NIA Project Registration and PEA Document

Date of Submission

Feb 2014

Project Reference Number

NIA_SGN0026

Project Registration

Project Title

Customer Self Isolation and Restoration (Stage 2)

Project Reference Number

NIA_SGN0026

Project Licensee(s)

SGN

Project Start

October 2013

Project Duration

0 years and 5 months

Nominated Project Contact(s)

Oliver Machan, Innovation Project Manager

Project Budget

£19,331.00

Summary

The purpose of this Project is to analyse the recommendations provided by the HSE/HSL and modify the model as necessary to ensure that the models can be integrated into the working environment of each of the Network Licensees.

Nominated Contact Email Address(es)

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Problem Being Solved

When a gas supply failure occurs it is necessary to isolate every consumer at the meter before the network can be re-commissioned. This is to prevent unburnt gas from entering buildings.

Currently Network Licensees have to use competent resources to carry out this isolation and to then purge and relight consumers' appliances once the network is re-commissioned. In a large supply failure this becomes a long and protracted process that could result in consumers being without gas for several weeks. This creates a risk of casualties (deaths, hospitalisations) caused by insufficient heating if the weather is cold and the incident protracted.

Studies have been carried out to investigate whether consumers could carry out their own isolation and restoration in a protracted supply failure in order to reduce the duration of the incident. It has been concluded that this approach would be beneficial under certain circumstances, and the HSE, DECC and other stakeholders are broadly supportive of this approach. However, they require comprehensive risk assessments to be carried out as part of the decision making process.

In 2011 work was carried out through the Innovation Funding Incentive to build a model that would provide Network Licensees with 2 graphs; one predicting the number of fatalities caused by gas incidents and the other which predicted the number of fatalities caused by the effects of weather during a gas supply outage. These graphs are used as a Decision Support (Risk Assessment) Tool for determining whether to use competent persons or consumers to isolate and reinstate supplies at the meter during a supply failure

incident.

Following on from this work the Health and Safety Executive (HSE) and Health and Safety Laboratories (HSL) reviewed the models and methodology. Their conclusion was that appropriate modelling techniques were utilised for both graphs. They did however have a number of recommendations regarding improvements to the model and regarding a number of inputs.

As a result, the Network Licensees have made a collective decision to implement these recommendations through an additional project stage i.e. Stage 2.

This project is innovative in that historically only competent resources have been used for this work, and the development of a risk assessment model as a decision support tool provides a mechanism for determining where it is acceptable to use consumers to carry out these tasks whilst minimising the overall health and safety risk.

Method(s)

This Project will address all of the recommendations provided by the HSE/HSL and modify the model as necessary. As part of the proposed programme of work, GL Noble Denton will refine the existing research and development work they previously carried out and look to address the following:

Self Isolation and Restoration Model:

• Extend the model to consider the risk of a fatality occurring during the isolation procedure

• The value chosen for the risk of a fatality from a fall in the home has a significant effect on the predicted number of fatalities. Identify if additional literature can be found and revise estimate if appropriate. Otherwise highlight within the model that the value chosen for this input is a cautious estimate with a large associated uncertainty.

• The error in the methodology used to calculate the risk of fatality in sections 'Instructions C1', 'Instructions C2' and 'Instructions E' should be corrected.

• The output of the self-isolation and restoration model is a graph on which the number of fatalities is plotted as a function of the number of properties where a gas supply failure has occurred. HSL recommends that the graph be modified to show the number of fatalities per 1000 affected properties as a function of the duration of the supply loss.

The following recommendations relate to the sections of the model that consider the likelihood of a gas explosion occurring following reinstatement of the gas supply. The number of fatalities that are predicted to occur as a result of gas explosions is negligible in comparison to the predicted number of fatalities from flashback. Therefore, whilst it is important that the necessary corrections to the model are made, GL Noble Denton will assess whether the implementation of these recommendations will affect the number of fatalities predicted by the model.

In addition, they will:

• Review the values assumed for the probability of a built in hob being left on and the probability of a freestanding hob being left on. If different values are chosen for these inputs, the reasoning for this should be provided.

• Combine the results of four separate calculations to determine the risk of fatality associated with a gas release from a hob, using OR logic, not the simple summation that is currently used in the model.

• Check and make the necessary corrections to a possible error that the HSL has identified with regards to the methodology used to calculate the probability that a gas release will be detected by smell.

• Modify the 'Instructions E' section of the model to include a calculation of the risk of a fatality in the event of an engineer performing the restoration procedure having not shut down all the gas appliances.

The development of a collaborative Project allows all Network Licensees to offer their input to what the GB gas industry requires

Scope

The purpose of this Project is to analyse the recommendations provided by the HSE/HSL and modify the model as necessary to ensure that the models can be integrated into the working environment of each of the Network Licensees.

Objective(s)

The objectives of this Project are to:

• To safeguard life and property during major off gas incidents.

