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 2021

Project Reference Number

NIA_NGN_348

Project Registration

Project Title

H21 Occupied Trials Phase 1 - Safety Case

Project Reference Number

NIA_NGN_348

Project Licensee(s)

Northern Gas Networks

Project Start

September 2021

Project Duration

0 years and 4 months

Nominated Project Contact(s)

Ryan Mallinder/Matt Kluwe

Project Budget

£45,600.00

Summary

The H21 project aims to demonstrate the feasibility of using 100% hydrogen in a gas distribution network and as part of the layering of confidence to the stakeholders and the HSE, to provide this we require expert assistance and assessment on gaining an Exemption from our current gas safety case. Therefore, NGN have requested Pipeline Integrity Engineers (PIE) to undertake a review and assessment of the documents developed to identify any potential intervention areas within the assessment of documentation in relation to GSMR and Safety case exemption. A key point from this assessment is to identify any potential gaps within the assessment of documentation in relation to GSMR and safety case exemption in order to operate a 100% hydrogen converted natural gas network.

Third Party Collaborators

Pipeline Integrity Engineers Ltd

Nominated Contact Email Address(es)

innovation@northerngas.co.uk

Problem Being Solved

As part of the recently closed NIA_NGN_268 Occupied Trials project, which is critical to the success of any live community trial to identify and establish the work required to gain HSE exemption through the development of a bespoke safety case, and to understand how the GSMR may change for the distribution of 100% hydrogen. A report has been produced which now would benefit from an expert in the industry to undertake further evaluation work and develop a further understanding of what requirements are required to gain the HSE exemption to be able to facilitate a live trial.

Method(s)

A site has been identified in NGN for occupied 100% Hydrogen conversion trials, utilising the existing distribution network.

This NIA is to undertake appropriate research and review of the previously developed research within NIA_NGN_268. This review is to analyse the potential intervention areas including the additional requirements for Hydrogen Production and storage that could prevent or delay progression to a safe and secure future trial.

Scope

To undertake a desk top review and assessment of the two documents developed under NIA 268 – Occupied Trials to identify any potential intervention areas within the assessment of documentation in relation to GSMR and Safety case exemption

- Phase 3 NIA output table
- H21 Phase 3 Work Packages

- 1.2 Identify and scope the work required to gain HSE exemption
- 1.4 Identify and scope GSMR work required

The scope is limited to reviewing the two-documents above and providing an output report of any potential gaps for NGN consideration and further assessment.

Objective(s)

Providing an output report of any potential gaps for consideration and further assessment that also indicates potential costs and timescales to address any gaps.
The objectives of the is project following a review of the research and documents generated under the first phase of the project. We will be working to provide an output report of any potential gaps for consideration and further assessment to enable a future live trial.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

This is a research/review project and will not have any direct impact on customers.

A successful trial has the potential for the role out of hydrogen as a form of energy for heating to those currently not connected to the gas grid. This could mean those financially not able to use natural gas to heat their home may be able to with hydrogen.

Success Criteria

Successful completion of the review and input of all prerequisites listed in the scope will allow appropriate assessment of the viability of the further specific Occupied trials.

Project Partners and External Funding

The project partner for this project is PIE (Pipeline Integrity Engineers)

Potential for New Learning

The project will allow areas of GSMR and the network Safety Case to be further developed that had not previously been considered as applicable and provide insight into areas of concern for the soon to come occupied trials.

Scale of Project

The project will be based on an identified trial area, but the review of the analysis and assessment shall be scalable to the wider Network and GDN's.

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL4 Bench Scale Research

Geographical Area

Online but the proposed trial area in question will be in the Teesside area within NGN's network, the work conducted however will be applicable to any of UK Gas Distribution networks.

Revenue Allowed for the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

External cost = £36,480
Internal Cost = £9,120
Full Project cost = £45,600

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:

As part of previous project, NIA_NGN_268, which was to understand the requirements for the transportation of 100% hydrogen to 678 homes in the north of England, we require expert assistance on gaining an exemption from our current gas safety case to support any such similar live trials regardless of scale or location. For this to be done appropriately and comprehensively we are working with our project partner to compile knowledge, resources, and expertise.

How the Project has potential to benefit consumer in vulnerable situations:

A successful trial has the potential for role out of hydrogen as a form of energy for heating to those currently not connected to the gas grid.

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)

N/A

Please provide a calculation of the expected benefits the Solution

This is a research project and will provide evidence to support the energy systems transition.

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

The research and learning undertaken as part of completing the prerequisites for H21 Occupied Trials site is applicable to all GDNs within the UK undertaking future Hydrogen conversion projects.

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

Contributes to the net zero targets of the UK.

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 elements of the H21 NIC & NIA projects will only provide the controlled environment testing results to support a 100% hydrogen gas grid conversion. All stakeholders (including the HSE-SD, DNV GL, GDN Asset Directors and Local Authorities) agree that, as with all controlled testing, and the unoccupied testing, definitive assessment can only be corroborated with in-situ testing via an occupied public trial.

This NIA will research and complete the prerequisites to allow the occupied trial on 100% hydrogen to proceed.
Ultimately the occupied trial will confirm the results of the H21 Phase 1 & 2 stages and then demonstrate the findings in an occupied trial and provide definitive evidence for hydrogen as a fuel establishing the evidence for customer acceptability.

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

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.

Engagement with other GDN's and a search of the SNP has been completed. Conversion of the existing gas network to 100% hydrogen has not been delivered in the UK before. The H21 Occupied Trials suite of projects has been discussed at all industry forums e.g. GFG, HPDG etc. to ensure effective collaboration. In addition this project is to build upon the project that came before it.

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

This project will build on the original work of the H21 Leeds City Gate project and the H21 Phase 1 & 2 NIC projects and provide valuable knowledge and learning to inform some of the next steps identified in the H21 road map. The completion of the prerequisites for the Occupied Trials for 100% hydrogen conversion on an area of the existing gas network has never been undertaken before.

Relevant Foreground IPR

IP generated from the previous project will be brought forward into this one.
This project and the resultant outcomes/deliverables will conform to the default treatment of IPR as set out under the agreed NIA Governance (where the default requirements address two types of IPR: Background IPR and Foreground IPR).

Data Access Details

For all data access requests, please follow the guidance set out in Northern Gas Networks Innovation Data Sharing Policy. https://www.northerngasnetworks.co.uk/ngn-you/the-future/our-funding/

Please identify why the Network Licensees will not fund the project as apart of it's business and usual activities

This project is in the interests of UK and is not specific to business as usual operations of the network with no allowance within regulatory business plans. Whilst the benefits are undeniable there is no guaranteed benefit back to gas customers without regulator and government support– projects associated with 100% hydrogen are at the cutting edge of gas network innovation.

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 project would only be undertaken with support from NIA funding, it is in the interests of gas customers, the regulator and the UK government and realization of any benefits are outside the control of the gas networks. There is no allowance in BAU business plans for this type of work and the commercial benefits and technical/operational risks associated with these types of 100% hydrogen projects are outside the traditional environment of any gas distribution network or its shareholders.

This project has been approved by a senior member of staff

☑ Yes