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

Sep 2017

Project Reference Number

NIA_NGN_219

Project Registration

Project Title

Alternative gas pinpointing

Project Reference Number

NIA_NGN_219

Project Licensee(s)

Northern Gas Networks

Project Start

September 2017

Project Duration

0 years and 4 months

Nominated Project Contact(s)

Sarah Wilkinson

Project Budget

£33,333.00

Summary

Phase 1

The first phase of work would involve a Requirements and Optioneering study containing:

- Detailed requirement capture
- Optioneering study
- Down selection Workshop
- Cost-benefit analysis

At this stage it is thought that, given the range of possible approaches to the problem, a phased approach would be the best way to resolve the problem. The first part of work would be to complete a requirements study in order to fully capture the boundaries of the design space. Through generating a thorough understanding of the problem a number of concepts will be developed as an output of the Optioneering study. The various concepts will be evaluated individually before utilising a weighted multi-criteria decision analysis (MCDA) tool to select a final solution.

The benefits of a requirements capture before the design phase of the project starts is best described using the Pareto Principle. This recognises that from a design perspective “80% of the important design decisions are made during the first 20% of a project”. Therefore it is crucial to have a thorough understanding of the project and an appreciation of the design space in order to make the correct decisions. The Optioneering study will give an opportunity for the design team to work in collaboration with the end user. This blend of experience and expertise should result in the final chosen concept meeting the agreed requirements.

Should this initial optioneering study prove successful and identify a suitable alternative route subsequent phases would cover:

Phase 2 -Concept Design

Where the chosen design is further developed and proven to a point where it is ready to enter the detailed design phase. This would include:

- High level concept design
- Basic design analysis and calculations
- HAZID

Phase 3 - Detailed Design

The main output being the development of a fully working prototype ready for field trials:

- Production of detailed design documentation including manufacture drawings
- Equipment/material selection and definition
- Detailed modelling and analysis
- HAZOP

The exact nature of phases 2 and 3 are dependent on the output of phase 1 and would require a separate project submission.

Third Party Collaborators

Energy Innovation Centre

Frazer-Nash Consultancy

Nominated Contact Email Address(es)

innovation@northerngas.co.uk

Problem Being Solved

The current technique used by the Gas Distribution Networks for detecting the location of external gas escapes from buried assets is 'Barholing'. The basic principle is to penetrate a small diameter hole into a footpath or carriageway, enabling gas samples to be taken from within the pavement structure. This is achieved using a pile driven pin, which has a barrel handle giving a minimum protection of 22kV for the operator.

Operatives carry out a number of 'barholes' in the general vicinity, minimum 15m radius of reported smell, of the gas escape before subsequent gas samples are taken at subsurface level in order to pinpoint the source.

The problem addressed by the innovation is to assist the networks in pinpointing gas escapes from buried underground equipment, allowing them to take subsurface readings using a safe and lightweight device. The current risks faced by operatives and the networks are;

- Risk of injury to colleagues
- Risk to members of the public
- Risk of damaging third party equipment
- Risk of skeletal injuries due to weight
- Risk due to excessive noise

GDN's also believe an improved solution could increase productivity of operatives.

Method(s)

This is an early stage optioneering approach to a possible solution as it remains unclear as to if any alternative solution is possible given:

- Specification of existing equipment
- Scope for amending existing equipment
- Alternative equipment available
- Cost of modifications
- Cost of alternative equipment
- Requirements of Operatives

At this stage in the project the final concept has not been decided upon. These details will be finalised as an output of the Down selection workshop.

Scope

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Objective(s)

There are two main objectives of this project. The first is to capture fully all of the information required to solve the problem. This is to

ensure that all subsequent decisions made are as informed as possible. This will be achieved through a detailed requirement capture and workshops with the operators.

The second objective is to select a final concept through a Down selection workshop. This will be done through an Optioneering study where up to five concept solutions will be generated which fulfil the requirements. The Down selection pack will contain all of the proposed concepts and communicate the rationale behind them. A weighted multi-criteria decision analysis (MCDA) tool will be used through collaboration with the design team and the customer in order to come to a collective decision on the final chosen concept. The key points from the workshop will be recorded and developed as part of an Optioneering report.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Requirements – The design space has been fully captured and all requirements have been agreed upon.

Down selection workshop – A single solution has been agreed upon to take forward to Phase 2 of the project.

Optioneering Report – All key design decisions have been recorded. There is a clear and structured approach to the problem. The final chosen solution is innovative and provides an obvious improvement to the current method.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

The project will identify suitable solutions through an optioneering workshop, where a single solution may be selected to take forward into a potential phase 2 of the project.

Technology Readiness at Start

TRL4 Bench Scale Research

Technology Readiness at End

TRL7 Inactive Commissioning

Geographical Area

NGN's Network

Revenue Allowed for the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

NGN External expenditure £25,000

NGN Internal cost £8333

Total expenditure £33,333

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)

This is applied research and will unlock potential further development of an alternate solution that may be developed to allow future benefits delivery.

Please provide a calculation of the expected benefits the Solution

The results of the optioneering study will be primarily qualitative, with financial benefits only being calculable on delivery of the new solution on completion of the project.

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

The operation is carried out by all Licensees, therefore the learning and implementation could be undertaken by all.

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

Unable to evaluate until after the project is completed.

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

The solution from the optioneering study will be used to improve accuracy and efficiency of gas leak location vs the current method of bar holing. All network licensees will be able to learn from the developments of this project.

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

The problem addressed by the innovation is to assist the networks in pinpointing gas escapes from buried underground equipment, allowing them to take subsurface readings using a safe and lightweight device. This has the potential to improve our customer service, emergency response and remove ergonomic impact on network operatives.

☑ 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