electricity north west

Bringing energy to your door

NIA ENWL010
Value of Lost Load to Customers

NIA Progress Report

31 July 2017

VERSION HISTORY

Version	Date	Author	Status	Comments
v.1.0	30 June 2017	K Quigley Project Manager	Final	

REVIEW

Name	Role	Date
L Eyquem	Innovation Programme Assistant	10 July 2017
G Bryson	Innovation Engineer	10 July 2017
P Turner	Innovation Manager	16 July 2017

APPROVAL

Name	Role	Date
Steve Cox	Engineering & Technical Director	20 July 2017

CONTENTS

1 PROJECT BASICS

Project title	Value of Lost Load to Customers (VoLL)
Project reference	NIA_ENWL0010
Funding licensee(s)	Electricity North West Limited
Project start date	October 2015
Project duration	28 months
Nominated project contact(s)	Kate Quigley (kate.quigley@enwl.co.uk)

2 SCOPE

Customer engagement research across the full range of DNO customers:

- Domestic customers (qualitative ECP and quantitative research): General, worst-served customers, vulnerable customers, fuel poverty, adopters of LCT, heavy users (targeted by tariff type)
- SMEs (qualitative ECP and quantitative research)*: Targeted at industries with heavy reliance on electricity
- Stakeholders (qualitative depth research): Ofgem, DECC, Citizens Advice Bureau, local government (resilience forums), charities(such as British Red Cross), police, fire brigade, housing associations, emergency services, hospitals, care homes, airports and other transport hubs.

** Large I&C customers are not a primary focus of this survey as they are likely to have provisions in place for dealing with lost load (such as generators).*

3 OBJECTIVES

This research aims to quantify the value of dead load/loss of supply to customers. This will be achieved by answering the following research objectives:

- What is the impact on customers of lost load?
- What is the value of this impact – financial and social costs to customers in £ per kw?
- How does this vary by customer type? Currently all customer types are treated uniformly
- How can Electricity North West and key stakeholders mitigate the costs of lost load to customers?
- How will this vary with LCT adoption?

4 SUCCESS CRITERIA

The project success criteria are:

- An understanding of customer impact, how value is defined and how this might be influenced, eg better communications
- A credible segmentation and future VoLL model by key customer groups (curves) to guide investment decisions
- A demonstration of how these values would help Electricity North West to better plan their network investment strategy
- Guidance on customer compensation strategies.

5 PERFORMANCE COMPARED TO THE ORIGINAL PROJECT AIMS, OBJECTIVES AND SUCCESS CRITERIA

5.1 Phase 1: Understanding the problem

Methodology statement

A revised methodology statement (version 2) has been published. This document supersedes the original VoLL methodology statement (version 1), published in February 2016 and incorporates refinements to the approach following consultation with key stakeholders, who were engaged to assess support for the VoLL project and shape its direction. This revised methodology statement is accompanied by three new addendums:

- Methodology Statement Addendum A: Literature Review
- Methodology Statement Addendum B: Peer Review
- Methodology Statement Addendum C: Stakeholder Consultation.

The documents produced in Phase 1 are published on the project webpage at www.enwl.co.uk/voll.

5.2 Phase 2: Refining the approach

Phase 2 of the research comprised focus groups and depth interviews with a cross-section of customers, and with stakeholders likely to be in contact with customers during a supply interruption. Attempts were made to include customers who have experienced low probability, high impact events in this phase.

Engaged customer panels

The approach and research objectives of focus group meetings was set out in the previous VoLL progress report, dated 22 July 2016. Findings and lessons learned are documented in the ECP report, published on the project webpage on 23 August 2016.

Depth interviews

Depth interviews were conducted with difficult-to-reach customers and stakeholders who represented organisations likely to be in contact with customers during a power cut. The topics covered in the depth interviews were similar to those discussed in the focus groups. Learning from this element of the study is documented in a report, published on the project webpage on 31 August 2016.

Relevant customer insights from the focus groups and depth interviews were integrated into the design and administration of the customer survey.

