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

Apr 2024

Project Reference Number

NIA_NGT0222

Project Registration

Project Title

HyNTS Operational Methodologies - Phase 1

Project Reference Number

NIA_NGT0222

Project Licensee(s)

National Gas Transmission PLC

Project Start

April 2024

Project Duration

1 year and 0 months

Nominated Project Contact(s)

Matthew Hammond, box.GT.innovation@nationalgas.com

Project Budget

£841,312.00

Summary

To support the energy transition, National Gas are looking to repurpose the National Transmission System (NTS) to hydrogen. National Gas currently use a suite of policies and procedures, both internal and external, to safely operate the natural gas network. As hydrogen has different properties to natural gas, these policies and procedures will need to be updated to enable hydrogen to be transported safely in the NTS.

This project will review internal policies and procedures and identify what evidence is required to update them for operating a hydrogen transmission system. Where there are gaps in the evidence, a test programme will be developed to carry out gather the physical evidence required to update the policies and procedures.

Third Party Collaborators

DNV

J Murphy & Sons Ltd

Nominated Contact Email Address(es)

Box.GT.Innovation@nationalgrid.com

Problem Being Solved

To support the energy transition, National Gas are looking to repurpose the National Transmission System (NTS) to hydrogen. National Gas currently use a suite of policies and procedures, both internal and external, to safely operate the natural gas network. As hydrogen

has different properties to natural gas, these policies and procedures will need to be updated to enable hydrogen to be transported safely in the NTS.

Previous work through H21, LTS Futures and FutureGrid has identified the policies and procedures which need changing and to what extent they will need to be modified. This project will build on this work, focusing on National Gas' internal operational procedures, and design the necessary test procedures to gather the evidence required to update the policies and procedures to hydrogen, and identify where new policies or procedures may be required.

National Gas have an ambitious programme of work called "Project Union" which will repurpose 2,000 km of high pressure transmission network in the UK to carry Hydrogen. Updating these policies and procedures is a key enabler for Project Union as the updated documents will be used for operating and maintaining the 100% hydrogen backbone.

Method(s)

This project will consist of desktop reviews of National Gas' internal policies, management procedures, work procedures and technical specifications by appropriate partners. This will include a review of ongoing work into policy and procedure updates in the industry, including the LTS Futures project. The next step will be to identify any evidence gaps and designing an appropriate testing programme to gather the physical evidence required. This will be done through a series of workshops and HAZOP studies with National Gas Subject Matter Experts. Again, the design of the test programme will take into consideration ongoing work in the industry, including FutureGrid and LTS Futures.

Measurement Quality Statement

The measurement approach used to meet Data Quality objectives will be through the identification of high calibre project partners who are experts in their given field. The methodology used in this project will be subject to our supplier's own ISO 9001 certified quality assurance regime and the source of data, measurement process and equipment as well as data processing will be clearly documented and verifiable. The measurements, designs and economic assessments will also be clearly documented in the relevant deliverables and final project report and made available for review.

Data Quality Statement (DQS)

The project will be delivered under the NIA framework in line with the agreed Energy Networks Innovation Process document and NGT internal policies. Data produced as part of this project will be subject to quality assurance to ensure that the information produced with each deliverable is accurate to the best of our knowledge and sources of information are appropriately documented. All deliverables and project outputs will be stored on our internal SharePoint platform ensuring backup and version management. Relevant project documentation and reports will also be made available on the ENA Smarter Networks Portal and dissemination material will be shared with the relevant stakeholders.

Scope

The project is split into six work packages as follows:

Work Package 1 – Process and Scope Definition

This work package will kick off the project and agree the proposed approach with National Gas Subject Matter Experts and relevant stakeholders. This will include a review of previous work carried out into the FutureGrid Procedure Review.

Work Package 2 – Pre-Workshop

This work package will involve identifying critical procedures, with operational procedures and documents required for Project Union taking precedence. The procedures will then be organised into batches of documents for the workshop and HAZOP activities. Pre-workshop reviews will be undertaken to determine the approach for the workshops to ensure efficient use of time during the workshops. DNV will produce a HAZOP style workshop process for the workshops including objectives and key words, with support of

National Gas Subject Matter Experts.

Work Package 3 – Workshop

A HAZOP style workshop will be carried out for each batch of documents identified in work package 2. The aim of the workshops will be to identify the evidence gaps in the documents in relation to updating them for hydrogen. The workshops will be attended by DNV and National Gas Subject Matter Experts as appropriate, as well as Murphys and National Gas SMEs where required. A follow on workshop will be organised for further discussion on any remaining gaps and to address lower priority documents.

