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

Jan 2023

Project Reference Number

NIA_NGN_415

Project Registration

Project Title

Supporting vulnerable residents during power cuts

Project Reference Number

NIA_NGN_415

Project Licensee(s)

Northern Gas Networks

Project Start

October 2022

Project Duration

0 years and 6 months

Nominated Project Contact(s)

sdacre@northerngas.co.uk

Project Budget

£48,500.00

Summary

The overall aim of this project is to create an integrated solution that uses temporary, portable and zero emissions power sources to keep vulnerable residents' appliances and associated systems operational under power outage conditions, particularly during freezing weather

Nominated Contact Email Address(es)

innovation@northerngas.co.uk

Problem Being Solved

Due to climate change, storms are becoming more unpredictable and severe. As a result, power outages caused by storms are becoming more variable and therefore the impacts more complex, extending into the wider aspects of community and the individual, affecting the function of appliances for heating [heating and cooling], lighting, aspects of transport and digitally reliant systems.

During power cuts (loss of electricity supply), NGN provides critical support to its respective DNO partner (NPg and/or ENW). Support provided includes customer resource on site; access to welfare facilities; local knowledge; as well as support from back office functions.

Through power cuts, once of the key frustrations faced by vulnerable customers is that whilst their electricity supply has been interrupted, there is no issue with their gas supply. However, gas cannot be used as electricity is required to make gas boilers operational

Current practices involve the use of preventative measures such as the pruning of trees near overhead electricity lines; fast response to restore all power in the relevant areas; and using petrol generators to maintain supplies to specific houses of known vulnerable residents. Under “normal” weather conditions these measures have proved adequate but under the more severe climate change influenced weather they are much less effective leaving the vulnerable residents more exposed to risk.

Method(s)

This section should set out the Method or Methods that will be used in order to provide a Solution to the Problem. The type of Method should be identified where possible, eg technical or commercial.

For RIIO-2 projects, apart from projects involving specific novel commercial arrangement(s), this section should also include a Measurement Quality Statement and Data Quality Statement.

The overall aim of this project is to create an integrated solution that uses temporary, portable and zero emissions power sources to keep vulnerable residents’ appliances and associated systems operational under power outage conditions, particularly during freezing weather. The key project outputs will be the following:

· a method of identifying geographical areas where vulnerable residents are likely to be at risk

· a way of engaging with key local stakeholders in these areas, in particular volume property owners with vulnerable residents such as social housing providers and local authorities

· a technical and operational solution that allows practical and cost-effective deployment of portable zero emissions power sources during times of high risk of power outages when the weather is likely to be cold enough to present risks to residents.

The key expected benefit is to help keep targeted vulnerable residents alive and well when there are power outages during periods of colder weather. Clearly there are wider benefits for all parties that have some form of shared responsibility for these residents including their families, regulated utilities, social housing providers and local authorities, emergency services and social care providers.

Scope

Category
Beneficial impacts
Delivery mechanism

Direct
Indirect

Financial
Existing market solutions do not work under climate change induced weather conditions. By taking a different approach, this solution will be more cost effective than investing much more to make the existing market solutions work.
Using the portable batteries when not being used to support the vulnerable to facilitate other low carbon applications that also save money i.e., by using them instead of standby generators thereby displacing expensive and polluting diesel.
Continuously review project cost benefit analysis and engage with stakeholders to demonstrate that the solution is value for money compared to current practise.

Scaling the project and rolling it out as business-as-usual as recommended in the report which will be developed as part of the overall project.
Health and safety
Allows networks to more effectively deploy internal resources in an emergency situation reducing exposure to risks. Reduce the risk to life and health of vulnerable residents due to power outages.
Secondary uses of portable batteries are better for health and safety than the alternative of running petrol or diesel generators / engines.
Scaling the project and rolling it out as business-as-usual as recommended in the reporting which will be developed as part of the overall project.
Environmental
Carbon and air quality benefits compared to using the existing fossil fuelled generator alternatives.
Carbon and air quality benefits for secondary usage of the portable batteries compared to using the existing fossil fuelled generator /

engine alternatives.
Scaling the project and rolling it out as business-as-usual as recommended in the report which will be developed as part of the overall project.
Customers
The solution focuses on reducing the risk to life and health to vulnerable customers.
Other customers could benefit by at least recognising the areas and properties exposed to the risk.
Scaling the project and rolling it out as business-as-usual as recommended in the report which will be developed as part of the overall project and will include a communication strategy to engage with customers.
Community
Some degree of local community engagement and support may be needed to ensure successful roll-out of the project.
Community recognition of the primary problem could then serve as a catalyst for wider support for vulnerable residents.
Scaling the project and rolling it out as business-as-usual as recommended in the report which will be developed as part of the overall project and will include a communication strategy to engage with customers.
Carbon reduction
Carbon reduction compared to using the existing fossil fuelled generator alternative.
Carbon reduction for secondary usage of the portable batteries compared to using the existing fossil fuelled generator / engine alternatives.
Scaling the project and rolling it out as business-as-usual as recommended in the report which will be developed as part of the overall project.
Other
More resilience to future climate change impacts.

