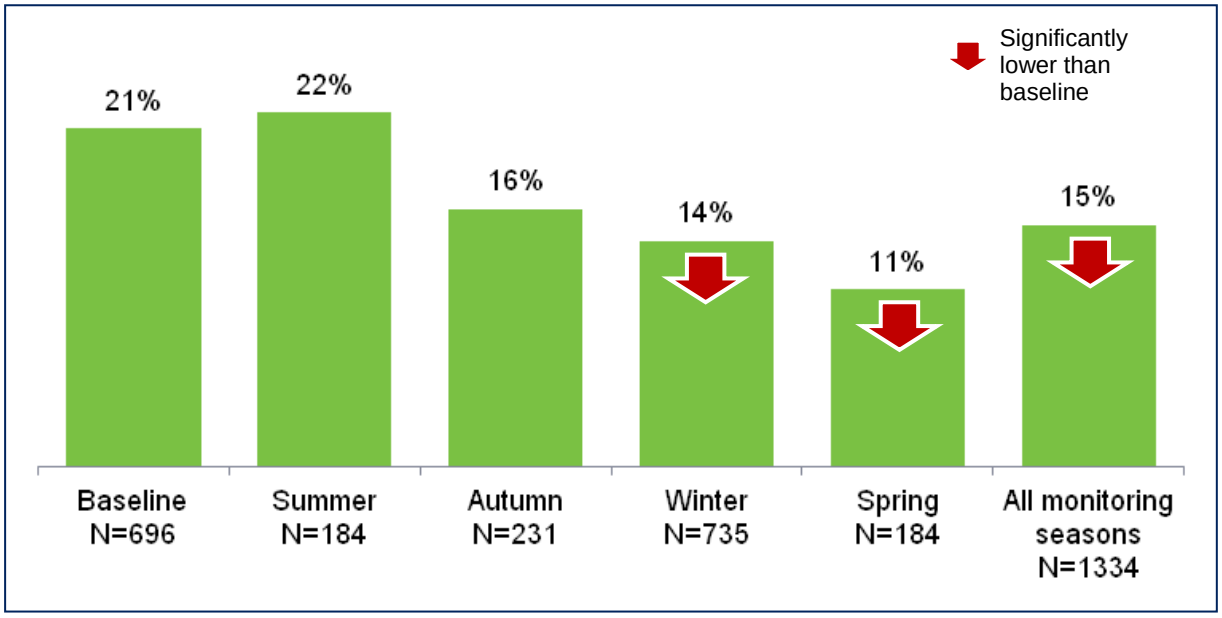
Detailed analysis of all the surveys taking place between April 2014 and May 2015 was undertaken. The overall results were found to be consistent amongst the statistically robust and representative sample of Electricity North West customers both at an aggregated level and by subgroup, including customer type, Trial type, vulnerable customers and by survey season.

Winter was the busiest Trial and survey season, coinciding with peak demand on the network, with over half of the customer surveys completed during that period. However, the survey results were consistent across all the seasons in supporting the hypothesis that CLASS would be indiscernible to customers.

There was no statistically significant change in customers' perception of their electricity supply or any adverse effect on the performance of electrical appliances from the baseline measurement taken prior to commencing the Trials.

Notably, the proportion of customers who had not noticed any difference in the quality of their electricity supply or the performance of appliances during the seven days preceding a survey increased to 85% overall during the Trial period, representing an increase of 6% from the baseline study of 79%.

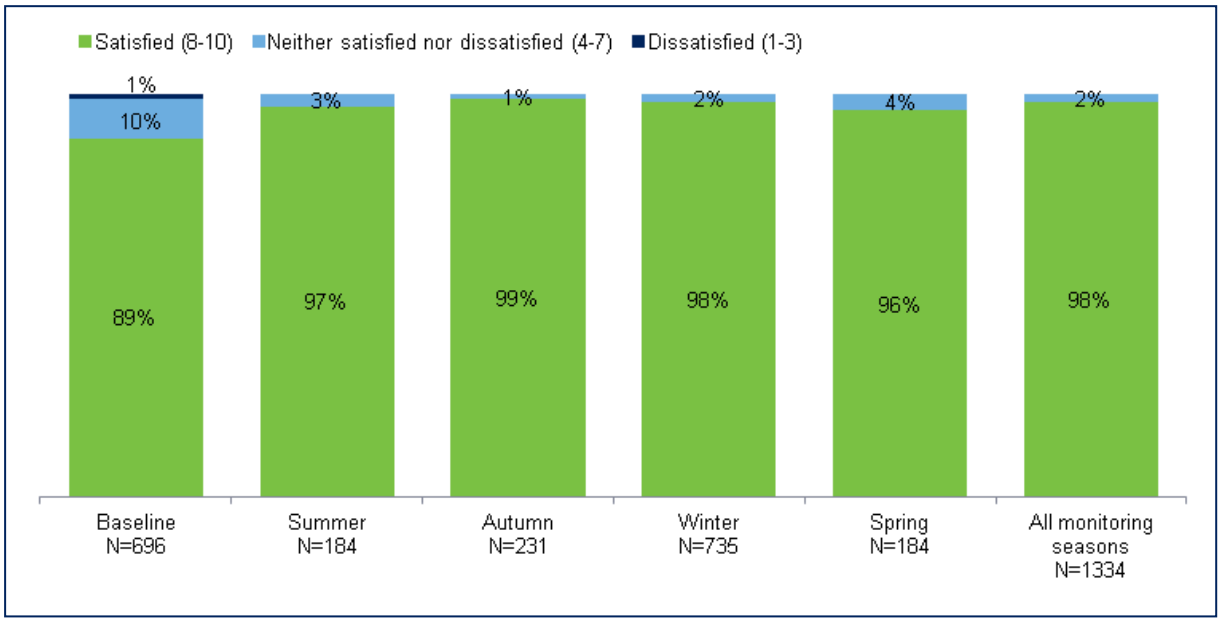
Chart 1: % noticing a change in power quality by season versus the baseline measure



