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

Oct 2023

Project Reference Number

NIA_NGT0220

Project Registration

Project Title

HyNTS Dataset - Physical Data Extraction (ILI)

Project Reference Number

NIA_NGT0220

Project Licensee(s)

National Gas Transmission PLC

Project Start

October 2023

Project Duration

0 years and 8 months

Nominated Project Contact(s)

Corinna Jones, box.GT.innovation@nationalgas.com

Project Budget

£1,695,733.00

Summary

East Coast Hydrogen is the first planned route for Project Union, the Hydrogen NTS Backbone. The route will consist of several repurposed natural gas assets alongside some new build to facilitate the joining of the Humber and Teeside Industrial Clusters. For these sections of pipeline, we shall need to gather additional information on the relevant pipeline integrity quantities we need to be aware of for Hydrogen conversion. This project shall demonstrate the In Line Inspection tools capability to help enable this and summarise the data collected from the chosen section of NTS for the demonstration.

Third Party Collaborators

Pipeline Integrity Engineers Ltd

ROSEN

Nominated Contact Email Address(es)

Box.GT.Innovation@nationalgrid.com

Problem Being Solved

This project outlines additional Pipeline Inline Inspection activities to be undertaken alongside a chosen standard inspection to determine the capability of novel ILI tools to be utilised to fill gaps in integrity data for the hydrogen transition of transmission pipelines during Project Union in the near future. This will involve identifying the most appropriate inspection that is already planned as part of business-as-usual activities and choosing the most appropriate inspection tools that we do not currently use on the Natural Gas network, building these into a new Pipeline Inspection Gauge to run alongside existing tools for that specific run. After completion of the inspection, there then needs to be an evaluation of the results, as well as a recommendation for a future Hydrogen inspection

regime that could influence NGT's plans for pipeline repurposing for Hydrogen service.

Method(s)

The project's aim is to enable the required integrity data to be gathered to support East Coast Hydrogen and progress NTS's energy transition for a hydrogen NTS backbone to be developed. The project will determine the capability of novel ILI tools to be utilised to fill the gaps in integrity data for hydrogen transition. In so doing, the project will achieve the following:

- Feeder pipeline to be inspected has been confirmed, with alignment to East Coast Hydrogen
- Appropriate Novel ILI tools have been identified and built onto PIG ready for deployment
- Inline inspection using novel tools has been successfully completed
- Complete dataset has been gathered from the inspection
- Summary of the results gathered has been provided, demonstrating the integrity data gaps that have been filled
- Provide all the data we require from an inline inspection to make an informed decision on Hydrogen conversion
- Approach defined for inspection regime required for pre-Hydrogen conversion on all of East Coast Hydrogen pipelines

The project will result in a technical report summarising the work undertaken and the outputs including business case and cost benefit analysis.

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 4 work packages detailed below:

Work Package 1 – Preparation for deployment

This phase shall identify the section of the NTS within East Coast Hydrogen to be inspected, determine the suite of novel tools to be used and build the PIG, ready for demonstration in Phase 2.

Work Package 2 – Novel tools demonstration

This phase will demonstrate the novel inline inspection tools on the NTS, to gather the integrity data required to give a full

understanding of Hydrogen readiness on that section.

Work Package 3 – Implementation plan for East Coast Hydrogen FEED

This phase of work shall provide the analysis of the data gathered during the inspection, summarising the view of the pipelines readiness for Hydrogen service. The lessons learnt from the inspection shall also be demonstrated in an approach outlined for further scale inspections for the pre-conversion activities required for East Coast Hydrogen, so this can be replicated during the FEED.

Work Package 4 - Reporting

As part of NIA funding requirements, Ofgem require that a final technical report as well as an ENA project closure form are completed and uploaded on to the ENA Smarter Networks Portal. NGT will complete the uploading of this information.

In Scope:

· Single feeder section of NTS

· Demonstration of novel in line inspection tools for Hydrogen Integrity data gathering

Out of Scope:

Inspection tools currently used as part of business as usual

Objective(s)

· Identify the most appropriate pipeline section on the NTS for deploying novel inspection tools that can collect additional pipeline integrity data for use in understanding Hydrogen related

· Deploy novel in-line inspection tools on chosen feeder, completing an inspection to collect Hydrogen related integrity data

Analyse the collected integrity data, alongside BAU data, to provide a technical summary of the information collected

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 most appropriate pipeline section on the Project Union route for deploying novel inspection tools for Hydrogen readiness assessment identified.

