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

Mar 2021

Project Reference Number

NIA_NGN_281

Project Registration

Project Title

Digitisation of SCO Database

Project Reference Number

NIA_NGN_281

Project Licensee(s)

Northern Gas Networks

Project Start

January 2021

Project Duration

1 year and 3 months

Nominated Project Contact(s)

Geoffrey Harle

Project Budget

£351,206.00

Summary

The aim of this project is to develop an end to end cloud based Safe Controls of Operations system to optimise the performance of Network operations, to ensure control of network conflicts, allow real time visibility of in-flight and planned work status and provide an electronic permit to work and isolation system. NGN are currently funding separately a project to develop and implement a cloud-based system allowing better management of the SCO database, linking Authorisation Engineer & Competent Person authorisation to the validation of work activity/hazard. The following functionality is currently being implemented under the separately funded project:

- Predetermining, where appropriate, the type of permit required for an activity (FOA, PTW, NRO, RO)
- Validating AE and CP Competencies against perimetry hazards and Site types (i.e. Network 0-75mbar, Network 75mbar – 2bar, etc).
- Highlighting restrictions at the point of validation
- Automatically applying predetermined controls dependant on type of permit and hazardous activity, (Pressure testing, Hot work, Lifting operations etc)

Third Party Collaborators

QEM Solutions

Energy Innovation Centre

Nominated Contact Email Address(es)

innovation@northerngas.co.uk

Problem Being Solved

The current Safe Control of Operations system is paper based system which involves entering safety critical information onto a

triplicate form and phone calls between Authorising Engineers and Network Controllers to confirm competency and approval for work to proceed.

As the current system is still a paper-based system it is highly inefficient due to the amount of effort required to hand write multiple permits across the entire networks operations. The current system is also open to human error is not fully traceable and potentially open to tampering and misuse.

In addition to this the validation process associated with competency management can often lead to costly delays during capex, operations and maintenance activities. The current system involves obtaining approval via a phone call from Network Control for work to proceed, including checking the competent person is on the database. The network controller reviews the current network conditions and confirms the work is suitable to proceed and may or may not be backed up by written approval. The onsite conflict management is managed by the authorising engineers and the network controllers but is open to human error such as shift changes etc.

Method(s)

Phase 1 - Permit Geographical Representation - To develop the design brief and establish system requirements to include geographical tools to enable conflict and risk management.

Phase 2 - Perimetry & Isolations - To develop the overall system to incorporate the geospatial referencing with additional functionality to provide cloud based perimetry in accordance with SCO procedures and provide a digital isolation process linked to perimetry.

Phase 3 - Field Trial - To test and validate all functionality of the system in a live site under hazardous activity conditions in parallel with the existing system to ensure integrity and safety is always maintained.

Scope

The developed system will provide the following:

- Creation of various Electronic Perimetry in the field, in line with SCO procedures, e.g. Forms of Authority, Permits to Work etc.
- Verification of competency using RFID & ID Badges
- Validation of competency against permits
- Auditing/Inspection
- Geospatial tools such as geofencing, spatial risk reporting and activity radius monitoring
- Isolation Management including linking isolations to Permits
- Verification of Assets using RFID
- Verification of Isolations using cloud-based application
- Georeferencing & Geo-reporting
- Spatial Risk Reporting
- Activity Radius Monitoring
- Training Materials and Training Delivery
- Identification of Integration requirements
- Identification of compliance information required to be stored in a blockchain

Objective(s)

Phase 1 - Permit Geographical Representation - Development and demonstration of a cloud based system to provide geographical tools linked to perimetry.

Phase 2 - Permits & Isolations - Development and demonstration of a cloud based system to provide perimetry in accordance with SCO procedure requirements and develop and demonstrate RFID tagging of assets and cloud-based isolations linked to perimetry.

Phase 3 – Implement full site Trial - Carry out a full site trial utilising all previously developed functionality including Network Control reporting and analysis.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Minimum Criteria – Provide a cloud-based system to undertake geographical representation, linked to perimetry
Measurement description - Demonstration of system in field trials

Minimum Criteria – Provide a cloud-based system to undertake perimetry and isolations
Measurement description - Demonstration of system in field trials

Minimum Criteria – Ability to store critical data in a blockchain
Measurement description - Use blockchain explorer to validate data entry as it happens

Project Partners and External Funding

Northern Gas Networks
QEM
EIC

Potential for New Learning

The learning from this project will be a better understanding of current SCO Database system and its functions / limitations and how they can be developed and improved. In addition to this there is the opportunity for other GDN's to implement the new system to improve their existing system and compliance.

Scale of Project

The project will be delivered as detailed and will bring significant increases in functionality relating to HSE compliance and competency management. It will also allow for greater MI reporting and auditing and to allow permits to be raised out of hours in the live field will be compliant.

Technology Readiness at Start

TRL4 Bench Scale Research

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

This project will impact the entire Northern Gas Networks area.

Revenue Allowed for the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

External funding = £294,500
Internal cost = £56,706
Total Cost = £351,206

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 a dramatic reduction in time required to generate permits and validate qualifications and isolations therefore reducing the amount disruption the customer saving time and money. Initial benefit assumptions c£30k p.a. of quantitative benefits and a significant element of qualitative benefits, mainly focused around the ability to increased safety and compliance relating to complex engineering operations.

Please provide a calculation of the expected benefits the Solution

This project starts at a low TRL and the benefit assumption will be tested throughout developmental stage gates.

Key benefit assumption(s) p.a.
c.9000 total PTW issued - assume 10 time saving minutes per PTW
c.2000 reduced site visits

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

Currently it is not possible to discuss roll out, however it is anticipated that the new system could be rolled out fully across other Networks or transporters. The system is being developed to be configurable for other networks meaning that it can be adopted across the entire UK gas network. A shared competency passport if adopted will then enable Competent Persons records to be available at the point of work irrelevant of network or employer. This will dramatically increase compliance and reduce the likelihood of errors.

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

This project is to identify if there are appropriate technologies and if so recommend any potential solutions to develop and end to end process.

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 new system could be implemented within other GDN's to replace their existing SCO Database. All UK gas networks are experiencing the same bottlenecks during the creation of permits and validation of AE and CP competencies. By allowing for a shared competency matrix between the systems, the network will dramatically increase the available resources able to authorize permits and act as competent persons reducing delays. In addition to this it will enable the resources to identify skills gaps across 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)

Optimised assets and practices.

☑ 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.

No system exists so this is a new development, detailed checks of the smarter networks portal have also been undertaken. NIA_WWU_033 did look in the similar area as this project will but was low TRL and this project aims to utilise the latest approaches to technology to adapt to go over and above the current methods of approaching the safe control of operations on networks.

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

No System has been tried previously due to the complexity of a system incorporating all three phases into one connected system.

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

The scale of the issues and the possibility to deliver the project is uncertain and would be beyond the Networks license risk appetite. This project will allow for greater understanding of the opportunities for improvement and what alternative methods are possible. This research, proof of concept and ongoing development within this project will allow networks to make well informed decisions on the future of SCO.

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

The high level of risk associated with a low TRL research project is beyond the current risk appetites of Networks. Thew NIA will allow NGN to complete this project to better inform decisions and opportunities for improvement and innovation in the high risk area of SCO. The use of NIA funding allows learning can be shared with other Networks. As SCO is used throughout the entire gas industry this project will benefit customers throughout the UK by ensuring continuity of supply.

This project has been approved by a senior member of staff

☑ Yes