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

May 2022

Project Reference Number

NIA_CAD0076

Project Registration

Project Title

FI 0015 Hydrogen Blending: Functional Spec for Commercial Frameworks (Phase A)

Project Reference Number

NIA_CAD0076

Project Licensee(s)

Cadent

Project Start

April 2022

Project Duration

0 years and 4 months

Nominated Project Contact(s)

Nolan Robertson

Project Budget

£211,808.00

Summary

Hydrogen is a key energy source for the Net Zero transition and is being considered as an alternative to natural gas. Over the next 5 years there is an ambitious work plan within the UK's gas transmission and distribution industry to prove the viability of blending hydrogen into the UK's existing gas networks.

This project seeks to explore and recommend adaptations to the existing commercial frameworks to enable hydrogen blending into the UK gas networks from industrial clusters.

Separate projects will explore the adaptations necessary to commercial frameworks in other blending scenarios, and the functional requirements for plant and infrastructure necessary to physically introduce and manage the hydrogen molecules into the networks.

Third Party Collaborators

Frontier Economics

Nominated Contact Email Address(es)

Innovation@cadentgas.com

Problem Being Solved

The UKs objectives to meet net-zero by 2050 require urgent solutions to decarbonise heat. 85% of homes are heated by natural gas, therefore an approach that includes repurposing all or part of the existing gas network for hydrogen service is likely to provide an effective solution. Furthermore, blending up to 20% hydrogen with natural gas could provide quick and meaningful carbon reductions, with little-to-no disruption for consumers. Blending hydrogen into the gas grid provides a reliable demand to enable the development of hydrogen production models and the wider supply chains. The government have recognised the important role of hydrogen blending by including the ability to blend hydrogen into the gas grids by 2023 as a policy objective within its 10-point plan.

The Hydrogen Blending: Functional Spec for Commercial Frameworks (Phase A) project seeks to deliver the first industry wide cohesive model of what it believes to be the best model for the early phase of hydrogen blending and the elements therein required to make it successful.

This first phase is an evaluation and subsequent recommendation of the adaptations necessary to the commercial and regulatory frameworks to enable hydrogen blending from track 1 industrial clusters during the early “prepare” stage blending connections. A second phase, which will be sanctioned separately, will then evaluate necessary framework adaptations for blending in all other credible scenarios.

The phase 1 project will explore the roles and responsibilities of participants in the hydrogen blending market and will deliver a networks view (with industry input) on the advantages and disadvantages of each and their suitability and acceptance with particular reference to:

a. Standards & Expectations

b. Roles and Responsibilities

c. Connections / Capacity Release Methodology

d. The commercial and regulatory framework

Another project, evaluating the scenarios to enable hydrogen blending from track 1 industrial clusters from a technical and engineering perspective, will be sanctioned and run in parallel to this project. Collaboration between the projects is expected

Method(s)

This initial phase of the overall project will look to identify and confirm stakeholders to act as the subject matter experts to be involved in subsequent phases of the project. The project will also seek to scope out the questions that need answering to build on the blending roadmap developed through previous work. Some of these questions include looking at what roles and responsibilities industrial parties will need to take on, in support of blending from track 1 clusters (including, what assets and activities they will be responsible for and their rights and obligations etc). The scope will also look at required amendments to regulations (such as GS(M)R) and explore Connections, billing and system operational considerations. The project will then progress through three further stages to engage with networks and cluster stakeholders, consolidate views and seek to develop a report setting out all of the views on the required next steps.

Scope

The scope of this first phase of the project is to determine the networks & clusters view of the necessary changes to the existing commercial frameworks to enable blending from industrial (track 1) hydrogen clusters.

An exploration into the adaptations and arrangements necessary for other blending scenarios will be addressed in a future, separately sanctioned, phase of the project.

