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

Dec 2024

Project Reference Number

NIA_UKPN0105

Project Registration

Project Title

Keeping Comms Open

Project Reference Number

NIA_UKPN0105

Project Licensee(s)

UK Power Networks

Project Start

January 2025

Project Duration

3 years and 0 months

Nominated Project Contact(s)

Ben.turner@ukpowernetworks.co.uk

Project Budget

£635,102.00

Summary

The UK telephone network will soon shift away from copper cabling to a fibre optic based network, reliant on electricity supply. This means that during a network outage, vulnerable customers would be unable to call for help.

This project will develop an existing Smart-UPS to deliver and facilitate health-related services to customers in vulnerable situations by enabling multi-day Fibre to the Premises (FTTP) power for phones in the case of prolonged power loss.

A satellite phone will also be developed for remote communities to provide connectivity to the DNO in case of a complete loss of communication in an area. This will provide the option to support individual PSR customers or communities as appropriate to their needs in the event of an outage.

Nominated Contact Email Address(es)

innovation@ukpowernetworks.co.uk

Problem Being Solved

The Public Switched Telephone Network (PSTN) is undergoing a shift away from copper cabling to a faster fibre optic-based network, because of this, the new fibre optic network will no longer be powered by the telephone exchange. The telephone network will therefore be reliant on a power supply from customers' properties.

Age UK estimates that 3% of the UK adult population aged 55 to 64 and 7% aged 65 & over do not own a mobile phone, (link) meaning their landline could be their primary source of communication. This means that following the PSTN switch, they would be unable to call for support during a network outage.

In the event of a storm, extensive damage to the High Voltage (HV) overhead network, may result in large numbers of customers off supply for extended periods of time. This could result in rural/non-rural communities being without communications. Mobile phone coverage would also be affected with poor or no signal coverage due to loss of supply to the mobile network mast. Without any mobile coverage, customers may experience difficulties staying in contact with colleagues and family. Having access to a Community Satellite Phone would allow those customers to call emergency devices and their DNO. Operational staff could also benefit from having access to these devices as it will allow them to maintain contact with their depots, and the operational control centre in the event of a prolonged outage.

Method(s)

The Energy Innovation Centre (EIC) ran a call for innovation ICA-23-03 – Keeping Comms Open During HV Faults where four innovators submitted proposals. One Innovator has been selected by the participating DNOs.

DefProc Engineering will develop an existing smart, uninterruptible power supply (Smart-UPS) that has previously been used for telehealth. The new device will provide power to an Optical Network Terminal (ONT); a device that connects a user to a fibre-optic network and provides internet access. The intention is to enable multi-day FTTP power for domestic and emergency phones in the case of power loss. They will also develop a community satellite phone box for remote communities and substations to provide connectivity to the DNO in the event of a complete communication loss to an area. This will provide the option to assist operational staff and support individual PSR customers and communities as appropriate to their needs.

The project will work with DefProc Engineering to develop their proposed solutions and test their suitability for deployment in customer homes, community buildings and substations..

Up to 18 Smart-UPS units will be supplied to conduct customer acceptability tests. Customers will be invited to trial the Smart-UPS where, should they have a power cut, they will be able to maintain telecommunications and receive appropriate support.

Up to 18 community satellite phones will also be deployed to remote communities or substations in areas with poor mobile coverage. Field staff will be asked to trial the satellite phone and receive instructions from control.

Scope

This project will consist of research and development for the Smart-UPS device and satellite phones. The project will be carried out over two phases. The first phase will consist of DefProc Engineering developing and testing the devices at their offices in Liverpool. Each partner will review end of work package reports. The second phase of the project will focus on identifying trial locations to deploy the devices produced by DefProc Engineering and then conducting the trials.

The trial stage will not have any impact on the length of the power cuts. There may be some impact on the customers selected for the trial stage as we may require them to switch off their supply for testing of the Smart-UPS device. This testing scenario will be developed in full in the trial design.

The project will consist of four work packages. The overall aim and scope for each work package is below:

Work Package 1 – Smart-UPS Build

· Development of Smart-UPS for use within vulnerable customers' properties

· Stage gate to review DNOs' business case for Smart-UPS devices

· Engage with telecoms providers to understand similar work they are doing in this space.

· Engage with disability charities to ensure that the Smart-UPS incorporates inclusion by design and that the accompanying information pack is easy to understand.

