Customer Load Active System Services Survey:
Initial Summary Report.
Peer Review

Customer Load Active System Services
(CLASS)

Produced by: Ken Willis

Centre for Research in Environmental Appraisal & Management

School of Architecture, Planning and Landscape

University of Newcastle

.

VERSION HISTORY

Version	Date	Author	Status (draft, etc)	Comments
Version 1	2nd June 2015	Ken Willis	Draft	Based on Version 1 with additional content
Version2	4th June 2015	Kate Quigley	Final	Final version

APPROVAL

Name	Role	Signature & date

GLOSSARY OF TERMS

Abbreviation	Term
CLASS	Customer Load Active System Services
LCNF	Low Carbon Network Fund
ENW	Electricity North West
I&C	Industrial & Commercial

TABLE OF CONTENTS

Section	Description	Page

1. EXECUTIVE SUMMARY

This report is submitted as part of the Electricity North West Customer Load Active System Services (CLASS) Tier 2 Low Carbon Network Fund (LCNF) project.

CLASS aims to provide a low cost, rapidly deployable solution that applies innovative and active voltage management to provide a range of demand response capabilities and network voltage regulation services. By aligning demand to existing network capacity through voltage control, CLASS has the potential to minimise the need for costly asset-based interventions and make a positive contribution to a low carbon future.

The key CLASS hypothesis is that:

> *Customers within the CLASS trial areas will not see/observe/notice any impact on their power quality when these innovative techniques are applied.*

Impact Research expertly devised a survey to assess whether there was any difference in customer perception of power quality during a CLASS trial compared to a control group (non-trial). The research methodology is commendable.

The analysis of the data by Impact Research was meticulous, and ensured that the results reported were accurate, reliable, and robust.

The research proved the hypothesis that "*CLASS is indiscernible to customers*". The research revealed that only a very small group of customers (less than 3%) noticed a change in their electricity supply that may have been attributable to CLASS.

2. THE OBJECTIVE OF THIS PEER REVIEW

The purpose of this peer review is to assess the Initial Summary Report of the Customer Load Active System Services (CLASS) Customer Survey by Impact Research. The Report aims to provide an accurate and robust assessment of any impact on customers attributable to the implementation of CLASS. The peer review is also intended to maintain standards of quality, improve performance, and provide credibility.

This review has been undertaken by Professor Ken Willis. Ken Willis is Emeritus Professor of Environmental Economics at Newcastle University. His research concentrates on environmental valuation (using stated preference, and revealed preference travel-cost and hedonic price models) and cost-benefit analysis; covering biodiversity, cultural heritage, energy, forests, landscape, quarries, recreation, transport, waste disposal, and water quality and supply.

He is currently the Editor of the Journal of Environmental Economics & Policy. He has undertaken research projects on Renewable Energy and Its Impact on Rural Development and Sustainability in the UK, for the Department of Trade and Industry; on The Growth Potential for Micro-generation in England, Wales and Scotland, for the Department of Business, Enterprise & Regulatory Reform; and a Cost-Benefit Analysis of Sustainable Public Procurement, for the Department for Environment, Food & Rural Affairs.

Ken Willis has a wealth of experience in evaluating the suitability of market research methodologies and the application of advanced statistical analysis techniques onto market research data. Given his expertise within the energy sector he is well placed to provide a peer review of the results of the CLASS survey.

The rest of this report focuses on an assessment of the customer research results in the CLASS Customer Survey Initial Summary Report by Impact Research, and is based entirely on the informed opinion of Ken Willis. His independence means the narrative is void of amendment from either Impact Research or Electricity North West.

3. RESEARCH OBJECTIVES

The Customer Survey Initial Summary Report by Impact Research for Electricity North West (ENW) principally assesses the hypothesis that the CLASS supply demand management system;

> "*will be indiscernible to customers (customer will not see / observe / notice an impact on the supply quality when CLASS is applied*"

CLASS applies voltage control tools to manage supply demand balances, to maximise the use of existing electricity assets, with the aim of deferring or avoiding investment in new distribution capacity, thus reducing distribution development costs.

