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 2014

Project Reference Number

NIA_NGGD0032

Project Registration

Project Title

Intelligent CO Monitors

Project Reference Number

NIA_NGGD0032

Project Licensee(s)

Cadent

Project Start

July 2014

Project Duration

3 years and 0 months

Nominated Project Contact(s)

National Grid Gas Distribution (NGG) – Lead GDN - Project Manager Sharon Harrison Northern Gas Networks (NGN) NGN – Tom Bell Wales and West Utilities (WWU) WWU – Lucy Mason

Project Budget

£351,210.00

Summary

The scope of this Project is a trial deployment of the Smart Compliance Ltd sensors in up to 600 social housing properties in a range of social housing environments and in other appropriate accommodation providers such as student accommodation where there are CO risks. It will monitor their use and report CO alerts and, failures, potential battery faults, objectively assess sensor health, user behaviour and acceptance, and benefits to Network Licensees in terms of reduced unnecessary FCO callouts.

The first stage is to identify and install the monitors and as such stakeholder engagement will be the first activity undertaken with a view to engaging with different partners to ensure a wide ranging demographic of properties in a varied geographical area. The trial will take place in three Network Licensee zones, with a different property demographics and householder types (i.e. Social Housing, Student Accommodation and the Vulnerable) and one zone that could trial a direct link between the detectors and the 0800 111 999 call centre.

Having three zones with three different themes is intended to maximise learning across different scenarios. The timing of the trials in each zone will be staggered to enable learning from project implementation in one zone to be applied in the project implementation of subsequent zones. The monitoring period for the detectors in each zone will be approximately 6 months. Information from all detectors is logged on a secure cloud based server to enable the performance of the system to be recorded and analysed. The project is then concluded with a 360 degree feedback report outlining all of the findings & lessons learned.

The GDNs will be funding the purchase of the monitors, Smart Compliance Ltd will be manufacturing, installing and monitoring the systems. The GDN will play a role in the identification of suitable social housing providers and in the collection of data from the systems. Smart Compliance will be drafting the final report which will require input from both the GDNs and the landlords/housing stock owners. Landlords and housing stock owners are keen to be part of the project from a duty of care point of view, as it allows them to intelligently monitor co levels in their housing stock thus ensuring that their tenants are not being affected by CO.

Nominated Contact Email Address(es)

Innovation@cadentgas.com

Problem Being Solved

The problems to be addressed are:

- The high number of false First Call Operatives (FCO) callouts relating to CO Monitor alerts
- The quality of the engagement with Customers (and the speed of an FCO callout response)
- Lack of customer awareness of the dangers of undetected CO exposure. There are approx. 50 people in the UK who die each year due to Carbon Monoxide (CO) poisoning and a further 200 are seriously injured (Source: Office of National Statistics).

Based on a data collection initiative by NGN in quarter 4 of 2011, in part of its license area 31% of First Call Operatives (FCO) CO alert callouts in the study were caused by reasons other than the presence of CO (e.g caused by misinterpretation of battery low warnings or faulty CO alarms). Similar data logged by WWU during 2012 and 2013 indicates that this percentage of false alerts is even higher at almost 48%. Taking the average of these two figures at 40% this equates to an estimated 20,000 unnecessary Network Licensee FCO callouts per annum. These false call outs impose additional costs on Network Licensees, tie up vital resources and incur unnecessary travel which also impacts on CO2 emissions (see section 2b on pages 5&6 for financial benefits). Also important to highlight is the social benefit associated with this project in relation to the prevention of death by CO poisoning.

Additionally, one of the outcomes from a large scale CO monitoring study by Liverpool John Moore University found that significant presence of low-level CO in homes that may not trigger a CO alarm but could still potentially lead to long-term health problems. Because of the simple nature of current devices these levels are below the trigger level for alerts, so occupants are unaware of them and the health risks that they may be subjected to. Raising CO awareness is vital as the threat of CO poisoning is something that the industry takes very seriously. This was raised as a significant issue during the RIIO-ED1 price control discussions and each Network Licensee has addressed this area in their Innovation Strategies.

The above issues are of particular concern to social housing providers, especially for their many vulnerable customers, and other providers such as student accommodation, as they do not have robust ways of ensuring their tenants are safeguarded from the risks of CO exposure, and are unable to assess any link between health issues and cumulative low level exposure to CO.

