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

Oct 2015

Project Reference Number

NIA_SGN0053

Project Registration

Project Title

Wireless Instrumentation Field Trial

Project Reference Number

NIA_SGN0053

Project Licensee(s)

SGN

Project Start

October 2015

Project Duration

1 year and 1 month

Nominated Project Contact(s)

Keith Ellison, Innovation Project Manager

Project Budget

£96,336.00

Summary

The scope of the project is to determine that wireless instrumentation can be used to monitor pressure at a number of selected points on a pressure regulating station (PRS).

Nominated Contact Email Address(es)

sgn.innovation@sgn.co.uk

Problem Being Solved

SGN have estimated that 320 operational sites at strategic points on the intermediate pressure (IP) and high pressure (HP) gas transmission networks have remote telemetry instrumentation. This provides and facilitates the essential monitoring and control of pressure regulation stations, flow metering and gas quality.

Site information control commands are communicated via a network of radio, satellite and landline data links to the SGN gas control centre, this allows the gas networks to be continuously monitored and controlled. These sites have a range of equipment installed to measure essential operational parameters including pressure, flow, temperature, security and plant status. Historically these instrumentation systems are hardwired using standard cabling systems. Connections are between a telemetry room and the individual instruments located at various locations around the site. The equipment can be located within hazardous areas and this requires a ranges of specialist equipment to be designed to ensure safe operations, and to ensure compliance with the ATEX (explosive atmospheres) requirements for intrinsically safe equipment which is certified to be used in these locations. By utilising wireless instrumentation the need for extensive cable installs and ducting can be removed, improving both installation time and therefore reducing cost.

Method(s)

The method is for SGN to work with Instromec Ltd to design, produce and test wireless instrumentation technology supplied by Emerson Process Management to monitor a remote gas control station. The proposed design will be tested in a live working

environment at SGN's Chelsfield Pressure Regulator Station (PRS) in parallel with existing operational instrumentation.

An additional dedicated telemetry outstation will be installed to link the Gas Control Centre within the system test area to allow data to be collated and compared. By running the systems in tandem, this will minimise the impact and operational risk on the original instrumentation monitoring systems.

Scope

The scope of the project is to determine that wireless instrumentation can be used to monitor pressure at a number of selected points on a pressure regulating station (PRS).

Objective(s)

The objectives of the project are to:

- Assess the reliability of wireless instrumentation
- Assess the resilience and security of wireless communications by ensuring the transmitted information cannot be accessed by any third party.
- Confirm it is possible that the interfacing software is capable to be integrated into SGN's existing telemetry systems
- Compare the wireless system against the existing site instrumentation
- Understand the benefits of wireless technology whilst gaining operational experience
- Establish the impact on SGN policies and procedures

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The success criteria for the project are:

- To prove whether the site will see a reduction in the number of cabling systems cable ducts, pits cable trays and the civil engineering requirements, reducing the cost of installation.
- Assess whether ELD (electrical line drawings) documentation will be reduced as long runs of cabling will not have to be input in the design drawings.
- To evaluate the reduction of installation commissioning time and site maintenance inspection activities.
- Determine if there is a reduction in the power requirements for the instrumentation equipment and the impact on its battery life.

Project Partners and External Funding

None

Potential for New Learning

Network Licensees will better understand the benefits of wireless instrumentation and the intention is to provide a site design that is transferable to other existing sites. The project will demonstrate the benefits of utilizing this type of monitoring equipment, allowing the Licensees to gain better understanding of the risks associated with the current methods. The project will provide the learning associated with using wireless instrumentation compared to the traditional methods of installing a 'hard wired' system.

Scale of Project

This project will assess the suitability of using wireless instrumentation to monitor flow, pressure, temperature and system alarms in comparison with current methods (installing a hard wired system). The project will focus on the design and development of a solution that will move onto one field trial on a site in the southern part of SGN's network. By proving that the technology can be integrated into the gas network and that its performance against existing communication system is robust, it can be then applied across all other sites. There is no benefit to trialling this on more than one site as the technology can be transferred once the project has been completed.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

The field trial will be held at the Chelsfield PRS which is in the southern area of SGN's network. The site has been strategically selected for its purpose and will provide additional benefits to the trial.

Revenue Allowed for the RIIO Settlement

While no savings on this expenditure are expected during project implementation, there is potential for this technology to result in considerable future savings during RIIO-GD1 in the capital and operational costs associated with wireless communication technology.

Indicative Total NIA Project Expenditure

The total project expenditure is £163,010. 90% of this is Allowable NIA expenditure (£146,709)

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 development of this technology has the potential to deliver substantial financial benefits. The present system requires hard wired instrumentation for the communication into SGN's network and the gas control SCADA (supervisory control and daily acquisition) system. This is estimated to cost around £30,000 per PRS. This is mainly due to the cabling and ducting that is required.

This project aims to develop a solution which will reduce these requirements and therefore the costs. It is difficult to accurately quantify the financial benefit at this early stage. The low TRL shows that the method is at an early stage of development.

Please provide a calculation of the expected benefits the Solution

Base costs: £38,000 per site – fitting and commissioning of existing technology using present day equipment and cabling, to enable monitoring of the network.

Method costs: £9,000 per site – the potential full replacement solution including fitting and commissioning, with the additional saving in maintenance cost as there will be no requirement to check any cables for integrity and performance.

The expected benefit per site is £29,000, which has been calculated on the base costs minus the method.

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

There are approximately 320 high pressure regulator sites in SGNs license area which utilise hard wired communication lines to transmit alarms and monitoring functions to allow a continuous update of flow calculations. Of these, it is estimated that 20% of the sites would be applicable during the existing RIIO period. Working on the savings detailed above, this works out as an overall potential saving of c.£1.85m.

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

It is expected that a reduction in the cost of monitor instrumentation will be dependent on the success of the trial project, however making the assumption that we will require training will be completed across all the networks.

As the number of sites installs and maintenance inspections required in the GB network is unknown, it is difficult to determine the exact roll out costs. It is anticipated that the cost of disseminating the learning outcomes and findings from the Project would be approximately £65,000 for SGN (including training costs). Based on the 4:2:1:1 split of the networks (applied with reference to the size

of each network), it is estimated that the total cost of training before the equipment can be used operationally throughout GB would be £260,000.

This estimate is based on an assumption of training courses and operatives per Network Licensee, provided by the project partner or their training provider and is subject to change. SGN will continue to share project progress throughout the duration of the Project with the other Network Licensees.

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 generated from this project. It will be presented in a final report that will focus on demonstrating the suitability of the technology to provide a reliable communication system. The conclusions and recommendations could be used to determine whether this technology will reduce the installation costs of pressure regulator monitoring and control systems.

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.

This is the first time that Emmerson have installed this wireless technology on any gas network. The technology has been used in a limited number manufacturing business and has proven successful. No duplication will occur as a result of this project.

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