***Base**: All participants taking part in each phase.*
***Question**: Thinking only about the last 7 days, have you noticed any of your appliances/electrical items working slower or less effectively/quicker or more effectively than usual at certain times of day? Thinking specifically about the lighting on site, have you or any of your colleagues noticed any of the following over the last 7 days?*

Analysis of aggregated customer survey data across all monitoring seasons appears to demonstrate that CLASS has had no adverse impact on customers' satisfaction with Electricity North West's service. Notably, overall customer satisfaction increased from the baseline score of 89% to 98%, representing a 9% increase in customer satisfaction during the Trial period.

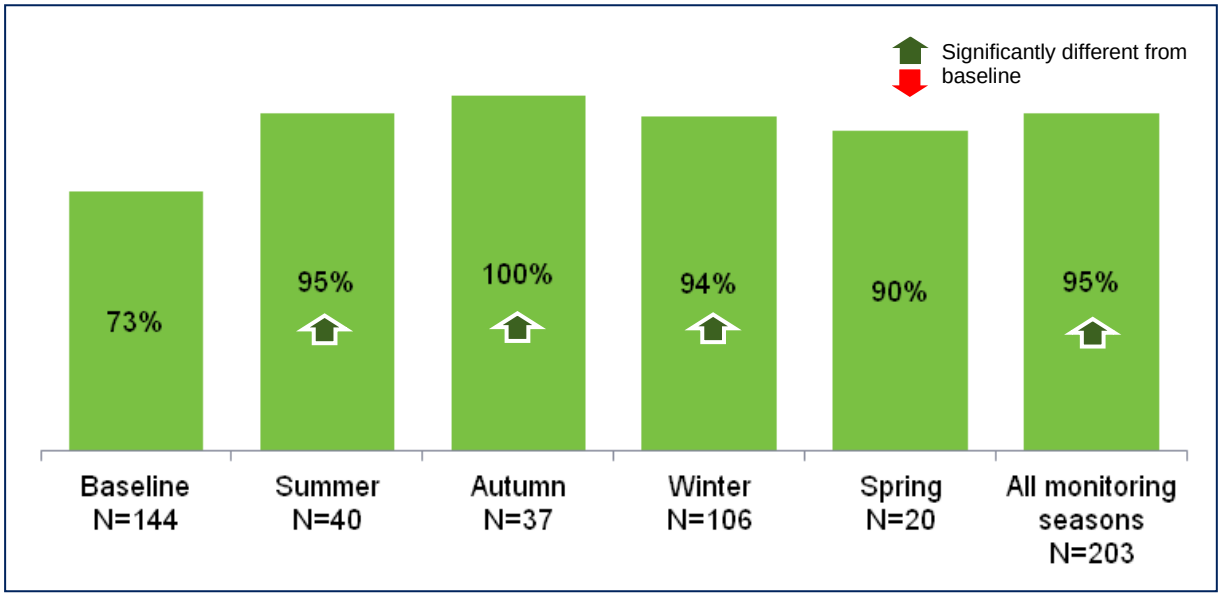
Chart 2: Overall satisfaction by monitoring phase, at the total survey sample level.



***Base**: All monitoring data N = 1334, All Summer N=184, All Autumn N= 231, All Winter N= 735, All Spring N=184*
***Question**: On a scale of 1-10 where 1 is completely dissatisfied and 10 is equal to completely satisfied how satisfied are you with the service provided by Electricity North West?*

Overall, 95% of customers who took part in the four monitoring surveys were satisfied with their electricity supply and those customers in the test groups were found to be no more likely to report changes to their power quality than those in the control groups.