· Develop a trial design for the testing period, with scenarios agreed by DNOs

Work Package 2 – Community Satellite Phone Build

· Development of Community Satellite Phone Call Point for use in remote communities

· Stage gate to review DNOs' business case for Community Satellite Phone Call Points

· Engage with disability charities to ensure that the community phone incorporates inclusion by design.

· Develop a trial design for the testing period, with scenarios agreed by DNOs

Work Package 3 – Smart-UPS Trials

· Data analysis to identify suitable customers for trial

· Produce instructions for customers, and training for operators and develop an installation plan for the Smart-UPS devices in customer's homes

· Field trial of Smart-UPS device in customers properties

· Obtain operational staff and customer feedback on the Smart-UPS

Work Package 4 – Community Satellite Phone Trials

· Data analysis to identify suitable areas for trials

· Train operational staff to install the phones and develop and installation plan for each device, obtaining planning permission where appropriate

· Field trial of Community Satellite Phone in remote communities and substations

· Engage with local communities and Community Councils to raise awareness of the new phones

· Obtain operational staff and customer feedback on the Community Satellite Phone

Objective(s)

· Build and test a Smart-UPS that can deliver power to communications for up to 72 hours

· Build and test a Community Satellite Phone which can provide communication from a substation or a community building.

· Demonstrate that both devices can safely enable communication when electricity is unavailable

· Deploy the devices to suitable trial locations across the three DNO groups

· Collect feedback from DNOs and customers during the trial, incorporating into any adaptations required for BAU deployment

· Assess the costs and benefits for the devices, including other devices on the market

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

The Smart-UPS will aim to assist PSR customers who do not have a mobile phone. These customers may be unable to leave their homes to receive welfare after/during a storm or power outage. The device will allow them to call the DNO or emergency services to request support/help.

The Smart-UPS device has been designed for customers to simply install it in their homes by plugging it into a standard three-pin plug socket. To assist vulnerable customers, various communication methods should be provided to explain the installation.

The Community Satellite Phone will assist customers and operational staff to report outages and other issues on the network where there is poor or no mobile connectivity.

Once the Community Satellite Phone has been installed, a variety of communication methods should be introduced to make residents aware of the device. Given that the device is for customers without a mobile phone, alternative methods such as paper flyers or calling their landline should be used.

Success Criteria

Success Criteria – Smart-UPS device must maintain power supply to an Optical Network Terminal (ONT) device for a suitable duration.

Measure – To be able to power a common and standard ONT device, phone and/or home router for a suitable duration in line with expected usage. This will be internally tested by the innovator and can be verified by trial by the DNOs.

Success Criteria – Community Satellite Phone must be user accessible and be easy to use for customers with disabilities.

Measure – To be able to be accessed and easily operated by customers with disabilities in line with the DNO/other relevant parties accessibility guidelines/policies.

Success Criteria – Community Satellite Phone must call the DNO contact phone number selected (e.g. 105)

Measure – To be able to call and hold a conversation with a DNO operative using dedicated contact number.

Success Criteria – Community Satellite Phone must continue to function for a suitable duration without mains electricity supply

Measure – Community Satellite Phone must be functional for a suitable duration based on expected usage without reliance on mains electricity. This will be Internally tested by the Innovator and can be verified by trial by the DNOs.

Success Criteria – Identify eligibility criteria for customers who could have the devices installed in their homes and the criteria for a substation/remote community to have a Community Satellite Phone installed.

Measure – Criteria for customers and locations which if met would outline them as a target recipient for these devices at BAU.

Project Partners and External Funding

The three DNO groups will share the cost of the development and trial of the two devices equally between themselves using NIA funding.

Each partner will sign off on key deliverables and provide the necessary locations for the device trials. The EIC will manage communication with the Innovator and will oversee the completion of project deliverables.

DefProc Engineering will oversee the device build and testing. They will produce the summary reports for sign off by all partners and they will take on board the feedback from the trial stage. At project completion they will provide the necessary information for a BAU roll out of the devices.

DefProc Engineering is a design engineering company specialising in early-stage product development and small-scale manufacturing. They offer skilled support for project scoping, proof of concept, prototyping, and small-scale production. DefProc has 12 years of experience working on projects with businesses of all sizes to create innovative solutions and achieve incredible things. In addition to working with startups, established businesses, and national organisations, DefProc specialises in Internet-connected (IoT) devices and is a leading innovator in LoRaWAN solutions.

