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NIA Project Registration and PEA Document

Date of Submission

Jul 2022

Project Reference Number

NIA_SPEN_0078

Project Registration

Project Title

Security of Supply for Vulnerable Consumers (SSVC)

Project Reference Number

NIA_SPEN_0078

Project Licensee(s)

SP Energy Networks Distribution

Project Start

August 2022

Project Duration

2 years and 2 months

Nominated Project Contact(s)

Robbie MacQuarrie

Project Budget

£375,000.00

Summary

There is an opportunity to improve the current method of capturing and actioning on vulnerable customers needs in both planned and unplanned system outages.

Security of Supply for Vulnerable Consumers (SSVC) aims to identify and test applicable technologies as part of a system and communication restoration and develop a technology/scenario support tool to enable effective decision-making during loss of supply incidents.

Planning to respond and protect the most vulnerable consumers following either planned (for example for maintenance) or unplanned (for example due to storm damage) system outages is a challenging process that relies heavily on staff expertise, local knowledge and manual data processing. This situation means that, despite best efforts, some consumers may be left without energy supplies and communications for periods of time that can lead to emergency situations.

Nominated Contact Email Address(es)

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Problem Being Solved

Energy consumers supply of electricity and other essential services is critically linked to health and wellbeing. Both planned and unplanned loss of electricity supply (and subsequent loss of communications) can have an acute impact on people's lives, particularly those living in vulnerable circumstances. In addition, certain health conditions and circumstances can increase reliance on electricity supply and increase the impact that a delay in power restoration will have. In the most severe cases, loss of electricity supply can result in exacerbation of health conditions leading to hospitalisation or fatalities.

Method(s)

A structured and innovative approach to solving this problem shall be taken by identifying the technology and hardware solutions that

can support consumers with critical reliance on electricity and communications supplies in different loss of supply scenarios. The solution shall also support networks' customer service and front-line response teams to effectively plan and respond to these needs. A stage-gate review will be conducted following phase 1 of the project, to assess the technology and application viability.

The project will be delivered via two parallel workstreams:

1. Technology Development

The Technology Development phase shall be split into three parts as described below.

a. Technology identification: during this phase an understanding of the scenarios that lead to technological solutions being required and the impacts on consumers based on living situations and vulnerability factors shall be developed. Technologies capable of reinstating power supplies and telecommunications shall be identified and scenario response plans shall be developed.

Stage-gate review 1: A review of phase 1 of the project will be conducted to assess the identified technology prior to progressing to phase 2 (laboratory testing).

b. Laboratory testing: the shortlisted technologies shall be tested and validated in a realistic laboratory environment, incorporating input from key stakeholders involved in emergency response.

c. Scenario response plan: Following testing, scenario response plans shall be produced outlining the technologies to be applied in the case of certain electricity and communications downtime occurring.

2. Integrated Decision Support Application

This workstream shall be conducted in parallel including the following activities.

a. User requirements: this task will aim to understand details of what will bring the most benefit from the decision support application and identify the key features to be developed in the following stages.

Stage-gate review 1: A review of phase 1 of the project will be conducted to assess the application viability prior to progressing to phase 2 (application development).

b. Application development: development of the integrated decision support capability.

c. User testing: this time will be used to refine and fix any bugs that may become apparent during the testing.

Scope

- Technology Development: Research, testing and scenario planning of the solutions and hardware required to safeguard consumers with critical risk factors. Both electrical supply and communications reinstatement shall be considered.
- Integrated Decision Support Application Development: Development of an integrated software application to help enable effective decision-making during loss of supply.

Objective(s)

The objective of this project is to identify, test and develop a solution that incorporates both hardware and integrated decision support capability to enable a rapid response to restoration of energy supplies for vulnerable consumers. Key aspects include:

- Identify the hardware that is most suited to different customer needs and scenarios for reinstating both power and communications.
- Test the hardware and communications reinstatement technology in a laboratory environment under realistic reinstatement scenarios.
- Develop and user-test an integrated decision support tool that helps customer service and operational teams select the right hardware to be used in different scenarios.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

N/A

Success Criteria

The following outputs will be important when assessing the success of the project:

- Several new hardware solutions capable of reinstating both power and communication are identified and tested.

- An understanding of how the hardware can be incorporated into business-as-usual processes and installed at vulnerable customer homes during supply incidents.
- An integrated decision support capability is developed and tested.
- Scenario response plans are developed and validated that incorporate both the hardware and decision support tools.

Project Partners and External Funding

Centre for Energy Equality (CEE).