• Establish a safety management system to reduce risk of explosion or exposing vulnerable customer to poorly heated environments with risk of hypothermia.

• Restore customer supplies rapidly and safely.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Through-out the Project there will be frequent meetings held between GL Noble Denton and the Network Licensees to update on project progress. Each stage will have its own deliverables and targets which the Project will measure itself against. If there are any unforeseen issues throughout the Project recovery plans will be adopted to ensure minimal impact on time scales, and avoid additional costs. The Project seeks to deliver:

- Demonstrate the models in the working environment of each Network Licensees.
- Assess the models effectiveness.
- Integration of the model into the business, which has been recognised by the HSE.
- Delivery of a robust safety management procedure that will allow customer self isolation and restoration during major off gas incidents.

Project Partners and External Funding

The Project Partners are listed below. The Project is wholly NIA funded.
GL Noble Denton (no external funding)
SGN (NIA funding £4,833)
NGN (NIA funding £2,416)
NGG (NIA funding £9,666)
WWU (NIA Funding £2,416)

Potential for New Learning

Learning from the Project would include:

- Better understanding for Network Licensees when managing an incident.
- Alternative approaches to managing an incident.
- Greater understanding into the risk of a fatality occurring during the isolation procedure.
- A graph on which the number of fatalities per 1000 affected properties is plotted as a function of the duration of the supply loss.
- Likely cost and time savings during an incident.

Learning will take place as part of the development of the models and process of undertaking the risk assessment. Operational learning will to take place as a result of the demonstrations undertaken during the trial period by all networks. They will then share the learning so that when a live incident does occur due diligence has taken place and systems are in best place to implement.

Scale of Project

The Project has been split into two distinct tasks;

Task 1 - A full review of the models initially produced will be undertaken, along with analysing the recommendations made by the HSE/HSL. GL noble Denton has been selected to complete this Project as the work involves refining some earlier work they carried out. As a result, they will then propose actions to address these recommendations. These actions will be carried out by GL Noble Denton in their office and the results provided to each of the Network Licensees for comment prior to progressing.

Task 2 – Following approval from Network Licensees, the new amendments of the model will be introduced and demonstrated in a working environment. Network Licensees will assess there effectiveness before integrating fully into their business.

Technology Readiness at Start

TRL7 Inactive Commissioning

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

To ensure this project is a success, a collective decision has been made to appoint a lead Network Licensee to work closely with GL Noble Denton throughout the duration of this project. SGN have been appointed into this role and they will work on behalf of the collaborating networks to minimises additional costs and ensure deliverables are achieved. The lead network will also ensure a level

of consistency, which will ensure the models can be integrated efficiently throughout each Network Licensees business. In addition, each network will need to develop a test plan and undertake a test operation and share the learning.

Revenue Allowed for the RIIO Settlement

It is not possible to determine whether revenue savings are likely during RIIO-GD1. This will be entirely dependant on whether or not a significant gas outage incident occurs where self isolation and restoration is suitable for use. It is therefore assumed that if progressed successfully through to development and
implementation then this type of solution will have potential to provide Network Licensees with an outperformance opportunity should these conditions occur.

Indicative Total NIA Project Expenditure

The expected total project cost is £19,331, 90% of which is allowable NIA expenditure (£17,398). This can be broken down for each Network Licensee as follows:

SGN (£4,350)
NGN (£2,174)
NGG (£8,700)
WWU (£2,174)

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)

There will be significant reductions in the duration of a gas outage incident where self isolation and restoration is used. On a large incident it is estimated that the duration could be reduced by approximately 70%.

Please provide a calculation of the expected benefits the Solution

Primarily the main financial returns for supporting this Project would be reducing the duration of a gas outage incident. This would reduce the cost of the incident and minimise its impact on consumers. It is estimated that this approach could reduce the duration of an incident by approximately 70%. This, in turn, would reduce the cost of the consumer isolation and restoration element and the consumer compensation element of the incident by a similar amount.

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

As this project is to be undertaken in collaboration with the other Network Licensees it demonstrates that there is desired need for success and that it is replicable across the whole of GB.

Each Network Licensee will be provided with their own graphical models that allow them to make informed business decisions in the event of an incident. The method would be rolled out and any internal training required to manage the models will be carried out in house with support from GL Noble Denton.

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

This project seeks to demonstrate and integrate new models into each of the Network Licensees businesses. Therefore, it is assumed that the only additional roll out costs associated with this Project will be the internal training costs.

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 as the outcomes will be related to each individual and the models implemented from this Project will be the same. As a result, this will be easily adopted into the GB gas networks.

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 has been performed and no similar Projects have been identified. A similar review of current academic literature and journals from leading UK and international universities has also been performed to avoid any potential overlap with the current Project. The Network Licensees have also engaged with the Project supplier and they have provided clarity that no unnecessary duplication of this Project is currently being undertaken in the UK.

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