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 2022

Project Reference Number

NIA_UKPN0084

Project Registration

Project Title

Power Protect

Project Reference Number

NIA_UKPN0084

Project Licensee(s)

UK Power Networks

Project Start

October 2022

Project Duration

1 year and 8 months

Nominated Project Contact(s)

innovation@ukpowernetworks.co.uk;
rona.mitchell@ukpowernetworks

Project Budget

£246,250.00

Summary

Power Protect aims to support most vulnerable customers by providing a portable power supply in planned and unplanned outage scenarios where these customers are off supply for an extended period of time. The project will develop and trial a proactive identification of vulnerable customers tool, an automated support offering system as well as a batteries dispatching tool and forecasting process in order to increase our customer safety, reduce operational cost during power outage restoration and ultimately deliver benefits to our customers.

Nominated Contact Email Address(es)

innovation@ukpowernetworks.co.uk

Problem Being Solved

It is estimated that around 3.5m households in vulnerable circumstances are eligible for our Priority Services. Currently, 56%* are registered on our Priority Service Register (PSR). Whilst UK Power Networks has introduced, developed and refined its approach to vulnerability there is still more work to be done.

In practice, customers can be added to the register against 30 needs codes, each covering a different situation of vulnerability. Customers who are medically dependent on electricity fit on the needs codes 1 – 4. The needs codes are divided into customers that need the following electrical equipment:

1. Nebuliser and apnoea monitor
2. Heart, lung and ventilator
3. Dialysis, feeding pump and automated medication
4. Oxygen concentrator

As it stands, there are a total of 64,566 households that have a PSR registration for one or more of needs codes 1 – 4 and a sustained

period of time without power may seriously impact their health conditions.

UK Power Networks' ambition is to deliver industry-leading support that maximises the value delivered to our customers in vulnerable circumstances therefore, innovative solutions are required to support vulnerable customers during power outages in order to ensure the delivery excellent customer service while resolving power outages (in planned and unplanned scenarios).

Method(s)

Power Protect will proactively identify and offer support to those customers that are reliant on medically dependant equipment in unplanned and planned power outages.

The number of customers off supply and their Estimated time for Restoration (ETR) will be analysed by a custom designed forecasting tool which will proactively offer the option of a portable battery power supply to be dispatched to impacted customers premises.

This solution will incorporate inputs from existing outage management tools and will include a battery performance tracking system designed against individual customer requirements.

The developed method will also ensure that, whilst temporary power is supplied to customers via the batteries, affected customers will still be processed as "off supply" and prioritised accordingly.

Customer research will be conducted to ensure a solid understanding of customer requirements and expectations and will trial the units in controlled scenarios to identify the real benefits of the solution.

The trial will include up to three different battery solutions from different providers.

Data & Measurement Quality Statement

Data relating to customer surveys, interviews and the trial will be kept securely and in accordance with data protection requirements. Anonymised data, aggregated where appropriate, will be included in project reports for wider distribution.

UK Power Networks will ensure the following terms are agreed in working with any project partners to protect data quality and security:

- Where data is held remotely, it shall be made readily accessible to UK Power Networks
- Project partners shall maintain back-up copies of data and undertake reasonable measures to protect it from corruption, external interference and unauthorised use.
- UK Power Networks will have the right to arrange for independent data audits throughout a project if deemed necessary.

Scope

Scope

The scope of the project is to deliver and trial an optimised battery dispatching framework to support our medically dependent customers during extended outages.

This project does not aim to replace existing storm response processes, but rather provide additional support to those most vulnerable customers as an interim support measure.

The project will be delivered in work packages focused on the different elements which from the solution.

Work Packages:

1. **Customer research and engagement**

Customer research will be carried out to cover a range of questions around customers' expectations and needs from the solution. Multiple research options will utilised ranging from surveys to users testing and interviews.

2. **Solution definition**

Solution requirements will be validated with project partners and suppliers (battery providers, field engineers, etc.) including logistics for battery storage, charging, transportation and recovery post outage.