Potential for New Learning

The learning generated will enable new technologies to be utilised when responding to loss of supply incidents.

Scale of Project

The project consists a desktop study and trial of the shortlisted technologies.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL5 Pilot Scale

Geographical Area

n/a

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

£169,500

Project Eligibility Assessment Part 1

There are slightly differing requirements for RIIO-1 and RIIO-2 NIA projects. This is noted in each case, with the requirement numbers listed for both where they differ (shown as RIIO-2 / RIIO-1).

Requirement 1

Facilitate the energy system transition and/or benefit consumers in vulnerable situations (Please complete sections 3.1.1 and 3.1.2 for RIIO-2 projects only)

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:

Vulnerable consumers shall benefit from prioritised and faster response during electricity supply downtime. Communities and households will also benefit from provision of solutions that are most suited to their individual needs. This will subsequently result in reduced health-related incidents and a greater feeling of security. Whilst difficult to calculate at this stage, these benefits are likely to result in significant societal saving related to reduced costs associated with hospital admissions and emergency medical treatments associated with loss of supply incidents.

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 (RIIO-1 projects only)

Not applicable as this is a research project, with laboratory demonstration only.

Please provide a calculation of the expected benefits the Solution

Not applicable as this is a research project, with laboratory demonstration only.

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

This project, if proven successful, could be applied throughout GB across all networks. The novel reinstatement solutions could be applied across all networks as the same challenges associated with rapid reinstatement of supplies for vulnerable customers exist.

In addition, the new decision support capability could be disseminated and embedded within other networks (including both electricity and gas networks).

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

The research to be carried out during this project will discover the costs associated with the loss of supply reinstatement technologies, as well as any operational changes required to ensure their effectiveness.

The decision support capability is anticipated to be a cost effective and efficient solution to planning emergency response and application of the technologies, but the exact costs will be uncovered throughout the project.

Requirement 3 / 1

Involve Research, Development or Demonstration

A RIIO-1 NIA Project 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

RIIO-2 Projects

- 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

The learning generated will enable new technologies to be utilised when responding to loss of supply incidents. The new technologies will form part of a toolkit that could enable the network to provide specific technologies based upon specific vulnerabilities and needs. In addition, learning will be generated that will help enable a more prioritised response when loss of supply incidents occur.

Or, please describe what specific challenge identified in the Network Licensee's innovation strategy that is being addressed by the project (RIIO-1 only)

n/a

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.

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

A search of the ENA smarter network portal and publication on the ENA huddle portal has revealed no other projects carrying out this specific work.

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

The focus of emergency reinstatement of supplies has historically been on rectification of damaged parts of the networks (i.e. from storms), and street level reinstatement using generators. The concept of prioritising and utilising new types of technology to protect the most vulnerable in emergencies has not had extensive research to date. This includes the technologies themselves, how the prioritisation process takes place, and the operational response processes.

Specific innovative aspects of the project include:

- It will identify and test existing and emerging technologies that are yet to be rolled out as part of system and communications restoration.
- It will enable pre-emptive planning, combining specific consumer care needs with applicable technologies.
- It will provide insight into the scenarios that most severely effect consumers based on a range of system, geographic, demographic and health impact factors.
- It will deliver novel capability that supports network staff in responding to vulnerable consumer needs by streamlining data analysis and providing easy to use dashboards and visualisation.

Relevant Foreground IPR

n/a

Data Access Details

n/a

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

Changing approaches to emergency reinstatement is complex and sensitive as it could involve providing households with new technologies. Therefore, researching, testing and development of the solutions requires efforts to overcome the uncertainties associated with such a change. These risks include the potential safety impact of attending and reinstatement at a home level, safety concerns with the technologies themselves and the risk that changes to operational response process could be cost prohibitive or unpractical.

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

The project can only be undertaken with support of the NIA due to a range of uncertainties and risks listed below:

- Commercial - the costs of the new technologies as well as the cost of changing operational practices are currently unknown and will need to be researched and tested during the project.
- Technical - new technologies will be identified and tested. Given that these technologies could be deployed in customer dwellings, it is important to trial and test them first.
- Operational - the project will involve new decision support and operational practices that will benefit from research and user-testing ahead of deployment into business as usual. The costs and efficiencies of these changes are not currently clearly understood.
- Regulatory - there are several regulatory implications that will need to be investigated and tested as part of the project, including how reinstatement at the home level is viewed by regulators in terms of responsibility and cost recovery implications.

This project has been approved by a senior member of staff

Yes