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

Jan 2023

Project Reference Number

NIA_WWU_02_15

Project Registration

Project Title

Hydrogen Village Regulation Project

Project Reference Number

NIA_WWU_02_15

Project Licensee(s)

Wales & West Utilities

Project Start

February 2023

Project Duration

0 years and 6 months

Nominated Project Contact(s)

Richard Pomroy

Project Budget

£262,827.00

Summary

The UK Government's Energy White Paper (2020) has identified hydrogen as a potential source of decarbonised heat in buildings. In order to prove the viability of hydrogen the UK Government requires a strong evidence base before deciding whether to promote hydrogen distributed in the existing gas network infrastructure (at all current pressures) to decarbonise heat.

WWU is working on the next phase of a project to develop Wales' first low carbon village. This will consider the potential for locally generated hydrogen to be blended into the low pressure gas distribution network to serve a village. This project will examine the commercial and regulatory requirements for this project. The learning from the project will be applicable to other blended projects in the UK.

Preceding Projects

NGGDGN03 - HyDeploy

Third Party Collaborators

Frontier Economics

Nominated Contact Email Address(es)

innovation@wwutilities.co.uk

Problem Being Solved

The UK Government's Energy White Paper (2020) has identified hydrogen as a potential source of decarbonised heat in buildings. In order to prove the viability of hydrogen the UK Government requires a strong evidence base before deciding whether to promote hydrogen distributed in the existing gas network infrastructure (at all current pressures) to decarbonise heat. A number of different

areas of evidence will be required to satisfy the use case for hydrogen including evidence on the feasibility, cost, convenience and safety of transporting 100% hydrogen.

WWU is working on the next phase of a project to develop Wales first low carbon village. This will consider the potential for locally generated hydrogen to be blended into the low pressure gas distribution network to serve a village. This project will examine the commercial and regulatory requirements for this project. The learning from the project will be applicable to other blended projects in the UK.

Method(s)

The project builds on work by NGN's blending project HyDeploy funded by NIC and Cadent's work on blending from industrial clusters at LTS and above. This project is part of the wider community energy project HyRes that is funded outside of NIA and seeks to demonstrate hydrogen blending into a rural below 7Bar network using established industry processes. The solution will be applicable to a wide range of rural areas considering community energy projects or Smart Local Energy Systems.

The main aim of this project is to identify the commercial and regulatory requirements to enable locally generated hydrogen to be blended into a rural below 7Bar gas network to serve a village. The specific village being targeted within the HyRes project is South Cornelly, but the findings will be generalisable to other similar projects. The project will deliver recommendations for policy and regulatory developments to support similar future community energy projects.

Data Quality Statement

All data and information used in this project will be subject to Frontiers standard QA review process to ensure that project outputs are accurate to the best of their knowledge. At a high-level, our review process includes answering the following key questions: Validation – is the analysis a suitable representation of the world?; Verification: have all calculations included in the analysis been implemented correctly?; Data and assumptions: are the inputs to the analysis appropriate? They will ensure that sources of data and information are appropriately documented. Data and information collected as part of this project will be stored on their internal systems ensuring backup and future access.

Measurement Quality Statement

The project will be subject to Frontiers internal Quality Management System. Their internal Quality Management System is consistent with best practice quality assurance principles. For this project, all outputs and draft reports would be read, discussed, tested, and challenged internally before being delivered, to ensure the clarity, accuracy and relevance of the material presented. The team structure is such that there is clear accountability for the quality of the work which rests with the Project Manager in the first instance and ultimately with the Project Director. While this project will involve limited quantitative analysis, for all quantitative analysis undertaken on the project, Frontier would follow their standard QA review process. All project outputs will be stored on their internal systems ensuring backup and version management.

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

Scoping (Phase One)

In this stage of work, Frontier will first confirm the relevant stakeholders they will engage with during Phase 2. For this project, the stakeholders are likely to include:

- Customers on the specific part of the network identified by the HyRes project, but also representatives from other customer types that could exist on other single feed below 7Bar networks. We will work with WWU to identify customers on the relevant network, but will also conduct out own research, including reaching out to Xoserve to understand what customer types they identified for HyDeploy;
- Hydrogen producers:
  - Marubeni Europower, who we understand is planning to develop a green hydrogen demonstrator plant in Bridgend county borough, where South Cornelly is located;
  - Other representative hydrogen producers that might supply projects similar to this;
- One or two other Gas Transporters, to ensure that conclusions are generalisable to other distribution networks;
- Independent Gas Transporters (IGTs);
- Shippers and Suppliers;
- Xoserve;
- Metering Equipment Managers;
- HyRes project representatives;

- Policymakers, specifically BEIS and Ofgem.

