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

May 2015

Project Reference Number

NIA_WWU_021

Project Registration

Project Title

SMART Pressure Sensor device

Project Reference Number

NIA_WWU_021

Project Licensee(s)

Wales & West Utilities

Project Start

May 2015

Project Duration

2 years and 1 month

Nominated Project Contact(s)

Martyn Pallant (Innovation Manager)

Project Budget

£258,416.00

Summary

The project is split into 4 main phases.

Phase 1: Develop requirements portfolio, undertake a review of market suppliers from across the world and analysis the suitability of the component in line with the project goal.

Phase 2: Design and procure component elements, machine , assemble and test 10 X prototype devices, end to end mating of hardware and software, bench testing and calibration. Review outputs from bench testing and rework if required.

Phase 3a: Identify a supporting partner to design an IOS/Android application to communicate with the proposed plus other devices that has since entered the market.

Phase 3b: Delivery of prototype for field trials, undertake field trials, review field trial results, amend where required/design revisions, re run bench testing and field trials, check performance and design is suitable for working environment and complete phase with detailed trial report.

Phase 3c: Consider other prototypes / devices that have entered the market since the commencement of the project and test alongside main project device.

Phase 4: Tooling development for final field device to be created, mouldings for device housing to be built and approval to applicable safety standards sought. End to end calibration of final field device, final device production run, further & final field testing and acceptance testing.

Each phase is dependent on the success of the previous phase.

Nominated Contact Email Address(es)

innovation@wwutilities.co.uk

Problem Being Solved

Given the very nature of the gas industry, the safety challenge for the business is significant and constantly under scrutiny. However, Wales & West Utilities (WWU) has, since the initial launch of the business, built and developed a first class reputation within the utilities industry. With a deployed workforce of more than 2,000 people, a multi-million pound replacement programme and the company's core role of managing the safe and secure delivery of gas – we continue our strong safety focus by having a comprehensive management system in place, designed and certified to standards including ISO 14001.

Once a new service supply has been fitted to a property, procedure states a pressure test must

be carried out to confirm a gas tight seal exists prior to commissioning or re-commissioning. Currently Wales & West Utilities and other UK Gas Distribution Networks use water gauges to test the pressure of domestic installations, non-domestic installations, services and mains to ensure the installation is sound and there is no loss of gas (leakage) within the installation.

The accuracy of the pressure test reading using the water gauges is dependent on the individual reading the position of the water level as this is a manual process. In order to provide an enhanced and demonstrable level of testing a new innovative method is needed to overcome and reduce any risk of inaccuracies and overcome the difficulties of demonstrating historical readings through our back office systems. The traceability and auditability of these records will not only ensure compliance but allow for any discrepancies to be highlighted at the earliest opportunity; thereby ensuring and improving the safety and reliability of the network.

Method(s)

By requiring that all service pressure tests, complete with the date, time, location and details of the tester, are logged automatically and recorded directly into the asset repository, WWU is able to evidence their compliance with the testing and commissioning requirements to a level that has not previously been possible. This project will develop a pressure sensing device that will allow a test pressure at any service installation to be recorded and transmitted to a receiving device (almost certainly a Smart device such as an iPhone or Samsung Galaxy S (but not exclusively).

The data to be transmitted will include pressure and GPS location details with time and date stamp.

The technical solution must operate using Natural Gas and Nitrogen and meet the following requirements

- The device must be able to test pressures of 0 – 350 mbar and display measurements in mbar.
- The device must be able to export data collected during a pressure test.
- Consideration should be given to whole life cost, life expectancy and the calibration requirements of the device.
- The device should be of a robust build to ensure any accidental damage does not affect the integrity of the device or its use.
- The device should be water repellent.
- Expected accuracy to be 1 mbar or less.
- The unit must be lightweight, portable and battery powered.
- The unit must be able to date stamp and record the location of the pressure test

Scope

The project is split into 4 main phases.

Phase 1: Develop requirements portfolio, undertake a review of market suppliers from across the world and analysis the suitability of the component in line with the project goal.

Phase 2: Design and procure component elements, machine , assemble and test 10 X prototype devices, end to end mating of hardware and software, bench testing and calibration. Review outputs from bench testing and rework if required.

Phase 3a: Identify a supporting partner to design an IOS/Android application to communicate with the proposed plus other devices that has since entered the market

Phase 3b: Delivery of prototype for field trials, undertake field trials, review field trial results, amend where required/design revisions, re run bench testing and field trials, check performance and design is suitable for working environment and complete phase with

detailed trial report.

Phase 3c: Consider other prototypes / devices that have entered the market since the commencement of the project and test alongside main project device.

Phase 4: Tooling development for final field device to be created, mouldings for device housing to be built and approval to applicable safety standards sought. End to end calibration of final field device, final device production run, further & final field testing and acceptance testing.

Each phase is dependent on the success of the previous phase.

Objective(s)

To evaluate, produce and test a smart pressure sensing device that will allow accurate measurement of test and installation pressures across the Wales & West Utilities distribution network and provide a digital record for storage within the back office records system as evidence that a pressure test has been undertaken.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Develop a fully functional pressure sensing device that will provide a digital record for storage within the back office records system as evidence that a pressure test has been undertaken, where, when and its success result.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

We will develop 10 prototype models that will be trialled across the WWU network area by First Call Operatives following the initial design and development stages. The scale of the field trial will allow an extended test to prove the concepts and the use of the hardware technology, e.g. reliability of transducers; battery life; drift; operating procedure development; training needs.

This project will also develop the ‘app’ for the smart device.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

Wales & South West of England

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

External project cost - £193,812

Maximum Internal cost – £64,604

Total Eligible cost - £258,416

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 clear estimate of the saving is difficult to predict in advance of the project start date however the field trial testing included within the project programme will provide the platform to quantify an estimate of the saving if we successfully develop this innovative pressure test device that will provide a visibility of information in a shorter timeframe not previously achieved.

The findings will be summarized within the project report.

Please provide a calculation of the expected benefits the Solution

WWU undertake approximately 300,000 pressure tests per year on both mains and services in the course of daily activities.

Whilst the time it takes to undertake a pressure test will remain at 3 minutes, it is anticipated that this tool and the method of information transfer, will provide an enhanced and demonstrable level of testing with a digital record being kept as evidence for these vast numbers.

The value of the expected financial benefit will be obtained within Phase 3 of this project.

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

The current method of gas tightness testing are common to all licencees throughout GB. This project has been designed to review the market & develop a potential solution.

It will provide all Network Licensees with information and a means of completing an alternative way of way of pressure testing any service installation and recording and transmitting the data from a range of smart phone technologies.

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

We envisage that the roll out costs will include equipment purchase, training and ongoing maintenance of the equipment.

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 networks will have a requirement within their broad scope of regular work activities to conduct gas tightness testing in the most efficient method which ensures safety of our customers, employees and offers them the best value for money. The learning generated and successful implementation of tooling could be used by all networks within their daily activities.

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

We continually look for ways to improve standards for our customers and colleagues to fulfill our commitment to deliver excellent safety standards

☑ 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