The project will, by its existence, give a more general awareness of climate change “adaptation” issues and risks and how they might impact on vulnerable and customers in general.

Objective(s)

The key project objectives will be the following:

· a method of identifying geographical areas where vulnerable residents are likely to be at risk

· a way of engaging with key local stakeholders in these areas, in particular volume property owners with vulnerable residents such as social housing providers and local authorities

· a technical and operational solution that allows practical and cost-effective deployment of portable zero emissions power sources during times of high risk of power outages when the weather is likely to be cold enough to present risks to residents.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

Results from Vulnerability Impact Assessment Tool:

Overall Project Score - 10

Success Criteria

Must identify properties that would typically house residents most at risk

It is critical that the first stage of the process works so that potential properties that typically house vulnerable residents at risk can be identified.
Compare the final results with any relevant historic evidence and feedback based on the practical experience of the relevant project stakeholders.
Must be able to engage localised support for the solution

The process needs to be able to engage and give confidence to key local stakeholders to ensure that they support and participate in the solution.
The reaction, confirmed level of participation in the trial and feedback from the relevant local stakeholders.

Must be a practical and cost effective solution

The solution must deliver the expected project benefits, be technically robust and operationally practical and be able to be rolled out at scale in future at a cost which is not prohibitive.
Feedback from the key trial participants on the solution's practicality, potential positive impact for the vulnerable and its cost effectiveness.
Must be capable of scaling and being future proofed

The project report must include robust recommendations of how the solution can be scaled into business-as-usual activities for typical stakeholders and also how the solution will be future proofed to ensure it remains viable or is even improved as, for example, battery technology advances.
Positive feedback from the key project stakeholders on the recommended scaling into business-as-usual and the associated future proofing aspects through time.
Desirable criteria (Could)
Measure
Ensure the batteries only utilise renewable electricity

The solution could be structured to ensure that under business-as-usual conditions only renewable electricity would be utilised to charge the portable batteries used by locally charging the devices using a supply that has a green contract attached.
Feedback from the key project stakeholders on the practicalities of achieving these recommendations and proposals within the report.
Identify ways to utilise batteries when not needed for keeping boilers operational during power outages

The project could include recommendations of how stakeholders could utilise the portable batteries to give them additional economic value outside of the core project requirement. This would clearly then improve the overall economics of the proposition under business-as-usual conditions.
Feedback from the key project stakeholders on the practicalities of achieving these recommendations and proposals within the report.
Ensure the solution developed works with hydrogen boilers

To fully future proof the solution the project could include the potential for it to work with hydrogen boilers as the gas industry decarbonises.
Feedback from industry hydrogen specialist within NGN and from a selection of the market leading hydrogen boiler manufacturers.

Comms highlight
Communication method
Audience
Schedule
Kick Off
Internal awareness through blogs and emails
NGN & Key External partners
Month 0
Stage Gates
Stage Gate Summaries /meeting
NGN & Key External partners
Monthly
Closure
Newsletter, Email, Workshops, Webinar, Open Dissemination event(s)
NGN & Key External partners
Month 6

Project Partners and External Funding

Northern Powergrid are intellectual partners to this project.

Potential for New Learning

This project will set a basis for exploring the impact of any future changes to a property's heating and hot water systems in terms of considering their resilience to power outages due to climate change related weather conditions and, in particular, how this will ensure the future wellbeing of vulnerable residents under these circumstances.

The overall aim of this project is to create an integrated solution that uses temporary, portable and zero emissions power sources to keep vulnerable residents' appliances and associated systems operational under power outage conditions, particularly during freezing weather. The key project outputs will be the following:

a method of identifying geographical areas where vulnerable residents are likely to be at risk

a way of engaging with key local stakeholders in these areas, in particular volume property owners with vulnerable residents such as social housing providers and local authorities

a technical and operational solution that allows practical and cost-effective deployment of portable zero emissions power sources during times of high risk of power outages when the weather is likely to be cold enough to present risks to residents.

The key expected benefit is to help keep targeted vulnerable residents alive and well when there are power outages during periods of colder weather. Clearly there are wider benefits for all parties that have some form of shared responsibility for these residents including their families, regulated utilities, social housing providers and local authorities, emergency services and social care providers

Scale of Project

The innovation within the proposed project is in packaging and deploying a mix of existing technologies and innovative approaches to give an end-to-end solution that works, comprising of:

Identifying properties that typically house vulnerable residents most at risk.

Making minor modifications to properties to allow portable battery units to be "plugged in" safely, which would be incorporated in the installation process.