Stakeholder Engagement (Phase two)
The stakeholder engagement will involve a number of in-depth stakeholder workshops, as well as smaller ad-hoc discussions with specific stakeholders where necessary to further explore specific details. The core workshops will cover:

- In the first workshop, Frontier will present to stakeholders the impacts and challenges identified in the scoping meeting in Phase 1. The aim will be to discuss these in more detail and identify any additional impacts. The outcome of the workshop should be an agreed list of challenges to resolve.
- In subsequent workshops, the aim will be to develop solutions to the impacts/challenges/constraints identified. The aim throughout will be to identify changes only where necessary, to enable blending quickly, and at reasonable cost and effort.

In total it is anticipated that three main workshops will take place.

Consolidation (Phase three)
In this stage, Frontier will review the inputs received from the stakeholder group, noting areas where there is and is not consensus. Where there is not consensus, they will carry out further work to evaluate the pros and cons of the different options. Any evaluation of options will need be based on a set of pre-determined criteria, covering factors such as delivering efficient outcomes, feasibility/practicality, path dependency towards 100% hydrogen, and fairness.

Developing outputs (Phase four)
This final stage will involve writing up the findings from the consolidation stage into a report.
The report will summarise the recommended changes for the gas commercial and regulatory frameworks to enable this project and similar future projects, with explanations of the purpose and need for these changes, including an explanation of stakeholder views in each area.

Objective(s)

To identify the commercial and regulatory requirements to enable locally generated hydrogen to be blended into a rural below 7Bar gas network to serve a village.

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 see the production of a report summarising the recommended changes for the gas commercial and regulatory frameworks to enable future hydrogen projects to move forward.

Project Partners and External Funding

Project partners are Frontier Economics and the project will be fully funded via NIA.

Potential for New Learning

Identify what is required to enable hydrogen injection into a single feed below 7Bar network using established industry processes to minimise changes to central industry processes and other industry parties' processes.

Scale of Project

The project will look at the commercial and regulatory requirements to introducing up to a 20% blend into the gas network. The scale of the issue is UK wide and will affect all networks. Both commercial and regulatory aspects will need to be looked at together as they both need to be addressed in order to come up with a solution. The case study village will look at the requirements on a small scale that can then be expanded up. The investment required will allow the gas networks to understand the changes required and potential solutions to the problems currently prohibiting the introduction of a 20% blend for domestic heating.

Technology Readiness at Start

Technology Readiness at End

TRL2 Invention and Research	TRL3 Proof of Concept

Geographical Area

This project focuses on South Cornelly, a village in South Wales. However learnings will be applicable to similar size villages across the UK.

Revenue Allowed for the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

External Costs: £197,120

Internal Costs: £65,707

Total costs: £262,827

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:

There is a need to undertake evidence gathering to understand the commercial and regulatory requirements to enable locally generated hydrogen to be blended into a rural below 7Bar gas network to serve a village.

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

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.

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

This will be fully replicable across similar villages across the UK.

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

The outputs of this project will not involve roll out costs.

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

- ☐ 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 outputs of the project will highlight the commercial and regulatory arrangements that will need to be changed in order to allow a 20% blend to be introduced into the gas network and customers to be billed correctly.

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.

All networks have been made aware of this project, Cadent wanted to ensure there was no duplication with project NIA_CAD0050. However there are distinct differences highlight below, Cadent were comfortable on the differences.

The South Cornelly Regulation project will focus on identifying the commercial and regulatory requirements to enable locally generated hydrogen to be blended into a rural below 7Bar gas network. While this project will build on earlier work undertaken on commercial and regulatory requirements to enable hydrogen blending, including an NIA project undertaken by Cadent in GD1, and collaborative work between network licensees on blending, the distinct focus of this project will be on specific impacts/challenges/constraints and requirements to facilitate blending into low pressure networks and support community energy projects. This differs from the Cadent NIA project which did not focus on specific impacts/challenges/constraints and requirements at this level. The Cadent NIA project also focused on setting out a longer-term timeline for adaptation of frameworks to enable hydrogen blending in general, whereas this project will focus on specific actions required for near-term, practical implementation.

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

This level of detailed analysis on the regulatory barriers to hydrogen has never been carried out. By completing this work we move closer to being able to decarbonise the network by providing hydrogen to homes and businesses. There are many stages to decarbonising the network and this project is the next step in that journey.

The UK gas networks are working on a wide range of projects to understand the feasibility of hydrogen as an energy solution for the UK as part of the net zero targets for 2050.

Relevant Foreground IPR

The project report will form the relevant 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 here
- 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" here

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