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

Jul 2022

Project Reference Number

NIA_CAD0080

Project Registration

Project Title

Hydrogen Village Safety Framework

Project Reference Number

NIA_CAD0080

Project Licensee(s)

Cadent

Project Start

July 2022

Project Duration

0 years and 6 months

Nominated Project Contact(s)

Ian Redshaw

Project Budget

£26,330.00

Summary

This project will look at the co-dependencies and consumer attitudes of the exit strategy mechanism from the Hydrogen Village project at the end of the trial period. It is unlikely that a finalised position can be reached in 2022 on what the preferred exit strategy should be but a clear steer to enable engagement within the hydrogen village community should be identified and then a process agreed for reviewing this position in-light of further developments should be detailed.

Third Party Collaborators

GL Industrial Services Ltd

Nominated Contact Email Address(es)

Innovation@cadentgas.com

Problem Being Solved

The UK government has set out its ambition to support the delivery of a 100% hydrogen village trial by 2025, to understand the feasibility, costs, and convenience of using hydrogen for heat in occupied properties. A future decision on whether to proceed with the build and operation stages of a village trial will take place in 2023.

In December 2021 Cadent Gad Ltd (Cadent) made an application to Ofgem for hydrogen field trial ‘Stage 2’ which is a detailed design study for a hydrogen village trial, under the Net Zero Preconstruction and Small Project (NZASP) Re-opener. The Cadent proposal for an area within Whitby, Ellesmere Port had funding approved in March this year. This proposal by Cadent Includes development of a case for safety framework.

It is currently a requirement under the Gas Safety (Management) Regulations 1996 (GSMR) that before a gas transporter conveys gas in a network that they have prepared a safety case and had that safety case “accepted” by the Health and Safety Executive (HSE). The purpose of a safety case is to demonstrate that arrangements are in place for managing safe flow of gas in the network, particularly in relation minimising the risk of a gas supply emergency, dealing with supply emergencies and dealing with reported gas escapes.

A network conveying 100% hydrogen, including the village trial, does not fall under GSMR and therefore legally no safety case is required. Similarly, there is no other equivalent applicable legislation. However, in feedback to the Stage 1 proposals HSE have stated that duty holders should use GSMR as a template to produce a ‘Case for Safety’ to help evidence compliance with the Health and Safety as Work Act. This project investigate the framework of the Safety Case.

Method(s)

The principle methods used in this work include:

- Reviewing the existing Safety Case for natural gas today and suggesting where changes will be required for a hydrogen safety case

- Looking at current and completed learning from hydrogen projects. This can include projects such as HyDeploy, H21 and any learning from H100.

- Engaging with industry experts, in particular HSE, but also individuals within BEIS and Ofgem, to discuss and hopefully reach agreement with the proposed Safety Case Framework will be an important part of the project.

Scope

The scope of this project is:

1. The recommended structure of the safety case should be provided which will include all relevant elements of the trial.

This should recognise that for the hydrogen village trial, a safety case will be required which encompasses the holistic identification and management of risk, i.e. not limited to the network as defined in GSMR, but to include downstream hydrogen utilisation and hydrogen production and storage where it directly impacts the network operation.

Consideration should be given to completed and ongoing projects and approaches to developing safety cases, e.g. H100 and Hy4Heat.

Adaptability of the format for future trials or wider roll out should be considered.

2. The framework should include identification of suitable section headings

The general intent to broadly follow the GSMR approach should be taken into account.

GSMR sections which are not applicable to the trial should be identified.

New / additional sections that are required due to the conversion to hydrogen should be identified. This will be particularly important for those parts of the trial that are not currently covered within existing safety cases (downstream).

How downstream and production (if applicable) operations will be incorporated should be considered. This will include whether one or more documents are required, and where one document is recommended how these elements are incorporated within the text or whether sit in appendices or similar.

3. The framework should identify the content to be included within each section. As a minimum identify the level of detail and range of content, including indicative text.

Consideration should be given to the following documents;

• GSMR Schedules 1 & 2

• HSE's Safety Case Assessment Manual (SCAM)

• Examples of content of existing safety cases accepted by the HSE

4. The recommended content should identify how the range of evidence required for a hydrogen trial will be covered within a safety case, either by direct inclusion or referenced from a safety case.

Consideration should be given to "HSE Safety Assurance Protocol : Hydrogen for Heat : Safety Demonstration : Considerations for Trials".

5. Identify and agree suitable HSE engagement

HSE have confirmed their intent to engage with the development of proposals for a safety case framework.

It should be noted that there is no financial benefit for the consumer to this project.

Objective(s)

The objectives of the project are as follows:

- Develop a framework for a Safety Case for a hydrogen village network trial. This can be based on previous Safety Cases submitted to the HSE for review (e.g., accepted network safety cases and HyDeploy) and also any necessary improvements to the framework.

- Work with external organisations such as the HSE to ensure that they agree with the findings and are content with the suggested framework

Understand how technical evidence underpins the Safety Case and how any immediate gaps can be filled.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

There is no impact of this project on consumers in vulnerable situations. This study is entirely desk-top and does not interface with vulnerable customers.

Success Criteria

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

The deliverables from this project will be:

1. Draft Safety Case framework.

2. Minutes from the Safety Case framework workshop.

3. Mapping of the Trials Considerations Spreadsheet to the Safety Case framework

4. Final Safety Case framework.

Project Partners and External Funding

The project partners are:

Cadent Gas Ltd

SGN

NGN

WWU

Potential for New Learning

This project will be supported by all the GDNs and is being commissioned as part of the Hydrogen Village Trial GDN collaborative projects workstream.

This workstreams progress is presented to BEIS, OFGEM, the HSE and all the GDNs on a bi-weekly basis when an update on progress. It is through this workstream that the project will be disseminated.

Scale of Project

This will be an entirely desk based and done at an appropriate scale.

Technology Readiness at Start

TRL7 Inactive Commissioning

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

This project is not bound or limited by a particular geographical area. The output of this project could be applied to any project that is looking to undergo a hydrogen village demonstration project.

Revenue Allowed for the RIIO Settlement

Not applicable to this R&D project.

Indicative Total NIA Project Expenditure

External funding to suppliers – 19.75k

Internal funding – £6.58k

Total funding: £26.33k

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 is a vital enabler to the Hydrogen Village, which has a considerable benefit in facilitating the energy system transition.

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

Not applicable

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)

Not applicable

Please provide a calculation of the expected benefits the Solution

Not applicable (this is a research project)

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

The intention is for this project to be relevant and therefore replicable to all hydrogen village trials.

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

Not applicable

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 can be used by any network that intends to do a hydrogen village trial or built upon by any network that intends to do any subsequent trials.

Or, please describe what specific challenge identified in the Network Licensee's innovation strategy that is being addressed by the project (RIIO-1 only)

Not applicable

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 being undertaken in this area due to the novel nature of the Hydrogen Village.

If applicable, justify why you are undertaking a Project similar to those being carried out by any other Network Licensees.

Not applicable

Additional Governance And Document Upload

Please identify why the project is innovative and has not been tried before

This project is a vital enabler for the Hydrogen Village trials which is a highly innovative programme that has not been replicated anywhere else in the world to date. This project has been initiated as part of the collaborative projects agreed by BEIS and Ofgem ahead of the project commencing.

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 hydrogen village projects and any of the associated enabling projects, cannot be considered as BAU due to their first of a kind nature and risks which go beyond BAU.

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 project has inherent risks due to its first of a kind nature so it is right it should be supported using NIA funding.

This project has been approved by a senior member of staff

☑ Yes