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 2014

Project Reference Number

NIA_SGN0064

Project Registration

Project Title

Advanced Gas Detection

Project Reference Number

NIA_SGN0064

Project Licensee(s)

SGN

Project Start

January 2015

Project Duration

2 years and 3 months

Nominated Project Contact(s)

Hector Salgado, Innovation Project Manager

Project Budget

£1,053,228.00

Summary

The Project will be broken down into the following sub-sections:

- GS700 Expansion – this will involve tasks such as; natural gas identification, bump testing, Bluetooth communication and trials/evaluation.
- Compliance management package (cloud IMS) – customised reports, guided decision making, trend analysis and security.
- Mobile application and development of associated software
- Analysis of calibration options
- Impact of the new technology on the site investigation procedures
- Manage off site field trials and testing, quantifying and controlling risks identified

Nominated Contact Email Address(es)

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Problem Being Solved

SGN currently use three primary types of gas detection equipment across its three networks, Gascoseekers, Gastech's and Gas surveyors. The units are predominately used by First Call Operatives (FCO's) when attending a reported gas escape, and subsequently the engineering teams throughout the repair process. The unit's involvement in the detection process is critical in providing pinpoint readings of the levels of methane present; allowing the operative to identify the source of the leak and determine the risk score and category of the escape. The result of the investigation is manually recorded by the operative on to a Leakage Investigation Sheet (LIS), which allows continuous site monitoring.

There currently is no equipment in use by Gas Distribution Networks (GDNs) that will reliably do **all** of the following:

- Determine the presence of carbon monoxide (CO) and methane,
- Establish the level of mercapton (odorant)
- Establish whether a report is from natural gas or from another source and
- Record it electronically.

Currently, when GDNs receive a report of gas it must be investigated and recorded. These reports are then sent off for analysis if they are not thought to be natural gas. This analysis can take up to a week to be returned. This project will result in a unit that can detect these gases, differentiate natural gas from other sources; and record the data electronically using GPS.

Instances commonly occur where no evidence of a leak can be found, known as a 'No Trace'. Across SGN's networks approximately 48,000 no trace surveys were conducted between September 2013 and September 2014, at a cost of approximately £739,000. To ensure no readings have been detected as a result of equipment failure, another full site survey must be carried out with a different detection device; if the result of the survey is the same the job can be closed. To facilitate the recheck; operatives either carry multiple devices or a second visit is made the following day.

For sites that are programmed for future works, the hard copy of the LIS has to be handed over to the next operative attending site to allow him/her to narrow the site search criteria in accordance with industry standards, reducing the time it takes to complete the site survey by 40%. If the detail on the previous site survey isn't physically handed over, a full site survey must be conducted again. Currently each LIS completed throughout the life of a leak must be stored for three years.

It will be possible to functionally check the new equipment on-site, avoiding the need to do a full site survey again. Work orders will be electronically recorded and transferred to operatives on-site, avoiding the need to hand over hard copies and avoid the administrative aspects needed to manage the data.

Method(s)

In order to address this project, SGN will work with GMI to develop gas detection equipment which will build on instruments that are already being used by GDNs throughout GB.

The project will develop a new method of managing site investigation data. Currently hardcopies of LIS worksheet pads are collected from the operatives once completed and stored for three years in each depot. The GS700 unit will have the ability to record the data electronically, using a web based application. This has the potential to allow full site work history to be available anywhere across the business, providing a rigid audit trail, whilst removing the need for a resource to manually manage the hardcopies of LIS. This will also facilitate live inventory reports based on the operation of each unit, the calibration history and compliance with safe operating procedures. The unit will also have the ability to detect levels of Carbon Monoxide and mercapton and will determine when false readings are detected on site. Currently this requires sample to be taken and sent for analysis.

Scope

The Project will be broken down into the following sub-sections:

- GS700 Expansion – this will involve tasks such as; natural gas identification, bump testing, Bluetooth communication and trials/evaluation.
- Compliance management package (cloud IMS) – customised reports, guided decision making, trend analysis and security.
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The project duration was required to be extended following the initial series of field trials. It was identified during the first stage of field trials that the GPS functionality of the device required further work and would value additional operational data to be gathered. As a result, further field trials are being undertaken. This will ensure a greater set of results is captured from the field and reported to the project team for evaluation. The extension to the project end date does not impact on the project budget or the benefits identified at the start of this project.

Objective(s)

The objectives of the project are to produce a portable gas detection device to detect methane and CO gases, and determine if readings detected on site are from a natural gas leak. Development of digital capture of site investigation data and inventory

management will also be developed as part of the project.

Summary of Work Required

1. Develop a working prototype of the gas detection device to meet relevant industry standards and specifications.
2. Develop work procedures for using the product
3. Trial the solution across SGN's regional networks
4. 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:

- Carry out design and development of a conceptual gas detection device
- Complete the manufacture of 20 prototypes of the solution to meet the relevant industry and SGN standards and specifications.
- Development of in-vehicle calibration devices
- Development of an associated training package for field trial
- Undertake field trials across SGNs regional networks
- Produce operator guidelines detailing the correct operating procedure of the equipment
- Produce and disseminate learning based on final project report

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 across a number of processes and SGNs geographical area. 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

TRL3 Proof of Concept

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

This project will be trialled 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 £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 costs associated with maintenance and shrinkage.

Indicative Total NIA Project Expenditure

The total project expenditure is £1,053,228.00, 90% of which is allowable NIA expenditure (£947,905.20).

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 the successful delivery of this project will result in a saving of £295,600.00 in the first year. The financial benefit will be realised because operatives will only have to attend the site once to gain reliable data pertaining to the leak. The resources involved in sending operatives back to the site of a reported leak will be utilised far more efficiently as a direct result of decreased 'no trace re-check's'. In fact 're-checks' could become obsolete; providing an on-going saving to GDNs.

Please provide a calculation of the expected benefits the Solution

Reducing or removing the need for no trace 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. The base cost is £739,000.00 and the method cost is £443,400.00 resulting in a 40% saving of £295,600.00 as a result of operatives spending less time on site.

Base case cost: current cost of attending a reported gas escape (p/a) = £739,000

Method cost: anticipated cost of new method (p/a) = £443,400

Estimated financial benefit = Base case cost – Method cost = £295,600

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 SGNs current numbers of 'no trace re-checks' (48,000) it can be assumed that the new unit could be used for each of these situations. The total savings for all GDNs would be £1,182,400.00.

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 product can be used would be approximately £20,000 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 £40,000, and Wales & West Utilities', and Northern Gas Networks' would be £10,000 each. Therefore, the estimated total cost of training before the equipment can be used operationally would be £80,000.

This figure includes six 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 of the equipment by SGN for representatives from each Network. It is anticipated that each Licensee would have their internal training carried after an initial training program from the product manufacture 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

The learning will be used to develop a unit that can determine the levels of CO and methane, determine if the source is natural gas or not and record the outcome electronically. If successful, this will enable GDNs to deploy technicians with reduced risk, increased efficiency and will provide more reliable data with the beneficial inclusion of GPS.

Once verified, this unit will be available for use by all GDNs to improve response to gas leaks.

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