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

Jul 2015

Project Reference Number

NIA_SGN0079

Project Registration

Project Title

Automated Pressure Tester

Project Reference Number

NIA_SGN0079

Project Licensee(s)

SGN

Project Start

September 2015

Project Duration

3 years and 0 months

Nominated Project Contact(s)

Hector Salgado, Innovation Project Manager

Project Budget

£519,333.00

Summary

This project proposes to develop an automated pressure tester. This proposed device aims to help ensure the accuracy and consistency of the testing and data recording process while removing the potential for human error and providing the opportunity to automatically update our asset records via a suitable cloud based service.

The project incorporates the development of two new devices (a larger one for mains and a smaller unit for services and risers) that will be designed to suit the needs of the GB Gas Distribution Network. The development and adoption of these devices has the potential to advance the way pressure testing is performed and managed.

Nominated Contact Email Address(es)

sgn.innovation@sgn.co.uk

Problem Being Solved

Pressure testing of assets prior to commissioning after installation, repair, or maintenance is a daily requirement throughout all GB GDN's operational activities. These essential tests assist in proving the assets are fit for purpose and safe. SGN currently employs over 1600 digital pressure gauges throughout its Scotland and Southern networks that support this activity. During annual calibration and testing it is found that 5% of these gauges fail and require replacement each year, due to the aging population of these gauges the failure rate can be expected to increase in future years, resulting in an increase in replacement costs.

The health and Safety Executive (HSE) have challenged the GB GDN's to demonstrate compliance surrounding the recording of pressure testing during these activities. SGN have sought to address these concerns by implementing a comprehensive data capture and audit process. Nevertheless, following a human factors review, it was determined that the automation of this activity could enhance this process.

Method(s)

The project seeks to develop an automated pressure tester for use in the GB Gas Distribution Network to be used on mains, services and risers with functionality to suit the needs of the GB GDN's, a key one of which is the ability to adopt appropriate software solutions via the devices proposed ability to upload test data wirelessly to cloud technology.

This project has been divided into six key phases, listed below:

1. Develop Specification and Form Factor
2. Electrical Design Development
3. Mechanical Design Development
4. Software and Wireless Communication Development
5. Off and on site testing
6. Project Reporting

Scope

This project proposes to develop an automated pressure tester. This proposed device aims to help ensure the accuracy and consistency of the testing and data recording process while removing the potential for human error and providing the opportunity to automatically update our asset records via a suitable cloud based service.

The project incorporates the development of two new devices (a larger one for mains and a smaller unit for services and risers) that will be designed to suit the needs of the GB Gas Distribution Network. The development and adoption of these devices has the potential to advance the way pressure testing is performed and managed.

Since the project was initially registered, SGN has been in protracted contract negotiations with the project partner, ULC. This was due to both a change in Project Manager and extensive discussions around the intellectual property clauses in the legal contract proposed between SGN and ULC. Furthermore, SGN have been mandated by the Health & Safety Executive to make improvements to its pressure testing process, and it was important that these were incorporated into the project. The extension to the project end date does not impact on the project value, which remains as originally stated.

Objective(s)

The objective of the project is to develop and extend the functionality of an existing Automated Integrity Test Device currently used in the US to suit the needs of the GB gas distribution networks (GDN's). Enabling this equipment to be made available for implementation into business as usual within the GB GDN's will assist in assuring data quality and safety assurance when carrying out pressure testing of assets on the GB distribution network. The project also allows the potential to reduce costs in relation to carrying out the activity of pressure testing of assets prior to commissioning.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The success criteria for the project are:

- Determined device specification requirements.
- Creation of conceptual designs.
- Production of full prototype design.
- Completed software development and wireless communication.
- Manufacture of prototype(s)
- Completed offsite testing against predetermined parameters
- Completed field trials.
- Completed final project report.

Project Partners and External Funding

None

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 automated pressure tester 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 on by being published on the Smarter networks Portal.

The GB GDN's 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

The proposed project structure has been determined to ensure that the necessary level of learning can be gained to properly assess the developed Automate Pressure Tester's suitability for integration into the GB gas distribution network as business as usual.

A number of offsite tests will be carried out as determined by the initial stages of the project before on site field trials are carried out. The minimum number of field trials to ensure adequate data can be gathered to aid product assessment and approval will be determined

Technology Readiness at Start

TRL4 Bench Scale Research

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

The project will take place with SGN's operational footprint.

Revenue Allowed for the RIIO Settlement

As pressure testing of mains, services and risers is carried out throughout SGN's operational activities there is no specific allowed expenditure detailed within RIIO-GD1 for undertaking this work.

Indicative Total NIA Project Expenditure

The total project expenditure is £519,333, 90% of which is allowable NIA expenditure (£467,400)

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)

The key benefit of progressing with this project is the intangible outcome of improved process and safety as well as an improvement in asset management accuracy and reductions in operative costs.

In order to accurately determine the financial benefit and payback period of implementing this technology into 'business as usual' an implementation methodology in terms of initial bulk purchase (if any) and unit costs, including annual test costs, must be known. Following successful completion of this project an implementation paper will be written which will make recommendations with regards to the various roll out options.

Please provide a calculation of the expected benefits the Solution

The approximate average cost of purchasing a new Druck gauge is £500 for the smaller models and approximately £3,500 for the larger units and the approximate average cost of carrying out the required annual tests is £50. In 2013/14, approximately 5% of gauges failed their annual test and were therefore replaced with new purchases. This means that the current annual cost of maintaining a working population of approximately 1600 Druck gauges is estimated to be in excess of £116,000 per year, this figure can reasonably be assumed to increase year on year due to the aging population of the gauges resulting in an increase in the failure rate.

Based on a reasonable target reduction of this annual cost of 10%, an annual saving of £11,600 can be potentially achieved. This is a conservative estimate and does not take account of the expected increase in replacement costs due to the aging population or the other costs savings that will be generated in terms of the labour savings that the automated device will generate.

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

The potential outcomes of this project are replicable across GB. All the network licensees will be able to utilise the automated pressure tester throughout their operational activities.

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, this will allow 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

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