Current CO monitor devices have operational reliability issues. They are not able to objectively assess the condition of the CO sensor device that they use, which has a finite lifetime which varies depending on the amount of CO it has been exposed to (typically around 5 years). The use of the test button does not test this aspect of the device. As a result of these flaws one of two things occurs, either CO monitors are replaced before the end of their actual useful life, OR they cease to function effectively and as such result in false CO Monitor alerts, and in many cases FCO callouts.

Method(s)

To address the problem set out above, this Projects seeks to test a new design of battery powered CO monitor with GPRS communications and advanced self-monitoring capabilities. It is particularly suited to the social housing environment but would allow almost any environment where CO exposure is a risk to be monitored remotely and intelligently.

The following are features of the system:1)Local alarm sounder (as per current devices), 2) Remote communication using 3G/GPRS, 3) Communication of actual CO levels, alert conditions, battery health and sensor health, including a method for objectively assessing the health of the actual sensor element and its viability, 4) A web based system for authorised third parties (e.g. social housing providers) to monitor alerts, sensor health and battery, 5) Notification of alerts via SMS and a smart phone App to any authorised party such as social housing providers, 6) Potential for directly linking CO alerts messages through to the 0800 111 999 call centre, 7) Removal of necessity to perform local weekly tests of the unit as the remote monitoring automatically does this, 8) Central monitoring of CO exposure levels enabling data for potential future use (with controls and permissions) by health care professionals and academia, 9) 5 year battery life (comparable to best existing products), 10) Comparable hardware costs to existing CO monitors.

Scope

The scope of this Project is a trial deployment of the Smart Compliance Ltd sensors in up to 600 social housing properties in a range of social housing environments and in other appropriate accommodation providers such as student accommodation where there are CO risks. It will monitor their use and report CO alerts and, failures, potential battery faults, objectively assess sensor health, user behaviour and acceptance, and benefits to Network Licensees in terms of reduced unnecessary FCO callouts.

The first stage is to identify and install the monitors and as such stakeholder engagement will be the first activity undertaken with a view to engaging with different partners to ensure a wide ranging demographic of properties in a varied geographical area. The trial will take place in three Network Licensee zones, with a different property demographics and householder types (i.e. Social Housing,

Student Accommodation and the Vulnerable) and one zone that could trial a direct link between the detectors and the 0800 111 999 call centre.

Having three zones with three different themes is intended to maximise learning across different scenarios. The timing of the trials in each zone will be staggered to enable learning from project implementation in one zone to be applied in the project implementation of subsequent zones. The monitoring period for the detectors in each zone will be approximately 6 months. Information from all detectors is logged on a secure cloud based server to enable the performance of the system to be recorded and analysed. The project is then concluded with a 360 degree feedback report outlining all of the findings & lessons learned.

The GDNs will be funding the purchase of the monitors, Smart Compliance Ltd will be manufacturing, installing and monitoring the systems. The GDN will play a role in the identification of suitable social housing providers and in the collection of data from the systems. Smart Compliance will be drafting the final report which will require input from both the GDNs and the landlords/housing stock owners. Landlords and housing stock owners are keen to be part of the project from a duty of care point of view, as it allows them to intelligently monitor co levels in their housing stock thus ensuring that their tenants are not being affected by CO.

Objective(s)

The objectives of the trial will be to:

- Give the Network Licensees confidence that the concept will deliver benefits in terms of reduced FCO callouts (elimination of unnecessary, i.e. false alarm, callouts due to non CO related issues with CO detectors, typically caused by low battery condition or sensor faults)
- Demonstrate to social housing providers that the concept is reliable, operationally efficient, economically viable and an assured way of them ensuring tenants are protected from the risks of CO (particularly the vulnerable)
- Understand behavioural or acceptance issues of the use of the technology
- Demonstrate rapid incident notifications to Network Licensee First Call Operatives (FCOs)

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The success criteria of the project is to identify:

- Social housing providers and trial target homes followed by the successful installation of the monitoring system in 600 properties
- The data collected from the 600 systems and analyse to establish a significant reduction in the number of false callouts for CO related issues
- The number and nature of behavioural and acceptance issues experienced with householders involved in the project
- The operational reliability of the system
- A reduction in response times and Network Licensee staff notification times to any CO incidents
- The commitment of the project hosts, i.e. social housing providers, to continue to use the system at the end of the trial. The quality of the householder experience (from feedback).
- The reduction in CO2 emissions from reduced travel as a result of elimination of false callouts

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

The Project will take place in three different housing provider environments, one in each participating Network Licensee area in total of 600 homes, over a period of 20 months. Analysis of statistics from the aforementioned Liverpool John Moore survey predicts that the number of real CO alerts in a trial of this size and duration would be 12-15 events. The trial needs to be of this size to give a statistically significant volume of data. However, if the system deployed in the project remains installed after the project it will allow data on incident and the response of the system to be built up further. This further monitoring will be undertaken by Smart Compliance Limited in conjunction with the landlords/housing stock owners.

