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

Sep 2016

Project Reference Number

NIA_NGN_179

Project Registration

Project Title

Remote ECV Isolation

Project Reference Number

NIA_NGN_179

Project Licensee(s)

Northern Gas Networks

Project Start

September 2016

Project Duration

0 years and 7 months

Nominated Project Contact(s)

John Pickering

Project Budget

£54,296.00

Summary

Hull is the only mainland UK city not served by BT. Its main telecommunication infrastructure is operated by KC, which also operates a number of other telecommunication systems in the UK. NGN already has a working relationship with KC and together understand the customer's future requirements. KC also has a close working relationship with Hull University to develop Internet of Things (IoT) systems that could lead to future business opportunities.

Together this consortium of organisations have reviewed how the product from Triple+ could be incorporated into a "Whole Home" system that could provide long term security, reduce risk, allow people to remain in their own home longer and provide clear business opportunities.

Air Quality Monitor monitors room air details once every second to predetermine levels. Should the level of Methane or CO exceed these predetermined levels it send a notification signal to the ECV controller attached to the existing valve positioned before the customers meter, closing the ECV. Immediately this action triggers a notification to a communication device in the customer's home. This communication device also monitors other systems around the home, it then sends a notification to the communications centre (Telecommunications Infrastructure).

The Network can then act on these messages and continue to monitor the property. These actions can include contacting affected stakeholders (Property Owner, Family Friends and Care Organisations). It will also communicate direct with the Networks Control Centre who can take immediate action.

Third Party Collaborators

Energy Innovation Centre

K.Com Plc

Triple+

Yorkshire Water Group

University of Hull

MACAW Engineering Limited

Nominated Contact Email Address(es)

innovation@northerngas.co.uk

Problem Being Solved

The main reasons the elderly, the vulnerable or people with dementia are placed into care is the safety to themselves and concerns of carers from living in their own homes. Placing vulnerable individuals into residential care is large and growing cost on society. If technologies could provide security to these individuals, remaining in their own home is preferable to everyone and reduces costs to UK economy.

During emergency situations or supply incidents, such as water ingress, networks often need to isolate a large number of customers from the gas network, for their own safety. This involves engineers gaining access to properties and turning off the main control valve (ECV). During emergency incidents this could take a large number of resources who could be better deployed on the safety to the wider public or begin immediate restoration.

Since the start of the gas industry, we (networks) have relied on individuals to report incidents of gas leakage within their home. This could be Natural gas or Carbon Monoxide and then all the networks react to the customer's problem. Unfortunately not all incidents like the above are reported and this can lead to major incidents, such as fires, explosions or asphyxiation and potential deaths.

Also we have to realise that as the population gets older there will be more people with special needs and after a risk assessment, often these individuals have to go into residential homes for their own safety. This is a great burden on the NHS and the support network and can be very upsetting to the individual.

The development of Internet of Things (IoT) within the home is rapidly becoming a reality with telecommunications companies leading the way. If gas is to part of the future within the home and play a full part in everyday life it needs to be part of this development to improve customer's lives and safety.

Method(s)

This demonstration project will bring a unique remote controlled ECV, never used in the UK, together with other IoT systems to show how combined technologies can safeguard homes and inform key stakeholders of risks. Action can then be taken by the Network and others to ensure safety is returned as soon as practicable.

The project is an initial proof of concept approach with K.Com Plc (KC) installing the equipment in a "demonstration room" within its offices in Hull. Hull University will also provide around 20 student accommodations to install the system to assess viability and operability. Should this proof of concept trial demonstrate benefits, a larger trial covering a wider demographic group will be investigated.

The "demonstration room" will also provide a communication route to how the art of the possible could be deployed across the UK. Engagement will be made with other GDN's and key stakeholders on future stages, impact, issues and involvement.

Currently, when a customer smells gas or suspect carbon monoxide they will ring the gas emergency number to report the incident, if it is in their property, they will be advised if they are a competent or a trained engineers to turn off the ECV (Emergency Control Valve). If the release of gas is not controlled the networks must attend the property in less than 1hr. However if the ECV is closed it is a controlled gas escape and the networks have two hours to respond.

The engineer arrives on site to undertake a full safety survey of the affected area.

Scope

Hull is the only mainland UK city not served by BT. Its main telecommunication infrastructure is operated by KC, which also operates a number of other telecommunication systems in the UK. NGN already has a working relationship with KC and together understand the customer's future requirements. KC also has a close working relationship with Hull University to develop Internet of Things (IoT) systems that could lead to future business opportunities.

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Air Quality Monitor monitors room air details once every second to predetermine levels. Should the level of Methane or CO exceed these predetermined levels it send a notification signal to the ECV controller attached to the existing valve positioned before the customers meter, closing the ECV. Immediately this action triggers a notification to a communication device in the customer’s home. This communication device also monitors other systems around the home, it then sends a notification to the communications centre (Telecommunications Infrastructure).