Issuing fully charged battery units to nominated local organisations.

When weather impacts are forecast, portable batteries are "plugged in" to the relevant residents' properties by the local organisations.

In the event of a power outage, the residents "flick a switch " which is easily accessible to allow their gas boiler to continue operating to give them heating and hot water. Alternatively, this switch over could be automated although this would likely make the units more costly. The best approach is to be determined during this project.

The local organisations can remotely monitor charge levels and faults, enabling them to swap the battery units as required.

None of the existing traditional solutions that are used now work effectively to keep vulnerable residents safe and warm during freezing weather at times of power outages caused by climate change influenced weather conditions.

The uniqueness of the solution is to develop a temporary, portable and zero emissions power sources solution that effectively works well for the purpose of keeping vulnerable customers alive and well and that it is value for money, within this context.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL7 Inactive Commissioning

Geographical Area

The project will take place in Northern Gas Networks geographical areas

Revenue Allowed for the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

An indication of the Total NIA Expenditure that the Funding Licensee expects to reclaim for the whole of the Project (RIIO2).

Project costs: £48,500

NGN internal cost £4,500

Total expenditure £53,000

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 key expected benefit is to help keep targeted vulnerable residents alive and well when there are power outages during periods of colder weather. Clearly there are wider benefits for all parties that have some form of shared responsibility for these residents including their families, regulated utilities, social housing providers and local authorities, emergency services and social care providers.

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

to help keep targeted vulnerable residents alive and well when there are power outages during periods of colder weather.

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

This solution will be fully replicable across GB

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

The cost will be worked out through thte project depending on the location

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

This project will set a basis for exploring the impact of any future changes to a property's heating and hot water systems in terms of considering their resilience to power outages due to climate change related weather conditions and, in particular, how this will ensure the future wellbeing of vulnerable residents under these circumstances. This learning can be applied across all relevant Network Licences.

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.

No other GDNs or DNOs are undertaking this research.

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

Gas boilers not working during electricity powers cuts has been a well known and recognised issue, placing our most vulnerable customers in extreme hardship. Recent weather events such as Storm Arwen have highlighted how important it is that we consider solutions that can help get boilers back operational during power cuts.

Relevant Foreground IPR

The project and the resultant outcomes/deliverables will conform to the default treatment of IPR as set out under the agreed NIA Governance (where the default requirements address two types of IPR: Background IPR and Foreground IPR)

Data Access Details

For all data access requests, please follow the guidance set out in Northern Gas Networks Innovation Data Sharing Policy. https://www.northerngasnetworks.co.uk/ngn-you/the-future/our-funding/

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

This project is eligible for funding under NIA due to the support it is aiming to provide to customers in vulnerable situations.

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

Risk description
Impact
Probability
Proximity
Owner
Mitigation
Inaccurate data

The data available to target suitable areas and properties is either unavailable or too inaccurate to give useful results.
Project benefits (Property targeting may be less focussed and specific)
Low
Month 1
Egnida
No data set will be completely accurate but based on previous experience the data is likely to be more than adequate for the purposes of this project. In reality, a trial can be carried out irrespective of the data quality with the main impact being less credibility during the stakeholder engagement stage.
GDPR

There may be concerns that Egnida will have access to personal details for vulnerable residents provided by third party stakeholders and that this will result in GDPR issues.
Time delays from having to agree GDPR data management processes.
Low
Month 3
Egnida
In the unlikely event that it is needed in the first place, all supplied sensitive data will be anonymised.
No interested or committed stakeholders

Third party stakeholders may not be interested enough to support the trial.
Project benefits (The trial will be less “real world” than proposed)
Medium
Month 8
Egnida
Use alternative properties and stakeholders elsewhere in the country that will allow a representative trial. This is unlikely to be a problem given the relatively small numbers required.
Technical solution does not work

For whatever reason the solution fails to work before or during the trial.
Project benefits. Potential loss of credibility albeit that the purpose of the trial is to test the solution anyway.
Low
Month 1 onwards
Egnida
Egnida has sufficient experience with similar projects to give an expectation that the technical solution will be successful and early “lab testing” of the prototype has been allowed to minimise the risk of any failures during the live trial.
Weather not cold enough during trial

To make the live trial as valid as possible it needs to take place at a time when the weather would be cold enough to run the heating as much as possible.
Project benefits /Time. The trial will be less “real world” and more theoretical in terms of how it would perform under the critical cold weather conditions.
Medium
Month 1
Egnida
The key to mitigate this risk is to start the project as early as possible to maximise the probability of the trial being underway when the

weather is coldest. The project has been scheduled on the assumption of a September start which although requiring some parallel processes still allows the live trial to take place over the coldest months. Being able to start the project earlier would further mitigate the inherent weather related risks.

This project has been approved by a senior member of staff

☑ Yes