Chart 3: Overall satisfaction amongst customers who noticed a change in their power quality.



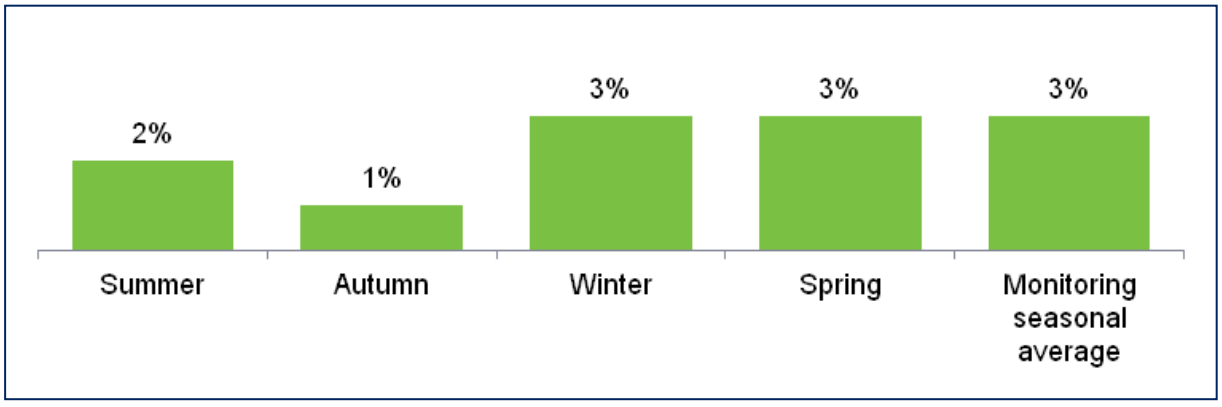
***Base**: Those who noticed a difference to their power quality - monitoring data N = 203, Summer N=40, Autumn N= 37, Winter N= 106, Spring N=20.*
***Question**: On a scale of 1-10 where 1 is completely dissatisfied and 10 is equal to completely satisfied how satisfied are you with the service provided by Electricity North West?*

Only 3% of survey participants (across all of the monitoring seasons) noticed a change to their power quality occurring concurrently with a test, which therefore might potentially have been attributable to CLASS. These customers had equally high satisfaction levels as the rest of the sample, despite noticing a change in power quality.

The changes noticed were most often related to lighting or to an appliance working less effectively that usual. As the proportion of customers reporting a change in power quality, potentially attributable to CLASS was so low as to be negligible, it was not possible to detect any significant differences between subgroups or region.

However, the significance of these reported changes could not be quantified and the response to questions within the survey highlighted that the changes could equally be the result of issues outside the CLASS Trials ie broadband running slower.

Chart 4: Changes in power quality possibly due to CLASS, by season.



***Base**: All monitoring data N = 1334, All Summer N=184, All Autumn N= 231, All Winter N= 735, All Spring N=184*
***Question**: Thinking only about the last 7 days, have you noticed any of your appliances/electrical items working slower or less effectively/quicker or more effectively than usual at certain times of day? Thinking specifically about the lighting on site, have you or any of your colleagues noticed any of the following over the last 7 days?*

Other possible influences on power quality perceptions

In order to ascertain if customers' perceptions of power quality had been influenced by factors other than the CLASS Trials, participants were questioned about the incidence of network faults resulting in a supply interruption during and preceding the Trials. There is no evidence to suggest that the CLASS Method negatively impacts perception of power quality or overall satisfaction, even amongst those customers affected by planned or unplanned interruptions since the start of the Trial. However, analysis of the general perception of service amongst customers exposed to supply interruptions is ongoing and the results will be included in the final report.

5 CUSTOMER ENQUIRIES AND COMPLAINTS OUTSIDE OF THE CLASS SURVEY

In parallel with the customer surveys, Electricity North West has embedded a robust framework to capture any enquiries or complaints potentially associated with CLASS via its traditional reporting mechanisms.

Customer engagement activities had the effect of sensitising customers on Trial networks and generated a small number of power quality enquires. These were subject to further investigation. However, none were found to be directly linked to the CLASS testing regime.

Nevertheless, it is recognised that certain I&C customers may have equipment that is extremely sensitive to voltage variations, by design or by configuration, even when voltage levels are well within statutory voltage limits and voltage deltas are at normal business-as-usual levels.

6 CONCLUSION

Based on the initial analysis of CLASS customer surveys, findings indicate that Electricity North West can be confident that implementing the CLASS Method across its distribution region would have no detriment to power quality, would be indiscernible to customers and could thus be applied across the wider GB network.