Work Package 4 – Physical Evidence Requirements

This work package will consider the outputs of WP3 and what evidence may exist to address gaps, determine what kind of work could be required to bridge any gaps and summarising the physical testing requirements.

Work Package 5 – Test Programme Design

This work package will involve the development of test programmes to bridge the gaps in evidence identified in previous work packages. This will be done as to maximise the efficiency by minimising bespoke test rigs and filling multiple evidence gaps from one test, where possible. Conceptual designs, equipment lists and testing matrices will be proposed as well as approximate costs and timelines to carry out the proposed testing programmes.

Work Package 6 – Reporting

Reporting will be carried out throughout the project, summarising the proposed workshop approaches and subsequent findings. A final technical report will be produced along with the ENA Closure Report as required for NIA projects.

Objective(s)

The project objectives are as follows:

· Identify operational policies and procedures not yet prioritised through other work and identify critical documents based on Project Union

· Identify evidence gaps in batches of similar documents through a HAZOP style workshop

· Review where evidence may already exist to bridge gaps in evidence

· Design test programme to bridge gaps in evidence

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

An assessment of distributional impacts (technical, financial and wellbeing related) for this project has been carried out using a bespoke assessment tool, which assesses the project as having a positive, negative or neutral effect on consumers in vulnerable situations. To help inform the assessment, this tool considers the categories of consumers identified in the Priority Services Register. This project has been assessed as having a neutral impact on customers in vulnerable situations. This is because it is a transmission project.

Success Criteria

The following key criteria need to be met for the project to be considered successful:

· Objectives met to time and cost

· Outputs can be fed into subsequent project(s) where testing can be carried out to bridge evidence gaps, ultimately leading to updated policies and procedures for hydrogen.

Project Partners and External Funding

Lead network: National Gas Transmission

Suppliers: DNV UK, J Murphy & Sons

Potential for New Learning

The project will provide stakeholders with an understanding of the gaps in evidence and the work required to bridge these gaps in order to update National Gas Transmission policies and procedures for hydrogen. This is a key activity in allowing hydrogen to be transported in the NTS and for Project Union to become operational.

Scale of Project

There are close to 600 documents including policies, procedures and specifications which allow National Gas Transmission to operate the NTS safely. Some work has been carried out to prioritise these documents for updating for hydrogen, however it is expected that physical testing will be required to provide evidence to update these documents for hydrogen. With such a large number of documents, a rigorous approach is required for this work, bringing together Subject Matter Experts from DNV, National Gas Transmission and National Gas Services, who carry out maintenance of pipelines and other assets on the NTS today. As these policies and procedures allow the safe operation of the NTS, it is crucial that this detailed approach is taken and that quality is not compromised by carrying out the project on a smaller scale.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL3 Proof of Concept

Geographical Area

UK-wide

Revenue Allowed for the RIIO Settlement

None – hydrogen-focused innovation project

Indicative Total NIA Project Expenditure

£841,312

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:

The project focuses on policies and procedures for safe operation of the NTS. These policies will need updating in order for hydrogen to be transported in the NTS. There will be gaps in physical evidence required to update these documents. This project is the first step in updating these documents and will identify the gaps in evidence and propose testing which can bridge these gaps. This will enable follow on work to design, build and test in order to gather this evidence to feed into the document updates.

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

Although this project does not directly affect vulnerable consumers the energy transition may and as such, we must consider the effect of the work we are doing through the NIA funding. The National Transmission System (NTS) is a key UK infrastructure for the transport of Gas to consumers, including those considered vulnerable. In a scenario where hydrogen replaces methane as a household heat source, it is essential the vulnerable are not excluded by virtue of fuel inaccessibility. In cases where vulnerable consumers already utilise gas it is likely that in a net zero future the optimum option is to provide a consistent energy solution. The transition to hydrogen within the NTS provides continuity of access to the vulnerable of hydrogen as a replacement to methane, with ongoing benefits of efficiency and economy of scale within a closely regulated environment. Ensuring robust NTS assets and consistent hydrogen production options will support the transition of the NTS to hydrogen which in turn supports the availability of gas to the vulnerable.

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

Value tracking

	Data Point	Data Point Definition
Maturity	TRL 0-1	The project is identifying the gaps in evidence of existing policies and procedures, leading to an early conceptual design and plan for testing.
Opportunity	100% and multiple asset classes	The project will review all internal operational policies and procedures, affecting all operational and maintenance activities on the NTS.
Deployment costs	-	The project will not deploy any technology. The first phase is a review of current methodologies and design of a test programme to gather evidence for hydrogen.
Innovation cost	£841,312	The cost includes reviews of ongoing work on hydrogen methodologies and a review of all existing internal methodologies by appropriate partners and Subject Matter Experts, which will require significant

time and effort. Design of a test programme to bridge evidence gaps identified.