Technology Readiness at Start

TRL7 Inactive Commissioning

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

The project trial will be conducted in all four Network Licensee territories (“Zones”), and as such will achieve a good geographical spread across GB.

Revenue Allowed for the RIIO Settlement

Not applicable as this project is being undertaken to meet the Network Licensees Social Obligations.

Indicative Total NIA Project Expenditure

NGG external expenditure - £163,952, NGG internal expenditure - £54,650.67

NGN external expenditure - £46,949, NGN internal expenditure - £15,648.10

WWU external expenditure - £46,049, WWU internal expenditure - £15,348.13

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)

From data provided earlier it is estimated that approx 40% of FCO CO callouts were effectively "false" (no CO present)

Number of FCO callouts in GB = 50,000 approx/annum.

x 0.40 = 20,000 CO alerts that are unnecessary and would not occur if the proposed Method was used in call cases

- Assuming 30 minutes of FCO time handling the incident + 30 minutes of follow up paperwork, the above equates to 20,000 GDN man-hours/year
- Assuming £50/hour FCO cost, the approx saving to the GB Network Licensees would be £1,000,000/annum
- A key point to note is the reduction in travel that will be achieved as a result of the elimination of false callouts, this will result in savings of CO2 Emissions thus reducing the Networks Licensees Carbon Footprint.

Please provide a calculation of the expected benefits the Solution

Key assumptions:

- There will be 600 CO Monitors deployed as part of this trial.
- Using research from Liverpool John Moores University it is expected that there will be between 12-15 FCO callouts (say average of 13)
- 40% of all FCO's will be effectively "False"
- The assumed cost per hour of an FCO is £50 (this is the total cost including overheads)
- The FCO will spend an hour dealing with the callout

Base cost

18 callouts * 40% false = 5 false call outs @ £50/hour = £250

Method cost

The Method cost = zero, as there would be a 0% possibility of a false alert if the Method detector was in place of the Base CO detector

Therefore the expected financial benefit of the 600 unit trial will be £250. (This equates to £1m of financial benefits per annum if a full roll out is undertaken across the GB)

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

Assuming a UK housing stock of 25m homes, 14m of these have gas central heating boilers and as such all these properties would benefit from this Method although there is no obligation on Network Licensees to roll these out. Raising awareness of CO Monitoring will be key to moving towards all GB housing stock having a monitor.

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

The Network Licensees will not be responsible for purchasing and installing the CO Monitors and as such there will be no direct costs to them of such a roll out. The costs will be borne by social housing providers, other accommodation providers (i.e. student) and home owners, however the vital role that the Network Licensees play in the roll out across GB is through their CO awareness initiatives. The landlords/housing stock owners that have already been identified to be part of the project have indicated that they would be willing to fund the purchase and installation of the monitoring systems and this will form part of their internal 'duty of care' policy. It is intended that the GDNs will continue to undertake data collection initiatives which will monitor the number of CO false call outs.

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

A project report will be compiled detailing a wide variety of aspects of the project. The understanding from this could be used for the following:

- Based on UK averages, Network Licensees have approximately 20% of domestic dwellings that are of social housing stock. The learning and case study that this trial would give could enable them to work with social housing (and other housing) providers in their areas to implement similar systems, so lead to reduced levels of false callouts for FCOs, and leading to more effective CO monitoring with reduced alert response times
- To inform the existing CO awareness activities undertaken by each Network Licensee as defined by their respective business plans, and refine their approach and communication approach, so increasing the awareness of CO risks
- The results may bring opportunities for the Network Licensees to generate new CO research projects with academia, charities or local authorities

Network Licensee’s identified in their innovation strategies that CO monitoring was an issue that need to be addressed.

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

Not applicable

☑ 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