Below is a list of the requirements for partners on the project

DefProc Engineering

· DefProc will enhance their existing 18+ hours of 12V 5G router power to be suitable for up to 72 hours.

· DefProc will build up to 18 prototypes for trials between the three DNO groups involved in the project.

· DefProc will also design and build up to 18 Community Satellite Phones using the same Smart-UPS technology for remote communities.

UK Power Networks, Scottish Power Energy Networks and Northern PowerGrid

· UK Power Networks will lead the engagement with telecoms providers to share best practice of the project and to understand similar work they are doing in this space.

· UK Power Networks will also lead engagement with disability charities to get their feedback on the project approach and to ensure we incorporate inclusion by design for the devices.

· Responsible for signing off on key deliverables from DefProc Engineering and the EIC.

· Responsible for finding trial sites, deploying the devices and collecting customer feedback.

Energy Innovation Centre

· The EIC will be responsible for project management, ensuring the innovator meets the deadlines specified in the project plan, and produces the end of work package deliverables for sign off

· At project completion, the EIC will produce an overall project report detailing the findings of the trials and a summary of the devices.

Potential for New Learning

This project will address the social, technical, and logistical issues associated with deploying telecommunications devices in customers' homes, community buildings and substations.

From a customer perspective the project will understand customer requirements for communication during storms/power cuts and learn about the scale of customers who are at risk of losing all communications during power cuts.

The project will capture learning of the barriers, limitations and gaps of this solution. It will help identifying key insights that can be used to steer the level of support for future needs and recommend appropriate courses of action in the best interest of the customer.

These learnings will be disseminated through different channels including:

- Publication of clear and accessible reports on findings and new approaches developed.
- Engagement with relevant stakeholders e.g. other DNOs, telecoms providers and charities

Scale of Project

The project will develop a Community Satellite Phone and UPS device that will be trialled in selected DNO areas. If the outcome is successful, this can be scaled up across all GB distribution networks.

The large scale of this project will help to build a strong benefits case to convince other networks to fast follow this solution.

Technology Readiness at Start

TRL7 Inactive Commissioning

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

Trials may be conducted in any of the three DNO groups' licence areas.

Revenue Allowed for the RIIO Settlement

No funding provided within the current RIIO-ED2 settlement will become surplus to requirements as a result of this project.

Indicative Total NIA Project Expenditure

The total expenditure for the project is £635,102 of which the total NIA expenditure is £571,592 and this will be split across the three DNO groups as follows:

- UK Power Networks £282,837
- Northern PowerGrid £142,420
- Scottish Power Energy Networks £146,335

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 proposal is to develop a Smart-UPS that can supply power to the existing communications network in the homes of DNO customers or to critical support locations for up to 72 hours.

The Smart-UPS will also supply power to Community Satellite Phone call points, which will be positioned in communities with known poor mobile phone connectivity. This will allow DNOs to communicate with communities or directly with vulnerable customers' homes, aiding better communication and support management during an extended unplanned outage.

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

Keeping Comms Open is a development project with stage gates that allow the Project Partners to measure the Cost Benefit Analysis (CBA) throughout the project life.

The social return on investment (SROI) method for measuring values not traditionally reflected in financial statements, including social, economic, and environmental factors, was utilised to enable a CBA to support this project. The sections used were:

- Reducing Stress during an Outage (£35 Per Customer)
- Customers Feel Better in Control of their Lives (£82.10 Per Customer)

It is assumed that one Smart-UPS device would benefit one customer and that one Community Satellite Phone could benefit 15 customers. This was based on the average size of a small UK village, which has population of around 500. If 3% of customers in a village don't have a mobile phone, then 15 customers could benefit by having access to a satellite phone. The solution assumes that 14,700 Smart-UPS devices and 480 satellite phones would be deployed to deliver the benefits calculated below. The method for these estimates is shown in section 3.2.3.

14,700 Smart-UPS deployed = 14,700 customers benefitted

480 Community Satellite Phones deployed = 480 x 15 = 7,200 customer benefitted

It is assumed that each customer that receives a device will experience a power cut each year for the benefit of this CBA. This is a worst-case scenario for the reliability of the UK's distribution network.

(14,700+7,200) customers x (£35 + £82.10) = £2.56m

Total Benefits = £2.56m per year

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

According to Ofcom's Connected Nation Report: Spring 2024, Mobile coverage remains stable for 4G, with around 93% of the UK landmass predicted to have good outdoor 4G coverage from at least one operator.