Objective(s)

The core aim of this project is to deliver a view of the functional specification of the roles and responsibilities, rights and obligations required of industry parties to successfully deliver hydrogen blending from track 1 industrial Hydrogen Clusters (the HyNet and East Coast Clusters, plus). Based on a managed process of stakeholder engagement, and our own analysis, the project output will provide recommendations for the changes needed to the gas commercial and regulatory frameworks in order to enable such blending. We understand that this project is not intended to give definitive answers on how hydrogen blending will work; rather it is intended to establish and communicate (to BEIS and other stakeholders) views from networks and the industrial clusters, as well as reflecting initial input from the Gas Goes Green Advisory Group, on how blending from the Track 1 clusters could be enabled. These views would then be tested with wider industry stakeholders in future work, including through further engagement with the Gas Goes Green Advisory Group

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

The insight this work supports will help to establish a clearer view of the impacts of the transition to Net Zero one of these will be cost and the impact on the customer.

We conclude that this project will have a low impact on consumers in vulnerable situations. This is because the project methodology and the solution will not deliver outputs that will impact the financial or well-being of any consumers. It is envisaged that this project will enable a future low carbon safe, secure, and reliable energy supply.

Success Criteria

The success criteria for the project is the delivery of the following;

A cohesive, and agreed, networks and clusters view on the adaptations necessary to the current commercial and regulatory frameworks to enable hydrogen blending onto the UK gas networks from track 1 industrial hydrogen clusters.

Project Partners and External Funding

The UK Gas Networks are the delivery partners, expecting to fund through the NIA process on a 4,2,1,1,1 split of costs.

Frontier Economics will be the delivery partner.

Potential for New Learning

In addition to the primary requirements of this project, the gas networks and hydrogen clusters will develop a greater mutual appreciation of each's challenges which will support future relationships and ventures.

Scale of Project

This is a desktop exercise with some stakeholder engagement with the Networks, Hydrogen Clusters and GGG Advisory Group. Geographically, the footprint of the whole UK gas network is considered.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL3 Proof of Concept

Geographical Area

The results from this project will be applicable across the gas networks throughout the UK.

Revenue Allowed for the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

External costs - £169,446.00

Internal costs - £42,361.50

Total - £211,807.50

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 research project will define the UK Gas Networks first considered view of the necessary commercial framework changes required to enable hydrogen blending from track 1 industrial clusters.

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)

N/A

Please provide a calculation of the expected benefits the Solution

N/A

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

The findings from this project will be applicable to all instances of hydrogen blending from industrial clusters in the initial "Prepare" phase of hydrogen blending roll out.

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

N/A

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 learning from this project will be applicable to all instances of hydrogen blending from clusters in all UK gas 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)

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.

There is no previous work that is duplicated by this project. It builds on work already published and develops it the next stage of development of a commercial framework to enable blending from track 1 industrial clusters.

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

Hydrogen blending is new in the UK and there is currently no knowledge or guidance for adapting current arrangements to accept a hydrogen blend from an industrial cluster.

Relevant Foreground IPR

The foreground IP created in this project are determining the required adaptations to the current commercial and regulatory frameworks to enable hydrogen blending into the UK gas networks from industrial clusters.

Data Access Details

Current expectation is that all data used in this project will be sourced from published documentation or through consultation with selected stakeholder groups.

Data for this project and all other projects funded under the Network Innovation Allowance (NIA), Network Innovation Competition (NIC) or the new Strategic Innovation Fund (SIF) can be found or requested in a number of ways:

- A request for information via the Smarter Networks Portal at https://smarter.energynetworks.org, to contact select a project and click ‘Contact Lead Network’. Cadent already publishes much of the data arising from our innovation projects here so you may wish to check this website before making an application.

- Via our Innovation website at https://cadentgas.com/future-of-gas

- Via our managed mailbox futureofgas@cadent.com

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

The current work in this area is sufficient for conveying natural gas in the gas networks, but to understand the necessary arrangements for a hydrogen blend is not a BAU activity and is currently wholly funded via innovation mechanisms

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

This research project will explore and recomend novel arrangements to enable hydrogen blends into the UK gas networks. This is not a BAU activity for the networks, therefore no allowable funding is in place.

Should the networks not be able to demonstrate a means to bring a hydrogen blend into the gas networks from industrial clusters there is a risk that government policy may not support the futher development of hydrogen as a replacement fuel for natural gas.

This project has been approved by a senior member of staff

☑ Yes