Peer review of survey instrument

A peer review of the pilot survey findings was undertaken on 30 August 2016 by Professor Ken Willis, who is Emeritus Professor of Environmental Economics at the University of Newcastle. The purpose of this peer review was to assess the appropriateness of the customer survey instrument; and whether it was able to provide a comprehensive assessment of the VoLL across a range of customer segments, which is fundamental to inform a potential revised framework to assist DNOs in better planning their network investment and customer strategies.

Customer survey pilot

A pilot survey was conducted with 930 customers to review the survey instrument and its supporting materials before it was rolled out more widely. The pilot was conducted with a statistically robust and previously unengaged audience of domestic customers and representatives of small to medium enterprises (SMEs). As a result of the pilot, refinements were made to the survey instrument to increase its effectiveness and enhance the associated research methodology.

Peer review of pilot survey findings

A peer review of the pilot survey findings was undertaken on 4 April 2017 by Ariel Bergmann, Lecturer of Energy Economics at the University of Dundee. The objective of this peer review was to evaluate the soundness of the evidence, findings, and lessons learned to improve the survey before wider distribution and engagement with the public across Great Britain (GB).

5.3 Phase three: Measuring VoLL

The final stage of the research involves a large-scale quantitative survey designed to provide insight into the following research questions:

- Does VoLL vary by customer segment and what are the relative value assignments of these segments?
- How will VoLL vary with LCT adoption?
- How would the level of incentives tested for demand side response in other Low Carbon Networks (LCN) Fund trials compare to future VoLL?
- Which segments, if any, would support a strong VoLL and hence potentially higher investment?
- How does the scale and duration of an interruption affect VoLL?
- Is there a tipping point at which investment to mitigate against supply interruptions becomes the most financially viable option to customers, particularly during extremely infrequent, lengthy and widespread outages?

A total of 6,000 surveys will be completed, split between customers from Electricity North West's operating region and from other GB DNOs. This will include 5,000 interviews with domestic customers and 1,000 interviews with SMEs.

The survey includes a complex 'stated preference' exercise which was identified in both the literature review and the independent peer review as being the most robust and reliable technique for measuring VoLL. This exercise involves asking customers to trade off different levels of supply reliability in exchange for receiving hypothetical financial incentives or

penalties. A second, similar exercise involves trading a monetary value against various support mechanisms that might mitigate the impact of a power cut.

The interviews will be conducted in two phases, winter 2016/17 and summer 2017 ensuring that seasonal variations in VoLL are captured, with 50% of each customer type being completed in each phase.

Winter survey

The pilot was conducted with a statistically robust and previously unengaged audience of domestic customers and representatives of small to medium enterprises (SMEs). A total of 3,010 surveys were carried out; 2,450 with domestic customers and 560 with SMEs.

Summer survey

The summer phase of the quantitative research will commence in July 2017.

An ECP will be reconvened after the survey analysis has been completed to review and evaluate the research findings.

Stakeholder update

Quarterly update reports were sent to industry stakeholders and Electricity North West's executive leadership team (ELT) in July 2016, October 2016, February 2017 and May 2017.

6 REQUIRED MODIFICATIONS TO THE PLANNED APPROACH DURING THE COURSE OF THE PROJECT

6.1 Phase 1: Understanding the problem

Methodology statement

Two key stakeholders, the Department of Energy and Climate Change (DECC) and Citizens Advice, were consulted during this phase of the project; the purpose of which was to outline the VoLL project's approach and integrate any feedback into the proposed method.

This culminated in a revised version of the original VoLL methodology statement. The revised method was published on the project webpage as version 2 on 29 July 2016 and incorporates refinements to the original approach.

The stakeholder engagement exercise proved to be valuable in obtaining clear and objective feedback. The changes made to the VoLL research approach as a direct result of stakeholder feedback were:

- **Increased clarity regarding the scope of the project –** Justification for omitting industrial and commercial (I&C) customers from the scope of the project was included in the method. A table of definitions was also added to clarify key terms and enhance the transparency of the scope of the project.

- **Inclusion of short duration interruptions (SDIs) in the VoLL choice experiment (CE) –** Customer responses to SDIs will be tested as part of the appraisal of VoLL in the CE that forms part of the customer survey.