The customer survey tests the hypothesis (H_1) that there is a discernible effect of CLASS management on customers' perception of electricity supply, against the alternative null hypothesis (H_0) that CLASS does not result in any discernible effect on customers' perception about supply. The expectation is H_1 will not be proven, and that CLASS will not have any discernible effect on customers' perceptions.

The Report lists associated hypotheses, for example, that "CLASS enables more low carbon generation". The information in the Report is not suitable for testing this particular hypothesis: customer acceptance of CLASS is a necessary condition for more low carbon generation, but it is not a sufficient condition for more low carbon generation.

4. CLASS CUSTOMER SURVEY METHODOLOGY

The survey methodology adopted by Impact Research is an excellent and rigorous approach to assessing the effect of CLASS on customer perceptions.

Effective customer research often comprises qualitative and quantitative aspects. Qualitative research, typically through focus groups, was necessary to facilitate and ensure effective communication of the CLASS approach to customers, facilitate customers' understanding of CLASS, and the development of an effective customer questionnaire. Impact Research organised this stage admirably.

This qualitative work ensured the research effectively engaged with both domestic and industrial and commercial (I&C) customers; and that the questionnaire or survey instrument developed by Impact Research for the study was readily understood by customers, and produced accurate and reliable responses from customers.

The quantitative research on customers' perceptions was also expertly structured and conducted. The research experiment implemented by Impact Research encompassed 'test' and 'control' groups, with customers in each group being given information that they were part of a group prior to the test; and with other customers not being informed on some trials.

	CLASS Test Group	Control Group
Information: yes	A	B
Information: no	C	D

The trial appropriately covered different seasons of the year, and different degrees of voltage reductions (i.e. 3% and 5%).

Tests across 60 primary substations ensured a representative coverage of customers, from different types of area (rural and urban) and different socio-economic group profiles. The sample sizes across control and test trials, types of customer (I&C and domestic), urban and rural, and seasons of the year, were sufficient to detect any statistical difference within these elements.

Measuring power quality by comparing perceptions held by respondents in the test and control groups provide a true assessment of whether changes noticed are the result of CLASS.

5. ANALYSIS AND RESULTS

The analysis of the survey data has been expertly undertaken. The analysis is based on descriptive statistics, with tests of statistical significance between groups.

The research revealed that customers were less likely to report changes in their power quality after CLASS trials than they had in the pre-trial baseline survey.

Moreover, the analysis revealed no statistical differences between test and control groups, whether respondents received notification of the CLASS trial or not. Thus CLASS trial can be deemed to be indiscernible amongst customers.

Given the fact that CLASS is indiscernible to customers, it would not be worthwhile trying to extend the analysis beyond the descriptive statistics presented in the Report. That is, it would not be worthwhile trying to build a sophisticated predictive regression model to explain which customers reported differences, and which did not in the trial and control groups, and what characteristics placed customers in the perceived and non-perceived voltage categories.

Impact Research staff were methodical and correct in their analysis and reporting, in trying to ensure that only CLASS effects were counted in the data. Thus Impact Research rightly tried to eliminate cases where respondents reported power quality changes that were false, e.g. because they were not at home at the time of the trial; or because machines were faulty with respect to normal levels of voltage fluctuation.

6. CONCLUSION

The research methodology and analysis undertaken by Impact Research on Customer Load Active System Services is an excellent and professional piece of research.

The research methodology is commendable in its experimental design, with test and control groups; in assessing whether the effect of CLASS on customer perception is statistically significant or not; and also in measuring any information and placebo effects that might be attributable to CLASS.

The analysis undertaken is meticulous and detailed, and provides accurate and reliable information about customers' preferences. The research also proves the hypothesis that "*CLASS is indiscernible to customers*". The research shows that only a very small group of customers (less than 3%) noticed a change in their electricity supply that may have been attributable to CLASS.