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 2022

Project Reference Number

NIA_WWU_2_13

Project Registration

Project Title

EUSE – Hazardous Areas Within Buildings

Project Reference Number

NIA_WWU_2_13

Project Licensee(s)

Wales & West Utilities

Project Start

November 2022

Project Duration

0 years and 3 months

Nominated Project Contact(s)

Darren Cushen

Project Budget

£33,497.50

Summary

This project will fulfil the need to understand the safety implications associated with the conversion to hydrogen and use of the existing infrastructure within homes. Networks need to understand if the conversion brings about new issues in relation to proximity to other existing utilities within properties.

This project will examine the existing work that has been done in this area for natural gas, as well as any other work that has been done as part of the ongoing evidence gathering for the use of hydrogen.

Preceding Projects

NIA_WWU_2_12 - EUSE - Ventilation Within Buildings

Third Party Collaborators

Kiwa

Nominated Contact Email Address(es)

innovation@wwutilities.co.uk

Problem Being Solved

The UK government has committed to reducing greenhouse gas emissions to net zero by 2050 with the Scottish government targeting net zero by 2045. All future energy modelling identifies a key role for hydrogen in providing decarbonised energy for heat, transport, industry and power generation. Significant decisions on the future of UK heat policy are expected from the UK government in 2026 so the need for further evidence to influence these decisions is of critical importance.

As part of the BEIS and Ofgem Hydrogen Village Trial, a number of projects have been identified through the End User Safety Evidence (EUSE) working group. The projects have been split between the four Gas Distribution Networks (GDN) with WWU taking lead on two projects, one of which is Hazardous Areas Within Buildings.

Method(s)

This project will fulfil the need to understand the safety implications associated with the conversion to hydrogen and use of the existing infrastructure within homes. Networks need to understand if the conversion brings about new issues in relation to proximity to other existing utilities within properties.

This project will examine the existing work that has been done in this area for natural gas, as well as any other work that has been done as part of the ongoing evidence gathering for the use of hydrogen.

KIWA will provide evidence and learnings in the following areas:

1. Literature review of existing work on hazardous areas for natural gas.
2. Literature review of existing work and ongoing work on hazardous areas for hydrogen.
3. Full final report on finding from literature review and findings on what if any issues arise in regards hazardous areas withing domestic properties as a result of repurposing downstream of the meter for hydrogen.

Measurement and data quality statement:

We will achieve by creating and applying a Quality Assurance (QA) plan including a QA log. These will be based on templates from the Department for Business, Energy & Industrial Strategy (BEIS) (for whom we are undertaking similar activities) and our experience of producing high quality research reports for clients.

The key aspects that will be quality assured are:

Literature review execution where the methodology will be defined to ensure that the quality and reliability of the sources is assessed correctly so that appropriate emphasis can be placed on the information that they yield. Checks will be made to ensure that it is consistently applied.

Literature review output where the output will be checked to ensure that the questions are answered and that where possible evidence gaps have been filled and if not, have been defined such as to inform the modelling activities. A formal record of each source reviewed and the findings with regards to its value and reliability will be made. This will be reflected in the reporting of the project.

Reports will be subject to a formal Technical Quality Review to ensure their quality prior to release.

Reports will be assessed against quality criteria which will include:

1. Accuracy (including correct reporting of modelling results)
2. Clarity (including spelling, grammar)
3. Graphics (including correct communication of information)
4. Appropriate referencing (mainly for the sources identified in the desk study and literature review),
5. Data and calculations,
6. Timeliness of delivery,
7. Stakeholder engagement.

The project is rated low in the common assessment framework detailed in the ENIP document after assessing the total project value, the progression through the TRL levels, the number of project delivery partners and the high level of data assumptions. No additional peer review is required for this project.

Scope

Existing work / current landscape assessment: A full list of outcomes and reference topics shall be curated and agreed to support a high-quality and effective literature review to provide a strong evidence base of the material assessed.

Kiwa will initially design the literature review architecture to identify, assess and catalogue the existing work that has been done in this area for natural gas.

Kiwa will categorise the information for reliability (depending on source: peer reviewed, industry publications, information held by Kiwa

from past studies and investigations, grey literature, etc.)

They will then identify and collate the information that may contribute to findings in the following stages of the project below

Literature review – hazardous areas for hydrogen: Kiwa will conduct initial desktop research into relevant projects and produce a literature framework to analyse the outputs from all projects identified in consideration of the agreed outcomes.