- **Expansion of the role of the engaged customer panel (ECP) –** In response to feedback from DECC, the role of the ECP was expanded and will now include an evaluation of the customer engagement outcomes and their implications for the VoLL project. To this end, the ECP will be re-convened to review, interpret and contextualise the research findings.

- **Definition of successful project outcomes –** More comprehensive detail about how the key project findings will be implemented and how DNOs might utilise the revised values, to inform decision-making, was included in the method.

The stakeholder consultation was conducted before any engagement with relevant customers to ensure the customer research methodology was shaped appropriately.

6.2 Phase 2: Refining the approach

Customer survey pilot

Based on the recommendations of the peer review, minor refinements were made to the pilot survey instrument to facilitate better customer understanding and more robust data acquisition.

Additional screening questions were incorporated to ensure that respondents met certain suitability criteria. These included a prerequisite to either jointly or solely pay the utility bills of their household or, in the case of SME representatives, have an appropriate level of responsibility for the financial decisions made by their organisation.

A commitment was also made to review the data collected during the pilot exercise to evaluate two primary methodological concerns:

- The balance achieved between show card information being sufficient to provide customers with accurate information on which to base their choices, while avoiding excessive and unnecessary detail, which might overwhelm and disengage respondents
- The validity of three groups representing low, medium and high energy usage among domestic customers.

6.3 Phase three: Measuring VoLL

Winter survey

The peer review of the pilot survey findings refined the proposed survey approach in a number of areas before the start of the large scale survey. The main changes were:

- Elements of the choice experiment (CE) were simplified
- The CE exercise was changed so that each participant only traded off either planned or unplanned scenarios. The ‘time of day’ and ‘day of the week’ parameters were also set to those which the respondent had identified as the most inconvenient for them for experiencing a supply interruption
- The volume of educational material was reduced
- Layout and formatting were changed
- Modifications were made to gather customer data if MPAN details were not provided
- The number of early adopters of LCTs that were recruited was increased.

No further changes were required to the planned approach.

7 LESSONS LEARNED FOR FUTURE PROJECTS

7.1 Phase 1: Understanding the problem

Methodology statement

The stakeholder engagement exercise, conducted as part of the review of the proposed VoLL methodology, was extremely valuable in providing clear and objective feedback. The two-way nature of the exchange was transparent, enabling joint learning, decision-making and refinement of the VoLL approach.

7.2 Phase 2: Refining the approach

Depth interviews

Depth interviews are a useful way of gathering feedback from difficult-to-reach customers and stakeholders for whom group discussions in central locations are not appropriate

It was anticipated from the outset of this customer research project that it would not be practical for customers with mobility issues or other vulnerabilities, or for those who lived in remote areas, to attend the focus group meetings in central locations, which were often far from their homes. Therefore, depth interviews conducted by phone provided an effective and alternative method of obtaining views from these important customer segments with minimal disruption for them.

Depth interviews also provided a confidential environment for individuals to share their opinions and unique views in detail, which might not have been possible because of the time restrictions in an ECP group environment. Interviewing this sample on a one-to-one basis allowed the research to benefit from the unique experiences of more difficult-to-reach customers, stakeholders and opinion leaders, in a cost-effective manner and at a time and place convenient for the research participant. It also allowed them to share information that they may have been uncomfortable divulging in front of a wider audience.

Customers often refer to perceived impacts on others but the most reliable data will relate to their own situation and experience

When questioning interviewees about their experiences of interruptions and their willingness to make or accept a payment for changes in service reliability, many were inclined to think not only about their personal situation, but also about the likely impact on, and opinion of, other customer groups. For example, when asked about willingness to pay, customers would often claim to be comfortable with paying extra themselves, but express doubts or concerns that other customers, such as those on low incomes, would feel the same way.

