Notes on Completion: Please refer to the appropriate NIA Governance Document to assist in the completion of this form. The full completed submission should not exceed 6 pages in total.

NIA Project Registration and PEA Document

Date of Submission

Oct 2015

Project Reference Number

NIA_ENWL010

Project Registration

Project Title

Value of Lost Load to Customers

Project Reference Number

NIA_ENWL010

Project Licensee(s)

SP Electricity North West

Project Start

October 2015

Project Duration

3 years and 1 month

Nominated Project Contact(s)

Electricity North West Innovation Team

Project Budget

£731,000.00

Summary

Customer engagement research across the full range of DNO customers:
Domestic customers (Qual ECP and Quant): General, worst served customers, Vulnerable customers, fuel poverty, adopters of LCT, heavy users (targeted by tariff type)

SMEs: (Qual ECP and Quant) * Targeted at industries with heavy reliance on electricity

Stakeholder engagement (Qual depths): 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)

Third Party Collaborators

Impact Research

Nominated Contact Email Address(es)

innovation@enwl.co.uk

Problem Being Solved

Improving and/or maintaining reliability of supply to customers requires significant and continuous investment in distribution assets.

Supply interruptions have financial and social impacts on customers, which vary by season, time of day, customer load and customer type. Research into the Value of Lost Load (VoLL) has previously been untaken however this resulted in a single uniform VoLL based on existing customer energy usage and assigned value.
As GB decarbonises heat and transport customers will become reliant on electricity for new needs and hence it is likely that the VoLL will change. This future VoLL is important in informing issues such as network reliability standards, design policy for LCT intensive networks and service standards. In addition VoLL may have significantly different value for sub segments for the customer base, for example rural customers versus urban, worst served customers versus average etc. Understanding the VoLL by segment will be an important factor informing DNO policies and investments plans for ED2 and beyond.

Method(s)

To facilitate a comprehensive understanding of VoLL over time and by customer segment, the Method will encompass three key stages of customer and stakeholder engagement.

Phase one: Desk research to gain contextual understanding, comprehensively reviewing previous research on VoLL (including the London Economics survey conducted for VoLL and DECC). Reviews of published literature on the subject of VoLL primarily in GB but also abroad, and information available from GB DNOs on efforts to measure the VoLL. Formalisation of best methods of evaluative procedures among customers and optimal methods of VoLL calculations - proposed methodology document produced and peer reviewed. Meetings with key stakeholders (Ofgem, DECC, Citizens Advice Bureau) to outline proposed approach and obtain buy in. Finalisation of research questions that will be explored.
Phase two: Qualitative research in the form of focus groups and in depth interviews with customer groups; including but not limited to Domestic customers; SMEs,(with a focus on industries heavily reliant on electricity); stakeholders e.g. hospitals, care homes, age UK etc. and customers.
This research will explore:
• How reliability and quality of supply is defined by customers
• Explore how customers and businesses prepare, if at all, for faults
• Differing expectations for planned versus unplanned faults
• How different customer groups value reliability of electricity supply in different ways
• The financial impact of lost loads (particularly to SME customers and service organisations)
• The social impact of lost loads (particularly to domestic customers)
• Expectations around communications and support during a supply interruption from Electricity North West and other stakeholders
• Key attributes of a supply interruption such as frequency, duration, time of day, financial impact etc that will determine the attributes and levels for scenario testing during the quantitative phase.
• How these views may change with decarbonisation of heat and transport
These issues will be explored for groups of customers likely to have shared experiences (e.g. SMEs, worst served customers, vulnerable customers). Key stakeholders will be interviewed individually, to understand their unique position between Electricity North West and their customer base. Engaged customer panels (ECPs) will be formed for domestic and SMEs, given the complexity of the survey topic, to facilitate informed discussions.
The main quantitative survey will be piloted in phase two, among the ECPs and a wider audience of Domestic and SMEs
Phase three: Large scale robust quantitative survey amongst customers. This survey is designed to test the following hypotheses:
1. Does VoLL vary by customer segment and what are their relative value assignments?
2. How will VoLL vary with LCT adoption?
3. How would the level of incentives tested for demand side response in other LCNF trials compare to future VoLL?
4. Which segments would support a strong VoLL and hence potentially higher investment?
The survey will include stated preference scenarios, where customers are asked to trade off varying levels of reliability of supply in exchange for a customer incentive (financial or otherwise). It is proposed that the worst served customers are key to this research, as these customers are the most likely to have experienced interruptions and thereby have a recent benchmark.
The survey will be conducted over two fieldwork periods, one winter and one summer, to understand the variations in VoLL by season. The survey and associated analysis will quantify the VoLL, and produce curves for relevant customer groups that identify the optimal levels of investment.