The project will also include information relating to use of town gas. Some formulations supplied in east Asia contain high levels of hydrogen (~70%) so including information relating to this will provide a broader view of the way in which risks associated with the presence of hydrogen in an ambient mixture is treated.

IGEM/SR/25 Hazardous area classification of natural gas installation is in the process of being updated with a supplement for hydrogen and blends of up to 20% hydrogen in natural gas. This and other areas of future roadmaps that are relevant to this topic shall be identified and reviewed as part of this task.

Final Report: All of the above will be compiled into a formal report, with an exec summary.
There is a lot of ongoing work to identify the most effective route to meet net zero in the UK and this project is one of many projects to evidence the major or minor role hydrogen will have in different scenarios. Repurposing the UK gas networks with hydrogen to support the challenge of the climate change act has the potential to save £millions with minimal gas customer disruption verses alternative decarbonisation solutions

Presentation compiled and delivered to HSE ERG review group.

Objective(s)

To investigate the safety implications associated with the conversion to hydrogen and use of the existing infrastructure within homes

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.

Success Criteria

A successful project will produce a report on issues that may arise with regards to hazardous areas within domestic properties as a result of repurposing downstream of the meter for hydrogen.

Project Partners and External Funding

Project Partners: KIWA. The project will be fully funded via NIA

Potential for New Learning

The outputs of the project will help understand if there are any issues arising from the conversion of internal pipework to hydrogen on the proximity to other services hydrogen within domestic properties. The learnings will be shared with the other networks, HSE, BEIS and Ofgem through the End User Safety Evidence working group as well as through the usual route of the Smarter Networks Portal.

Scale of Project

This will be a desktop study, which is the appropriate scale for this project. This allows networks to assess the impacts of the findings before deciding if further work is needed in this area.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL3 Proof of Concept

Geographical Area

The project is applicable to the entire GB network.

Revenue Allowed for the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

External £25,497.50 Internal £8,000 Total £33,497.50

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 project is necessary to facilitate the transition to a natural gas transmission and distribution system to a network transporting 100% hydrogen. Conversion of existing pipework within domestic properties will need to be assessed to ensure that there are no concerns over the proximity to existing services. This project will undertake assessment of the work done for existing natural gas installation in order to quantify the suitability for current configurations to be used for 100% hydrogen. A literature review of existing natural gas work will be completed in order to get a baseline, the ongoing and completed work for hydrogen conversion will then be looked at to identify if any changes are required

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

This is a research project.

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

This will be fully replicable across all networks.

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

There are no roll out costs at present, as this is a research project.

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

As part of the BEIS and Ofgem Hydrogen Village Trial, a number of projects have been identified through the End User Safety Evidence (EUSE) working group. The projects have been split between the four Gas Distribution Networks with WWU taking lead on two projects, one of which is this project.

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.

As part of the BEIS and Ofgem Hydrogen Village Trial, a number of projects have been identified through the End User Safety Evidence (EUSE) working group. The projects have been split between the four Gas Distribution Networks with WWU taking lead on two projects, one of which is this project.

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

Assessment of existing gas pipework within domestic properties under hydrogen transportation conditions is being looked at through various End User Safety Evidence projects. The effects if any on separation distances to existing services such as electric cables is currently unknown. Understanding the results of this project will allow a more comprehensive assessment of the feasibility of conversion of existing UK domestic properties gas infrastructure for the use in transporting hydrogen. The output of this project will be integral in quantifying the feasibility of large-scale hydrogen conversion of existing natural gas infrastructure

Relevant Foreground IPR

The project will produce a report which forms the foreground IPR

Data Access Details

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'. WWU 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 http://www.wwutilities.co.uk/about-us/our-responsibilities/innovation/
Via our managed mailbox innovation@wwutilities.co.uk
Details on the terms on which such data will be made available by Wales & West Utilities can be found in our publicly available "Data sharing policy relating to NIC/NIA projects" http://www.wwutilities.co.uk/about-us/our-responsibilities/innovation/

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

Ofgem published its final determinations which included a variety of provisions to enable necessary development work on Net Zero projects but also to ensure vulnerable customers are thought about in any decision making. This project has the potential to facilitate the energy system transition, while also keeping vulnerable customers front and centre of our thinking and is therefore eligible to use the NIA funding mechanism.

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 the realisation 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 there is a risk that if hydrogen is not accepted as a means to heat homes in 2050 that this work is no longer valid.

This project has been approved by a senior member of staff

☑ Yes