This type of projected perspective is valid when expressed by opinion leaders or stakeholders with responsibility for safeguarding other customers because their view is based on professional experience and expertise and they can provide considerable empirical evidence to support their opinions. However, for those who are not in this position, projected opinions suggesting the viewpoint of another can only be regarded as speculative. It is therefore best practice to refocus interviewees on their own situation, unless they have been expressly consulted to represent a specific customer segment. The actual opinions of particular customer groups, such as low income and vulnerable customers, will be obtained through surveys, which will include statistically robust samples of these customer segments during the quantitative phase of research.

Peer review of survey instrument

The peer review concluded that the proposed questionnaire is an appropriate vehicle to estimate the VoLL to different segments of customers. The questionnaire is a practical and effective way of investigating if a single uniform value of lost load (VoLL), applied to all

customer segments, remains appropriate, as GB moves towards an economy increasingly reliant on electricity. The questionnaire is comprehensive and rigorous in its approach to trying to derive accurate information from customers and preferences of customers for electricity supply characteristics.

Customer survey pilot

The pilot survey, conducted in line with the VoLL methodology, constituted a critical part of the review and endorsement of the proposed survey instrument. The pilot was extremely valuable in providing clear and objective feedback, which guided refinements to the instrument, optimising data capture and results.

Customers struggle to imagine a future scenario with greater use of LCTs

The projective technique utilised in the pilot CE trade-off involved providing supplementary educational materials and phrasing questions in the context of future electricity usage and dependency, linked to a greater presence of LCTs.

Analysis failed to provide sufficient evidence that either the materials were effective in conveying this future scenario, or that participants' future VoLL was substantially different from their current VoLL.

In future innovation projects it is recommended that projective techniques and associated materials are appraised by an ECP before they are employed more widely. Evaluation of this nature should provide a reasonable understanding of whether projective techniques are capable of attaining the desired research outcome. If materials are sufficiently able to contextualise an imaginary future and critically, should qualify whether customers can envisage or are willing to accept that imaginary future.

It is also recommended that a stratified random sampling approach is employed to ensure that a cross-section of early adopters and high consumers of electricity are included in the survey population. These participants' responses are based on actual experience, which is typically easier to recall, analyse and articulate than hypothetical scenarios.

Allow ample time to recruit early adopters of LCTs

During the pilot survey it became apparent that early adopters of some LCTs are particularly challenging to identify and recruit. This finding was specific to EV and EHP users, because of the relatively low uptake of these technologies across GB at the present time.

Permission must be obtained from the landowner and/or operator of EV charging points, such as those located in large shopping precincts, before market research interviews can commence on site. This process can take up to eight weeks and therefore, forward planning is essential. A further observation was that EV users who were engaged at charging points were often unwilling to complete the survey on site, demonstrating a preference towards the online survey, when this was suggested as an alternative. The implication of this finding is that it is important to have a variety of administration methods to capture a sufficient number of surveys from the target population.

A significant proportion of properties, identified as having an EHP installation, are in social housing stock; and many of these systems are in high rise blocks. It is recommended that wardens are engaged in advance to arrange convenient access times. Furthermore, third party collaboration of this nature, with a person likely to be known and trusted by respondents, may encourage and maximise recruitment opportunities.

Interviewers should also be provided with a letter from the client, which provides a brief overview of the research and a point of contact. This promotes participation by allaying potential concerns about the genuine nature of the survey and clarifies that participation will not result in any subsequent direct sales or marketing. Additionally, it is advisable that

interviewers should visit in pairs, where an assessment of the target area presents a concern for safety; and these additional costs should be factored into the research budget.

Computer aided telephone surveys are not an appropriate medium for administering surveys with a significant volume of stimulus material

The pilot survey contained a large quantity of educational materials to contextualise the narrative. Some of this information was embedded in a visual format, which was extremely challenging to convey over the telephone. The survey also included a complex CE trade-off exercise which, in its original format, was time-consuming to explain over the telephone.

It is technically feasible to assist a survey participant by guiding them through an online survey with simultaneous telephone support, allowing both the respondent and interviewer to view the same information at different locations. However, this involves the interviewer sharing their screen, which requires the respondent to install specific software on their computer or tablet device. Understandably, respondents may be unable or unwilling to go to these lengths, simply to take part in a survey and because of concerns about online security.