· Novel in-line inspection tools on chosen feeder successfully deployed; completing an inspection to collect Hydrogen related integrity data

· Analyse the collected integrity data, alongside BAU data, to provide a technical summary of the pipeline sections readiness for Hydrogen conversion

Project successfully delivered to time, cost, quality.

Project Partners and External Funding

None

Potential for New Learning

The project will provide understanding of using new and novel inspection tools on the NTS and understand which data points and tools will be needed to enable the transition to hydrogen. This work will be a demonstration.

The findings from the project will be uploaded to the ENA Smarter Networks portal and will be shared via National Gas innovation social media.

Scale of Project

This project must be completed on a section of the NTS to ensure that real-world integrity data can be collected from the NTS, using the appropriate In Line Inspection tools. Only one section of the NTS is required for this purpose to demonstrate that tools can be deployed to collect additional data and so this is what has been chosen for this project.

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL5 Pilot Scale

Geographical Area

UK

Revenue Allowed for the RIIO Settlement

None – Hydrogen network focused project

Indicative Total NIA Project Expenditure

External = £1,256,800

Internal = £438.933

Total = £1,695,733

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:

This project directly facilitates National Gas Transmission's plans for Project Union, the UK's Hydrogen backbone. Additional integrity data collected during the demonstration inspection on the NTS will provide the extra information needed to inform repurposing activities during Project Union. This project will also provide information on the likely cost of implementation during Project union, as well as helping to understand the types of information that will be important to us.

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

The main benefits of the project are:

- Demonstration of additional ILI tools now, will benefit the planning for ILI tool deployment during the early stages of Project Union
- There is an opportunity to evaluate the extra data that will be provided by the ILI tools, and ensure that the business is prepared for ingesting the data with the tools are deployed during Project Union
- This project is a direct enabler to Project Union, therefore facilitates the overall Hydrogen Strategy

Value tracking

	Data Point	Data Point Definition
Maturity	TRL4-5	Demonstration of In-Line Inspection tools, to investigate Hydrogen Integrity related parameters, that have not been deployed on the NTS before
Opportunity	100% of single asset class	These tools will gather additional integrity data for our pipeline asset as a whole
Deployment costs	-	Unknown at project start. This will be better understood in the course of the project with a view of how to reduce future deployment costs of ILI technology.
Innovation cost	£1,256,800	Cost of innovation project for a single feeder
Financial Saving	-	Unknown at project start. Focus is not on financial saving over more the focus is on increased data integrity for decision-making.
Safety	-	Not a direct focus of the project however, an improved understanding of the NTS current condition will have knock on safety benefits.
Environment	-	This project is an enabler for the transition to a Hydrogen network, therefore there is an environmental benefit however hard to quantify at this stage
Compliance	Support compliance	It is expected that in the future, some or all of the tools deployed in this project demonstration, shall also be used to support compliance
Skills & Competencies	Departmental	New technical knowledge shall be required in National Gas Engineering to understand the new type of data that will be gathered on the pipelines
Future proof	Must have for the business Strategy	This piece of work is essential to demonstrate and understand the new in line inspection tools that will be required to support the Project Union Hydrogen strategy.

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

The aim of this project is to demonstrate that we have been able to deploy the tools required for additional H2 related integrity data, on a section of the NTS. Therefore, if this project is successful in doing so, NGT will be able to replicate this approach across any section of the NTS that is “piggable” and a candidate for Hydrogen repurposing.

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

Until the outputs from this project are known, and the type of information we want to gather in future inspections has been defined, it is difficult to extrapolate the cost from this project on a whole, across the NTS.

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

Other network licensees will be able to see how the inspection has been deployed and the types of tools used, which they may have not deployed themselves either. This could help inform similar demonstrations of such tools on their own networks and provide an understanding of the type of data that we have been able to gather in the context of the NTS which could be transferable to their network.

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.

The project proposal has been shared with the gas industry to avoid duplication. There will be no duplication of activities done as part of this program. This project will address a gap in National Gas' ongoing innovation work looking at data integrity and enabling work to support the energy transition.

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

In Line Inspection Tools that have not been used on the NTS before, for Hydrogen integrity data collection, shall be deployed as part of this project, which is why this is innovative.

Relevant Foreground IPR

The likely ILI tools to be demonstrated on the NTS are established in other sectors and carry pre-established background IP. The application on the NTS and the data generation (and platform) has the potential for foreground IP.

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

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

National Gas Transmission are not funded for Hydrogen related projects through business as usual funding, and so this project must be funded through the Network Innovation Allowance.

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

Funding this project through NIA gives an opportunity to share the findings with other network licensees to enable their own Hydrogen inspection related activities.

This project has been approved by a senior member of staff

☑ Yes