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UPDATED PEA DOCUMENT

The certification of the equipment has never been produced to enable a network trial to be undertaken. Therefore phase one has been terminated and a review of certification has to be undertaken to determine the requirement to allow this project to move forward.

To date we have proved under simulated conditions the operation will work and send information to computer/phone/tablet etc. by utilizing an App.

To continue this project we must undertake the following:-

Literature Review and Specification Development. (see attached original proposal mail – 5 weeks)

This includes development of a detailed specification for an Automated ECV, this shall include all design and type testing requirements, with which manufacturers of such equipment shall demonstrate compliance. As discussed previously the price for this scope of work is £15000.00

2: Review state of compliance of products put forward by manufacturers for this application.

This includes reviewing the state of compliance of products available from manufacturers to meet the defined specification and final selection of equipment to be used in the field trial. This is not currently included in our scope of work as it is not known how many products will be offered for evaluation.

3: Completion of AECV feasibility study including revising the existing risk assessment and assessing any additional controls required in respect of any identified gaps in the selected product compliance with the specification.

Objective(s)

- To determine best location of sensors and develop the best sensor for the operation.
- To determine turn off point (LEL readings)
- Test under simulated conditions.
- Test in specific properties.
- Check data integrity.
- Develop process and check process.
- Interact with all utilities on the development.
- Close out report.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The project is deemed successful, if it can be proved that the system operates as designed and over a length of time, without failure or creating an increase in workload. Therefore, the project has to meet the following criteria:

- Gas safety framework is accepted for deployment during proof of concept stage

- Remotely operated ECV is compatible with EU approved sensor
- Fifteen units are successfully deployed for nine months
- All stakeholders, trained, informed, consulted, aware and comfortable with actions
- No false negatives reported throughout trial
- Communications systems conform to necessary standards
- Final Report produced, with recommendations

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

This proof of concept stage is to be very limited to a small number of unoccupied, student or “friendly home” situations. This is due to the safety concerns of false operation.

Communication will be through NGN and Hull University who are the property owners.

The safety management and risk assessments will be wholly managed by NGN under the safety management framework developed by Macaw Engineering Ltd.

The complexity of the relationship team involved will be coordinated by Energy Innovation Centre, to focus on project assurance between parties.

No units will be fitted or trialed without specific acceptance of all risks, communications and actions acceptable to stakeholders. Constant monitoring, testing and records maintained through period.

Technology Readiness at Start

TRL4 Bench Scale Research

Technology Readiness at End

TRL5 Pilot Scale

Geographical Area

The trial will be very limited in geographical area managed by Hull University or NGN. This is to ensure NGN’s response is controlled and compliant with safety framework.

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

External Costs: £40,722

Internal Costs: £13,574

Total Costs: £54,296

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:

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 (RIIO-1 projects only)

It is estimated that in the UK around 50 lives per year are lost due to the effects of CO poisoning. If this could reduce this by 5% this would result in a saving to the UK economy of around £4m

In 2014/15 there were 240 non – fatalities in the gas industry that where reported under RIDDOR (Reporting of injuries, diseases and dangerous occurrences regulations). Of these 23 where explosions or fires caused by Natural gas and 214 confirmed CO. All of these incidents have to be investigated at an average cost of 1K per incident.

It will reduce loss of gas after the meter which will reduce a customer's bill

Please provide a calculation of the expected benefits the Solution

This is a proof of concept project that will research the process changes and communication impact on existing processes. While cost benefits may be identified for the Networks during this trial, the vast benefits from this approach will be seen within the UK economy and safety to customers.

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

This is a proof of concept project that will research the process changes and communication impact on existing processes. While cost benefits may be identified for the Networks during this trial, the vast benefits from this approach will be seen within the UK economy and safety to customers.

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

It is envisaged that implementation would take place in three distinct areas:

1. A service provided for vulnerable people to allow them to remain in their own home safely
2. Managed properties, MOB's, tenanted community and other specific locations
3. All properties in the UK

Area three would need significant legal and regulatory changes, but these would come from evidence gained during roll-out in areas 1 & 2.

Approximately £500/installation.

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

Remote operation of valve does occur in industrial processes, to manage safety of equipment, this approach is also used within the USA. The trial is to understand if mechanical operation can take place by detecting air quality. However, the key learning objectives for this project is the communication and understanding of behaviour's around remote operations.

In the UK emergency control valves are only operated manual by either competent persons or customers under the instruction of the GDN. This operation is aimed at changing that relationship, so before wholesale changes are made learning must take place on what those new relationships are likely to be

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

Safe Guard Life and Property.

Be pro-active rather than re-active around internal gas escapes.

Safety.

This project will make sure that NGN is working with other utilities to develop all processes into the next decade, to provide better customer service.

The project therefore addresses NGN's strategy focus areas of *Environment, Health & Safety and Customer Service*

☑ 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.

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 apart 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