Scope

Customer engagement research across the full range of DNO customers:

Domestic customers (Qual ECP and Quant): General, worst served customers, Vulnerable customers, fuel poverty, adopters of LCT, heavy users (targeted by tariff type)
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Objective(s)

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

Consumer Vulnerability Impact Assessment

n/a

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 ENW to better plan their network investment strategy.
• Guidance on customer compensation strategies

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

If quantification of VoLL is credible and tailored to specific customer groups, this approach could be implemented GB wide as a business as usual consideration for long term investment planning.

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL5 Pilot Scale

Geographical Area

Geographically representative of typical DNOs. Qualitative research predominantly in the Electricity North West region, quantitative research will be GB wide (subject to cooperation from other DNOs as required), with specific targeted groups focussed in ENW region.

Revenue Allowed for the RIIO Settlement

Zero

Indicative Total NIA Project Expenditure

£530,000

Project Eligibility Assessment Part 1

Requirement 1

Facilitate the energy system transition and/or benefit consumers in vulnerable situations

Please answer **at least one** of the following:

How the Project has the potential to facilitate the energy system transition:

n/a

How the Project has potential to benefit consumer in vulnerable situations:

n/a

Requirement 2 / 2b

Has the potential to deliver net benefits to consumers

Project must have the potential to deliver a Solution that delivers a net benefit to consumers of the Gas Transporter and/or Electricity Transmission or Electricity Distribution licensee, as the context requires. This could include delivering a Solution at a lower cost than the most efficient Method currently in use on the GB Gas Transportation System, the Gas Transporter's and/or Electricity Transmission or Electricity Distribution licensee's network, or wider benefits, such as social or environmental.

Please provide an estimate of the saving if the Problem is solved

The scale of financial benefits to customers will be a key deliverable from the research – Customers will inform us of the VoLL and therefore what appropriate compensation would be for accepting a lower level of reliability. It is estimated that the project has the potential to deliver net financial benefits of upward of £100m of societal benefits owing to the adoption of more appropriate VOLL values for customers for whom electricity is used for heating and transportation. The revised VOLL would be incorporated into an adjusted common CBA assessment and would enable network operators to appropriate assess the benefits of future investment options in this context.

Please provide a calculation and/or description of the expected benefits of the solution

Not applicable.

Please provide an estimate of how replicable the Method is across GB

If the Method is scaled up to customers across the network area and ultimately GB this could represent significant savings to customers nationwide. The exact distribution and scale of the benefits will be a deliverable of the research.

Please provide an outline of the costs of rolling out the Method across GB.

Not applicable

Requirement 3 / 1

Involve Research, Development or Demonstration

Projects must have the potential to have a Direct Impact on a Network Licensee's network or the operations of the System Operator and involve the Research, Development, or Demonstration of at least one of the following (please tick which applies):

☐ A specific piece of new (i.e. unproven in GB, or where a method has been trialled outside GB the Network Licensee must justify repeating it as part of a project) equipment (including control and communications system software).

☐ A specific novel arrangement or application of existing licensee equipment (including control and/or communications systems and/or software)

☑ A specific novel operational practice directly related to the operation of the Network Licensees system

☐ A specific novel commercial arrangement

Involve Research, Development or Demonstration - Please select all that apply

☐ A specific piece of new equipment (including monitoring, control and communications systems and software)

☐ A specific piece of new technology (including analysis and modelling systems or software), in relation to which the Method is unproven

☐ A new methodology (including the identification of specific new procedures or techniques used to identify, select, process, and analyse information)

☐ A specific novel arrangement or application of existing gas transportation, electricity transmission or electricity distribution equipment, technology or methodology

☐ A specific novel operational practice directly related to the operation of the GB Gas Transportation System, electricity transmission or electricity distribution

☐ A specific novel commercial arrangement

Specific Requirements 4 / 2a

Please explain how the learning that will be generated could be used by the relevant Network Licensees

Currently there is a universal view of VoLL. This research will provide differentiation of VoLL by customer type and allow investment decisions to be guided accordingly.

n/a

☑ Has the Potential to Develop Learning That Can be Applied by all Relevant Network Licensees

Is the default IPR position being applied?

☑ Yes

Project Eligibility Assessment Part 2

Not lead to unnecessary duplication

A Project must not lead to unnecessary duplication of any other Project, including but not limited to IFI, LCNF, NIA, NIC or SIF projects already registered, being carried out or completed. Networks must explicitly mention similar projects that they have considered and how these differ.

Please demonstrate below that no unnecessary duplication will occur as a result of the Project.

n/a

If applicable, justify why you are undertaking a Project similar to those being carried out by any other Network Licensees.

n/a

Additional Governance And Document Upload

Please identify why the project is innovative and has not been tried before

n/a

Relevant Foreground IPR

n/a

Data Access Details

n/a

Please identify why the Network Licensees will not fund the project as a part of it's business and usual activities

n/a

Please identify why the project can only be undertaken with the support of the NIA, including reference to

the specific risks (e.g. commercial, technical, operational or regulatory) associated with the project

n/a

This project has been approved by a senior member of staff

☑ Yes