This area includes nearly all the premises in the UK. 5G coverage has also remained steady over the previous four months with around 92% of premises being able to get a 5G signal outdoors from at least one mobile network.

Assuming the satellite phone is deployed at operational substations, or communities near them. Using the estimates from Ofcom, it is assumed that 7% of the 6865 primary substations in Great Britain (link) are in mobile not spots. Meaning 480 primary substations could benefit from a Community Satellite Phone.

For the development of the Smart-UPS for use in properties of vulnerable customers; specific PSR customers' properties will need to be selected, either for those in mobile not spots, or customers without a mobile phone. The number of people on the PSR varies across DNOs, but it was estimated to be just under 7 million households in a study by Citizens advice in 2023 (link). 3% are assumed to not have a mobile phone and 7% of those customers are assumed to live in areas with poor mobile coverage.

Under these assumptions, it is estimated that 14,700 customers could be supported by a Smart-UPS device as part of an initial BAU roll out.

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

For the creation of a CBA, it was estimated that a Community Satellite Phone would cost an estimated £3,500 (+£100 annual Opex) and a Smart-UPS for a customer's home would cost £400 per unit (+£5 annual OPEX).

£5.88m for 14,700 Smart-UPS devices

£1.68m for 480 Community Satellite Phones

Total costs = £7.56m + £121k annual OPEX

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 help DNOs understand the challenges of the PSTN switch off. At the end of the project, findings can be shared with other DNOs to give them the information to fast follow this solution.

During the project, the network partners will join workshops with Ofcom and other telecoms providers to discuss the switch off and the various solutions being considered. Learnings will be disseminated to promote further collaboration.

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.

There is no duplication between other DNOs' current and previous projects. DefProc Engineering are using their own IP to develop these devices for the use case of this project.

The PSTN switch off has forced the telecoms industry to address the risks posed to vulnerable customers.. The partners will engage with Ofcom and telecoms provider throughout the project to understand what solutions they are working on. By maintaining healthy dialogue, we will avoid duplication of the work this project is seeking to carry out.

If a solution is provided by another project, the scale of the trial stage could be reduced to minimise project costs.

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

This project originated from the EIC Call for innovation ICA-23-03 – Keeping Comms Open During HV Faults where four innovators submitted proposals. One Innovator has been selected by the contributing network operators.

The PSTN switch off is scheduled to start in 2027. There are no active examples of these devices currently as there is no demand for them. The type of equipment being developed in the project has not yet been tested in a live environment. By testing the devices over the course of this project, we will ensure DNOs are ready to address the needs of their vulnerable customers when the PSTN switch off occurs.

Relevant Foreground IPR

The data created, outputs and deliverables produced as part of the project will conform to the default treatment of IPR. The Relevant Foreground IPR would be the documents on how to use the devices, as these will be required by each DNO as part of BAU transition.

- Smart-UPS installation and Setup guide document
- Community Satellite Phone installation and Setup guide

Both documents will be owned by DefProc Engineering. No Background IPR is required to use this Relevant Foreground IPR.

All network partners will collect feedback from customers and operational staff during the trial stage. The findings will be made available for sharing with other partners should they wish to fast follow this project.

Data Access Details

UK Power Networks recognises that Innovation projects may produce network and consumption data, and that this data may be useful to others. This data may be shared with interested parties, whenever it is practicable and legal to do so, and it is in the interest of GB electricity customers. In accordance with the Innovation Data Sharing Policy, UK Power Networks aims to make available all non-personal, non-confidential/non-sensitive data on request, so that interested parties can benefit from this data.

To view the full Innovation Data Sharing Policy, please visit UK Power Networks' website here:

http://innovation.ukpowernetworks.co.uk/innovation/en/contact-us/InnovationDataSharingPolicy.pdf

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

This project involves the deployment and trial of telecommunications within customers' homes which is an activity not completed as part of the electricity networks' business as usual activities.

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

This project requires collaboration between DNO and technology companies to be successful as well as live trials on the distribution network. Therefore, the funding provided via NIA is suited for this type of project in order for it to progress into BAU. Furthermore, the benefits for this are fully societal and stimulus funding is essential in incentivising the roll out in BAU.

This project has been approved by a senior member of staff

☑ Yes