Additional support devices such as standalone lighting, electric blankets, travel kettles may also make up part of the trial solution in line with customer research findings.

3. System and software development

Utilisation and alignment analysis of existing software and platforms will be completed to identify new user requirements which will lead to the development of the required asset forecasting and tracking system.

The optimal approach to utilising existing or new communications platforms to contact and manage customers will also be explored.

4. Trial Operations

New operational process and customer journeys will be developed in collaboration with project partners, suppliers and key UK Power Networks internal stakeholders.

Battery units and the novel forecasting and dispatching software will be trialled in a controlled environment to identify the benefits of the solution and the more appropriate BAU roll our strategy.

Objective(s)

The objectives of the project are to:

1. Identify medically dependent on electrical equipment customers on the PSR that are at risk of health issues being off supply for a sustained period of time in an unplanned power outage scenario

2. Identify a suitable customer support offer for portable power support

3. Trial a battery bank forecasting and dispatching tool for time off supply

4. Identify and record the benefits for the usage of battery banks for vulnerable customers

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

The project is steered towards supporting vulnerable customers and will not have any additional impact on fuel poverty. Consumer vulnerability is a wide topic, and there are many intersections of different vulnerabilities. This can include concerns, among other things, of finance, literacy, mobility, communication and support networks. This project specifically focuses on customers who are medically dependent on electricity.

We are working with the Research Institute of Disabled Customers (RiDC) to carry out customer research. They are experts in this field and this will allow us to get a much better understanding of what needs our customers have.

Impact of the method/solution on customers:

Customers who are medically dependent on electricity are planned to receive a portable battery power supply in the event of a power cut lasting more than four hours. This can be used to power their essential medical equipment, reducing the risk to their health. The battery can also be used to power devices to support comfort and wellbeing, such as electric blankets, lights and kettles.

Success Criteria

A successful project will:

· Identify an efficient solution that delivers an appropriate level of customer support and value add at an economical cost.

· Provide insights on the key requirements/needs of vulnerable customers medically dependent on electricity

- Gather customers feedback to identify the value of the proposed solution
- Trial the operational procedures required to successfully deploy the solution
- Provide and high-level assessment of the operational costs of the solution
- Map the overall customer journey
- Identify the processes and procedures required for an effective BaU roll out

Project Partners and External Funding

The project will be delivered in collaboration with the following partners and suppliers.

1. Battery banks suppliers
2. Research institutes
3. Academic Partners
4. Software developers

These will be identified via a competitive and transparent selection process.

Potential for New Learning

This project will address the social, technical, and logistical issues associated with portable battery dispatch in a planned and unplanned outage scenario.

The project will deliver key learnings on the key requirements of medically dependant customers as well as the viability of an additional support solution in outage scenarios. It will capture learning of the barriers, limitations and gaps of such a solution. It will help identifying key insights that can be used to steer the level of support for customer future needs and recommend appropriate courses of action in the best interest of the customer.

From a solution perspective the project will establish limitations in timing and capacity for portable batteries for use in the home as an energy supply back up for vital medical equipment as well as validate the additional support devices that will be required.

These learnings will be disseminated through different channels including:

1. Publication of clear and accessible reports on findings and new approaches developed;
2. Events with relevant stakeholders e.g. other DNOs and local authorities to share learnings; and,
3. Publication of relevant and accessible information for third parties.

Scale of Project

The project will deliver a portable battery solution to a control group of vulnerable customers who fit the criteria for medically dependent customers on electrical equipment.

The project will test up to 24 battery banks with a view to trialling on multiple customers with differing requirements over various localities (urban, rural, multi- occupancy buildings etc.) in order to create robust use cases to be sued for future wider roll out.

The volume of customers' sites visited will be determined by the number of available/viable customers identified by the consumer research.

A time extension of nine months was approved in May 2023. This was because of delays in the battery procurement process and to extend the trial phase to ensure sufficient customers are included to make a confident decision about any post-project rollout.

In addition, an expansion of the trial size (through an increase in the number of batteries) was approved in May 2023. The potential for learning and value of the project is in increased by ensuring more batteries are available at one time.

