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

Mar 2017

Project Reference Number

NIA_SGN0110

Project Registration

Project Title

Remote Site Monitoring Device

Project Reference Number

NIA_SGN0110

Project Licensee(s)

SGN

Project Start

March 2017

Project Duration

3 years and 3 months

Nominated Project Contact(s)

Hector Salgado, Innovation Project Manager

Project Budget

£387,000.00

Summary

The features of the three distinct parts of this proposed solution are detailed as follows:

- New low power sensor with long term operation
- New sensor enclosure with flow path, suitable for use in gaseous atmosphere
- Sensor bump testing when installed
- IP rating suitable for wide range of environmental conditions
- Sensor with integrated short range communications
- Reusable

Nominated Contact Email Address(es)

sgn.innovation@sgn.co.uk

Problem Being Solved

GDN's have '*at risk*' mains that are not leaking but require frequent monitoring as a risk management measure prior to direct replacement being carried out. SGN also have sites where work is being carried out but remain live and require periodic checking.

Monitoring of these scenarios require personnel to be on site, as frequently as necessary, to take the gas measurements and subsequently report findings. On occasion, this demands resource to travel to known locations to perform a very quick survey. However, depending on location (e.g. London) the entire operation can take several hours.

This project will look at alternatives to human resources, and will develop a battery powered remote monitor that, when installed, will

allow gas readings from an existing job to be automatically transmitted direct to the Cloud. This will allow readings to be monitored remotely, more frequently and automatically escalate activities as necessary.

Method(s)

In order to address this project, SGN will work with GMI to develop a product that can be used by all GDNs throughout GB.

The product will comprise of three distinct sections:

- Remote sensor with short range communications
- Base station with long range communications
- Cloud based data management package

The solution will allow the remote sensors to be deployed which will feedback data on a regular basis. Data will be available frequently and reduces the need for personnel to be on-site to obtain the gas readings. It could also be used by personnel on-site to alert them to site changes.

Although there are three distinct parts to this proposed solution, the remote sensor will generate the main technical challenge. A low power sensor complete with housing will be developed to deliver prolonged use in all environmental conditions.

Scope

The features of the three distinct parts of this proposed solution are detailed as follows:

- New low power sensor with long term operation
- New sensor enclosure with flow path, suitable for use in gaseous atmosphere
- Sensor bump testing when installed
- IP rating suitable for wide range of environmental conditions
- Sensor with integrated short range communications
- Reusable

Objective(s)

The objectives of the project are to produce a Remote Site Monitoring Device for the detection of natural gas. This device will be capable of being left on-site and will transmit gas readings. These gas readings will be viewable remotely and will indicate the site's status.

Summary of Work Required

- Develop a working prototype of the Remote Site Monitoring Device to meet relevant industry standards and specifications
- Develop work procedures for using the product
- Trial the solution across SGN's regional networks
- Commercial appraisal for the overall use of the product and potential efficiency savings resulting from the success of the field trial.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The success criteria for the project are:

- Analysis of conceptual design, detailed designs and prototype manufacture of a solution which meets the relevant industry and SGN standards against specifications
- Facilitate the introduction of the product into the GB gas industry for field trialling, evaluation and approval
- Manufacture prototypes and undertake field trials across SGN's networks
- Manage off-site field trials and testing, quantifying and controlling the risks identified
- Develop work procedures and field trial documentation for using the product
- Project Management including attending project meetings as required
- Assessment of the potential benefits and operational value to SGN
- Reporting and analysis as requiredProduce and disseminate learning based on final project report

Project Partners and External Funding

Gas Measurement Instruments Ltd (GMI)

Potential for New Learning

The successful completion of this project will provide all GB Network Licensees with an understanding of the benefits of integrating the remote site monitoring device into their business as usual activities.

The outputs of the project will be detailed in a final project report which will be available to other network licensees by being published on the Smarter Networks Portal.

The GB GDNs will be able to use the learning from this project to replicate the cloud based solution or to understand the potential advantages of implementing cloud based solutions into their IT strategies.

Scale of Project

In order to ensure that learning associated with this project is maximised and that the future application of this technology is well understood, it is necessary to trial this new technology across a number of processes and SGNs geographical area. The trial will take place in network locations in Scotland and Southern England in order to assess the various parameters of interest over different types of network and different geographical areas.

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL7 Inactive Commissioning

Geographical Area

This project will be trialled in network locations in both Scotland and Southern England.

Revenue Allowed for the RIIO Settlement

During RIIO-GD1 it is estimated that SGN will spend approximately £255.7m on maintenance and shrinkage respectively. While no savings are expected during project implementation, it is expected that if successful the project outcomes could provide Network Licensees with an opportunity to reduce resource costs associated with maintenance and shrinkage.

Indicative Total NIA Project Expenditure

The total project expenditure is £516,000, 90% of which is allowable NIA expenditure (£464,400)

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)

A search was carried out to gather data from SGN electronic record over the financial years of 2015/16 in regards to emergency jobs involving more than 3 recheck visits to the same site.

- Over 7000 jobs had more than three revisits to the same site
- Sites can be visited up to ten times with an average duration from when the initial work order was opened until it was closed up to 19 days

Of 73% of the jobs revisited more than three times it is anticipated that the equipment could be used to reduce the number of site rechecks by 50%, significantly reducing the resource requirements.

This could result in a 37% reduction in resource costs.

Please provide a calculation of the expected benefits the Solution

Reducing or removing the need for re-checks is potentially a huge benefit as a result of this project. The evaluation of anticipated benefits will form part of the field trials

Total base number of repeat visits over the year 2015/16: 80,000 visits

Method using equipment to reduce of repeat visits by 50% following the initial three site visits

Estimated resource reduction = 20% reduction

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

The potential outcomes of this project are replicable across GB. Using the 4:2:1:1 ratio and SGN's current numbers of emergency 'rechecks' (80,000) it can be assumed that the new unit could be used for each of these situations. The total resource savings for all GDN's could be 64,000 visits to sites.

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

Excluding the cost of purchasing the equipment, it is anticipated that the cost of disseminating the development outcomes and findings

from the project and training costs incurred before the products can be used would be approximately £10,000 for SGN. Using the 4:2:1:1 split with reference to the size of the networks, It could be assumed that National Grid's training costs would be approximately £20,000, and Wales & West Utilities', and Northern Gas Networks' would be £5,000 each. Therefore, the estimated total cost of training would be £40,000.

This figure includes three training courses for 12 people for each Network Licensee in three separate locations across their network with an allowance for travel included, and approximate costs for one practical demonstration by SGN for representatives from each Network. It is anticipated that each Licensee would have their internal training carried after an initial training program to a selective proportion of their workforce.

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

All Network Licensees will be able to use the learning from this project as the outputs will be presented in a clearly defined report that will be available to them on the Smarter Networks Portal, allowing the Network Licensees to make informed choices as to whether to invest in this technology.

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

☑ 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.

A review of all other Network Licensees Innovation Funding Incentive Annual Reports and NIA portfolios has been performed and no similar projects have been identified

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 project involves designing and developing a probe that will inserted in the ground and is capable of detecting natural gas and transmiting the data to a remote unit.

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

There is significant development work in terms of sensors and transmission of data that is outside of the GDN's field of expertise and therefore needs to be undertaken by a partner.

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

There is significant development work in terms of sensors and transmission of data that is outside of the GDN's field of expertise and therefore needs to be undertaken by a partner. In addition field testing and support form a TSP will be required for this project.

This project has been approved by a senior member of staff

☑ Yes