Financial Saving - The project may not result in financial savings.

Safety - The outcome will be a test programme that can be taken forward to update policies and procedures for hydrogen, which will enable safe operation and maintenance of the NTS.

Environment - No direct savings from this project but it will enable hydrogen to be safely transported in the NTS.

Compliance Ensures compliance Updating the policies and procedures ensures compliance with safety regulation and legislation etc.

Skills & Competencies No change The outcomes of this project will ultimately lead to updated policies and procedures which will affect teams across the business.

Future proof Supports business strategy Supports the transition to hydrogen by providing evidence for policies and procedures to be updated.

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

National Gas Transmission, as the operator of the UK's gas transmission system, have a number of similar documents (operational procedures) to the Gas Distribution Networks. A number of projects are underway where the TSO and GDNs are collaborating on updating these documents. This project focuses specifically on National Gas documents, however there will be similarities and overlaps with GDN documents. Therefore, the findings from this project could inform GDN work into procedure updates. Furthermore, the test designs could also support evidence gathering for GDN documents.

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

The project will not deliver a method that can be rolled out. The solution proposed will be specific to National Gas policies and procedures.

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

National Gas Transmission, as the operator of the UK's gas transmission system, have a number of similar documents (operational procedures) to the Gas Distribution Networks. A number of projects are underway where the TSO and GDNs are collaborating on updating these documents. This project focuses specifically on National Gas documents, however there will be similarities and overlaps with GDN documents. Therefore, the findings from this project could inform GDN work into procedure updates. Furthermore, the test designs could also support evidence gathering for GDN documents.

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.

This project will focus solely on National Gas internal documents, therefore will not be duplicated elsewhere. There is ongoing work into updating documents for hydrogen across the gas networks, however the evidence gaps and test plan requirements for National Gas internal policies and procedures have not been identified, therefore this project is unique.

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

National Gas Transmission are carrying out work to repurpose the National Transmission System to carry hydrogen. As well as the technical feasibility of repurposing physical assets, current policies, procedures must be updated to allow operators and technicians to work on the network safely. Many current operational procedures were developed based on test programmes or analytical studies, therefore, in order to update these documents for hydrogen, new test programmes and studies will be required. Much of the ongoing work on hydrogen that involves physical testing is being carried out as demonstrations of certain assets. This project will focus specifically on what testing would be required to bridge gaps in order to update procedures, something that has not yet been carried out. Where possible, the project will propose using existing test facilities if appropriate, or minimise the number of unique and new test facilities required to gather the evidence.

Relevant Foreground IPR

The project is a research and development activity, therefore no new Foreground IPR will be generated. However, the project will deliver test programme conceptual designs which may be developed further in future project resulting in relevant Foreground IPR.

Data Access Details

Details on how network or consumption data arising in the course of an NIA funded project can be requested by interested parties, and the terms on which such data will be made available by National Gas can be found in our publicly available "Data sharing policy relating to NIA projects" at www.nationalgas.com/gasinnovation. National Gas data access is managed IAW provisions under 2.15-2.18 for the current NIA Governance Document.

National Gas already publishes much of the data arising from our NIA projects at www.smarternetworks.org. You may wish to check this website before making an application under this policy, in case the data which you are seeking has already been published.

Data Quality Statement (DQS)

The project will be delivered under the NIA framework in line with the agreed Energy Networks Innovation Process document NGT internal policies. Data produced as part of this project will be subject to quality assurance to ensure that the information produced with each deliverable is accurate to the best of our knowledge and sources of information are appropriately documented. All deliverables and project outputs will be stored on our internal SharePoint platform ensuring backup and version management. Relevant project documentation and reports will also be made available on the ENA Smarter Networks Portal and dissemination material will be shared with the relevant stakeholders.

Measurement Quality Statement (MQS)

The methodology used in this project will be subject to our supplier's own ISO 9001 certified quality assurance regime and the source of data, measurement process and equipment as well as data processing will be clearly documented and verifiable. The measurements, designs and economic assessments will also be clearly documented in the relevant deliverables and final project report and made available for review.

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

Hydrogen is not currently transported in the NTS and the current policies and procedures are not appropriate for hydrogen. Hydrogen is being directed as a future energy solution but RIIO-2 business funding does not allow the development of hydrogen ready solutions and therefore this project cannot be undertaken as part of BAU activities.

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

Energy transition projects and research is not catered for in the current RIIO-2 settlement and the project is high risk and low TRL which would not be considered for BAU funding. NIA funding reduces this exposure to the risk and enables early stage research to be carried out.

This project has been approved by a senior member of staff

☑ Yes