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NIA Project Registration and PEA Document

Date of Submission

Mar 2014

Project Reference Number

NIA_SGN0021

Project Registration

Project Title

Osprey Pressure Validator

Project Reference Number

NIA_SGN0021

Project Licensee(s)

SGN

Project Start

September 2013

Project Duration

0 years and 8 months

Nominated Project Contact(s)

Ryan Smith, Innovation Delivery Manager

Project Budget

£51,568.00

Summary

The scope of this project is to work in partnership with Abriox (manufacturer) to support the field trial of a wireless, intrinsically safe, battery-powered remote monitoring unit that fits inside bollards, posts and meter boxes and monitors gas pressure up to 100mbar. The aim is also to introduce competition to the supply market for this type of equipment.

Nominated Contact Email Address(es)

sgn.innovation@sgn.co.uk

Problem Being Solved

Scotia Gas Networks (SGN) network analysis models underpin almost every financial decision in relation to asset investment. The accuracy of these models is determined through a rolling cycle of pressure validation and model build and update in SynerGEE. Although pressure measurements are logged extensively across our networks (some manually, some remotely), the various products and processes that have been built up over many years are not particularly coherent or efficient. At present, all the pressure monitoring devices that we utilise within SGN are available from only one existing (monopoly) supplier. Therefore, it was identified that a new approach from a different supplier could be highly beneficial, particularly if that supplier could utilise advances in low power electronics and telecommunications and assist us towards interfacing directly with actual performance on the network.

The current pressure validation process involves moving a group of pressure loggers around our networks every 3-5 years in order to validate network sections. This process takes one operative 20 to 30 minutes per site (excluding travelling) to install the logger. Whilst they are in place, loggers are manually downloaded in order to extract pressure data onto a laptop. The current loggers used have to be calibrated every year and require battery changes every four years at a cost of £120.00 each.

Under this current process, huge amounts of data are collected but only a tiny fraction of it is actually used, since pressure is monitored continuously but typically only the validation date/time identified from peak "send-out" is used in modelling. This date/time is not known until the end of the winter. In addition, there are lots of manual processes (hand-offs) and problems in the process, including:

- Large amount of time spent putting out and collecting data loggers – this has to be done in the winter, typically GDNs' busiest time of year and therefore when labour resources are most constrained.
- Manual downloading of loggers while they are in the field – again, huge time demand on the technicians.
- Sometimes the same logger is used to cover more than one location so paper records need to be used to split the downloaded data.
- Checking that the data has been collected from the right location,
- Node naming issues.
- Loggers lose battery power and all the data is lost.
- Time correction (including BST/GMT errors).

Pressure Loggers are also used to carry out emergency poor pressure investigations identified locally by operatives in specific locations on the low pressure network. Due to the restrictions identified above with the manual download of loggers, this can be a time consuming process, with each logger having to be returned to a central depot for data download.

A new design which addresses the problems above would allow processes associated with pressure measurement to be carried out more quickly. Where data is used for poor pressure investigations, a method which made data available immediately for analysis would reduce the time taken to resolve the problem and as a result the impact on the customer.

Method(s)

SGN will compare an innovative wireless remote monitoring unit, Osprey, against the current conventional approach. Field trials will be carried out in two locations (one in Scotland and one in South England) with 25 Osprey units fitted in each location over the winter period. The units will be trialled in each type of intended housing including bollards, posts, and meter boxes to ensure they can be used in a number of different applications. The time spent distributing and collecting loggers will be measured and effectiveness of the results displayed via the pressure management website will be evaluated.

Not only will this solution have an impact on the pressure management systems, it will also affect the maintenance activities within SGN and the amount of shrinkage (amount of lost gas through leaks) experienced due to better pressure management of the network. Field trials will allow assessment of these benefits.

If this field trial proves to be a success, utilisation of this technology could prove to be an efficient way for licensees to improve the accuracy of their network modeling systems and manage their pressures more effectively.

Scope

The scope of this project is to work in partnership with Abriox (manufacturer) to support the field trial of a wireless, intrinsically safe, battery-powered remote monitoring unit that fits inside bollards, posts and meter boxes and monitors gas pressure up to 100mbar. The aim is also to introduce competition to the supply market for this type of equipment.