Technology Readiness at Start

Technology Readiness at End

TRL6 Large Scale	TRL8 Active Commissioning

Geographical Area

Trial participants will be located within UK Power Networks' licence areas (Eastern Power Networks plc, London Power Networks plc and South Eastern Power Networks plc.). Exact locations are to be defined during the consumer research phase.

Revenue Allowed for the RIIO Settlement

No funding was provided within the current RIIO settlement that will become surplus to requirements as a result of this project.

Indicative Total NIA Project Expenditure

The total expenditure that UK Power Networks expects to incur for this project is £246,250 of which:

- 10% (£24,625) will be paid by UK Power Networks
- 90% (£221,625) will be recovered from NIA.

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:

The project aims to give additional support to Customers who are medically dependent on electrical equipment by providing a portable battery power supply if they are experiencing a power cut of greater than four hours. The battery can be used to power their essential medical equipment, reducing the risk to their health and possibly also increasing their comfort.

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)

N/A

Please provide a calculation of the expected benefits the Solution

Assumptions:

- Calculation is based on a typical year
- All PSR (1-4) customers off supply for >4 hours received a backup supply
- Average battery life = 1,400 cycles at 80% of battery size
- Cost of charging battery unit is negligible compared to hardware and dispatch cost

Baseline:

Number of dispatched generators (4,200) x average cost per generator dispatch (£1550 inclusive of dispatch resources and fuel) = £6,510,000

Method cost

(Number of dispatched batteries (4,200) x average cost per battery dispatch (£602 inclusive of dispatch resources hardware cost) = £2,527,500

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

This method could be applied across the whole of GB and applies to all network licensees, since there are vulnerable customers in all locations across the UK.

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

The solution could be deployed in any licence area providing the DNO implements processes and systems to facilitate collaboration with customers, meter operators and suppliers.

The final cost of rolling out the method across GB is strictly dependant of individual DNOs support requirements and specific vulnerable customer volumes.

The estimated cost to purchase, deliver and maintain battery banks for vulnerable customers support at GB scale will be finalised as part of 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 project will gain insight into PSR customers needs and requirements in an unplanned outage scenario. It will identify suitable battery bank support solutions as well as volume of resource requirements to dispatch and retrieve them.

It will disseminate learnings around asset performance and associated support devices to shape future solution alternative solutions.

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 check has been completed on the smarter networks portal and no similar projects at this point have identified.

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

Not applicable.

Additional Governance And Document Upload

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

This project will be the first attempt to understand the impact of using a portable battery as a power supply to provide additional support to customer off supply through unplanned outages.

The project will assess this solution based on the criteria mentioned above and identify the role it will play in supporting our most vulnerable customers optimising the network performance.

Relevant Foreground IPR

The data created, outputs and deliverables produced as part of the project will conform to the default treatment of IPR.

Data Access Details

For all data access requests, please view the full Innovation Data Sharing Policy available on UK Power Networks' website here:

https://innovation.ukpowernetworks.co.uk/wp-content/uploads/2021/11/UK-Power-Networks-Innovation-Data-Sharing-Policy-.pdf

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

The NIA Governance document, the DNOs are encouraged to pursue different types of methods and solutions to meet challenges affecting customers and network operators. This project seeks to provide a solution that could meaningfully increase customer comfort, safety and satisfaction levels by offer a new approach to support.

These activities would not form part of BAU activity due to a change in approach and the uncertainty around the benefits that will be delivered to this customer group.

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 as an innovation pilot given the operational risks associated with the deployment of an unproven solution for vulnerable customers.

As noted in the NIA guidance, certain projects are speculative in nature and can yield uncertain commercial returns. This is the case for with this project as well as not being clear as to whether or not the customer would indeed benefit from a fully integrated BAU solution.

The solution that is being trialled as part of this project is innovative and is going to provide a strong insight into the vulnerable customers needs, requirements and expectations in relation to medically dependant equipment in an unplanned outage scenario.

This project has been approved by a senior member of staff

☑ Yes