Nevertheless, it remains important to include the use of telephone recruitment and/or facilitation in customer engagement plans as this is an effective method of reaching harder-to-engage groups such as the vulnerable and fuel poor. It is recommended that, for complex surveys of this nature, the telephone method is utilised to recruit customers, at which time, arrangements can be made for a subsequent face-to-face or self-completion online interview.

Survey participants will not read excessive communication materials if they can understand and complete survey questions without them

Respondents were able to complete the survey without reading a significant proportion of the embedded educational material. This was substantiated by analysis of the data collected from those who completed the questionnaire quickly and comparing these results against the survey respondents who took longer. This analysis considered the time taken to answer each question, taking into account the relevant briefing material and evaluating this against the overall mean. The analysis demonstrated that those responding quickly, who would realistically have been unable to thoroughly read the supplementary information, were equally able to provide an accurate view of their willingness to make or accept a payment, in return for changes in the reliability of service or provision of support.

Earlier in the project an ECP had assisted in identifying and evaluating the key characteristics of supply interruptions that should be tested in this research. The suite of educational materials shared with the ECP was valuable in assisting the panel to develop an appreciation of the role of a DNO within the energy sector. They also conveyed the meaning and significance of VoLL and critically, the importance of studying the different impacts of supply interruptions on a range of customer segments across GB.

These comprehensive materials enabled participants to make informed and considered judgements on related matters, which were critical in allowing the project team to develop the survey instrument and its supplementary educational content. However, the pilot population revealed that respondents did not require this level of understanding for the survey.

Peer review of pilot survey findings

The peer review concluded that the pilot survey report is a high quality document that presents the pilot study in good detail, both procedurally and findings. The debriefing and analysis of potential weaknesses or aspects that can be improved for the next iteration, prior to engagement with a much larger population is both extensive and sufficient. Once a version two pilot survey has been conducted to test and assure the changes have captured the anticipated improvements to the survey there is a high likelihood of large scale survey being successful in acquiring the research objectives.

7.3 Phase three: Measuring VoLL

Winter survey

Results from the first phase of the survey are currently being analysed. Early indicators have identified distinct variations in VoLL across a broad spectrum of customers.

Domestic and SME customers are prepared to provide postcode information when the reasons for doing so are clearly explained

A direct learning from previous customer engagement projects is the difficulty customers typically have in providing accurate energy consumption information. To mitigate such poor recall, respondents were asked to provide the postcode for their home or business and explicit consent for this personal data to be utilised to source accurate consumption information for their property from network data sources. Respondents were reassured that their personal data would only be utilised for research purposes. The majority of domestic and SME customers were willing to provide this information; fewer than 5% dropped out of the survey because of a reluctance to do so.

Further reasons for collecting postcode information are domestic customers' inability to accurately identify their DNO (see below) through low brand awareness; and SME customers' difficulty in providing MPAN information.

Customers find it difficult to identify their DNO, even when provided with a map

A GB regional map was included as part of a range of communication materials in the quantitative survey and customers were asked to identify their DNO from a prompted list. The map was also preceded by educational information which outlined the role and purpose of a DNO relative to energy suppliers. Despite the provision of a map and the list of DNOs, more than a third (35%) indicated that they were unable to identify their DNO. It is therefore useful to collect postcode information from both domestic and commercial customers as a means of verifying the DNO. Since the pilot survey, IDNOs were added to the list of DNOs and were selected by 5% of respondents.

Care should be taken when analysing electricity consumption data

Electricity consumption data for survey respondents was obtained (with their consent) by entering postcode and address details into a national database. Results which provided data for the previous two years, was sometimes difficult to interpret and contained anomalies.

Analysis was conducted and a tool developed to mitigate the anomalies found which utilised Estimated Annual Consumption (EAC) data and took into consideration meter changes, incorrect number of digits entered and day/night reads for 'multi rate meters'.

8 THE OUTCOMES OF THE PROJECT

Not applicable.

9 PLANNED IMPLEMENTATION

Not applicable.

10 OTHER COMMENTS

Not applicable.