Objective(s)

The objectives of this project are to:

- Allow SGN to transmit data automatically or on-demand to a pressure management website which will display, interpret and archive the results.
- Allow real time analysis to take place and for the data to be exported into network validation software automatically for planning and emergency response to poor pressure problems.
- Evaluate and report on the costs and benefits of the system trialled

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

In order to determine whether this project has been successful or not it will be trialled and tested across our regional networks for a period of 4 months during the winter months alongside the current validation loggers used. The key success criteria will be:

- Trial of a new piece of technology which utilises Global System for Mobile Communication (GSM) technology
- Record and display pressure data in 'real time' using specialist software
- Field trial data clarifying the effectiveness of the equipment
- A reduction in the time taken to install a pressure validation measurement point

- Production of a technical report detailing the project outcomes

Project Partners and External Funding

n/a

Potential for New Learning

n/a

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 over the winter period November 2013 to February 2014. The trial will take place in network locations in Scotland and South England in order to assess the various parameters of interest over different types of network and different geographical areas.

Technology Readiness at Start

TRL7 Inactive Commissioning

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

This project will be trialed in network locations in both Scotland and South England.

Revenue Allowed for the RIIO Settlement

During RIIO-GD1 it is estimated that SGN will spend approximately £192.3m and £138.8m 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 costs associated with maintenance and shrinkage.

Indicative Total NIA Project Expenditure

The total project expenditure will be £51,568, 90% of which is allowable NIA expenditure (£46,411).

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)

The introduction of this newly developed technology has the potential to deliver large financial savings against the original method if successful outputs are achieved, since it is expected to reduce the need for site visits to maintain and download data from the loggers.

Furthermore, on average across SGN we deal with approximately 44,762 escapes per year. With a more accurate recording system and data stream, there is the potential for financial savings to be made through more effective pressure management control. As part of this project the reduction in volume of gas leaked from the network will look to be quantified in financial terms.

Please provide a calculation of the expected benefits the Solution

Base case costs:

The average costs for one pressure point for a single winter validation

Maintenance and calibration of the equipment = £40.00

Installation and removal of one logger = £80.00

Download and data integrity checks = £20.00

Total expenditure with current method for one unit = £140.00

Method costs:

Using the new Osprey units, it is anticipated that the equivalent cost for one point for a single winter validation will be £88. This is because maintenance cost will be reduced by 90%, and the download and integrity checks will not be required due to the improved method of reporting the data and the system in place to record it. It is also likely that the installation cost will be reduced over time once the Global Positioning System (GPS) mapping is fully operational.

The estimated net financial benefit per unit install is therefore: £140 - £88 = £52

Historically SGN on average install 2,000 loggers on the low pressure network across all three networks each year. This calculates an estimated saving of £104,000 per year.

Based on commercially confidential discussions with suppliers, we have assumed the Osprey units to be comparable in price to existing loggers. Actual savings will depend on final unit price and ongoing maintenance requirements, which will be quantified more accurately through this project, as field trials will clarify both the technical and financial benefits of the Osprey pressure validator.

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

All Network Licensees have to validate their networks, making this type of technology integral to the maintenance, development and operation of the low pressure distribution networks. Depending on the quantity of points required for each network, it is anticipated this technology and the learning from the project could be applied to all other Network Licensees. It could be assumed National Grid have approximately 4,000 sites and Wales & West Utilities and Northern Gas Networks have around 1,000 each, giving an estimated total of around 8,000 sites across Great Britain (GB) were this technology could be applied. This figure is estimated based on a 4:2:1:1 split, reflective of the size of the networks and it is assumed that the GB networks are typical of SGN's.

It must be noted that these figures are based on averages and estimates rather than real network data and the project outcomes may show that applicability of the Method varies from site to site. The main focus of this project is to test the technology and understand the potential benefits.

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

Until the product is developed fully, it is difficult to determine an accurate price for the roll out of the equipment. Further development through this project will enable assessment of the cost of the equipment and costs associated with its deployment.

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 results from the field trial and comparisons that are made against existing methods will be shared with the other Network Licensees by the production of a technical report, demonstration of the management system and practical demonstration if required. If proven to be a success this will allow Network Licensees to introduce this technology into their networks and enable them to begin remotely monitoring the pressures across their networks and extracting the data if and when they require it.

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.

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