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## NIA Project Registration and PEA Document

### Date of Submission

Aug 2022

### Project Reference Number

NIA2\_SGN0025

## Project Registration

### Project Title

Interventions for Hydrogen by Asset Group

### Project Reference Number

NIA2\_SGN0025

### Project Licensee(s)

SGN

### Project Start

August 2022

### Project Duration

1 year and 6 months

### Nominated Project Contact(s)

Innes Maciver

### Project Budget

£276,547.00

## Summary

The project will look to develop an asset category framework and database to enable the networks to collate all the information, evidence and data generated from previous network hydrogen projects into one central location. This will help to highlight where evidence gaps still exist and the interventions required to fill them. The database will expand on the ENA NSIB evidence framework with each of the themes within this framework further divided into categories and sub-categories.

The project will bring visibility to the status of the research work overall, identifying expected completion dates, RAG categorisation of the research work in terms of remaining knowledge gap, and will also help to avoid any unnecessary duplication within hydrogen projects and trials.

### Nominated Contact Email Address(es)

sgn.innovation@sgn.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 2025 so the need for further evidence to influence these decisions is of critical importance.

The next step of the UK government's Ten Point Plan is the Hydrogen Village trial which is looking to run a 100% hydrogen network of up to 2000 homes, offices and other buildings for a period of 2 to 3 years. The Village trial will focus on how the existing gas network can be repurposed and will build on evidence gained from previous hydrogen studies such as Hy4Heat, HyDeploy, H21 and H100. The main problem with the evidence already gathered from these projects is there is no formal database or similar for storing this data and therefore identifying future issues and outstanding gaps can be difficult to ascertain.

## Method(s)

The project will be split in 3 main phases, outlined below:

- Phase 1 – Initiation and Definition.
- Agreeing the studies to be included – should this include HyDeploy (hydrogen blend) and Hy4Heat (end use)?
- The boundaries of the study – should this include production/storage, pipelines, AGIs etc?
- Defining the type of study and whether the evidence is sufficient and credible enough to be used in a trial.
- Framework definition – confirm the categories and sub-categories required to support conversion.
- The classification of assets and their sub-categories.
- Agreeing who will supply the information/data and when to enable the project to be delivered on time.
- Inclusion of Technology and Commercial Readiness Levels (TRL and CRL) for equipment.
- Phase 2 – Analysis of the Data
- This phase will include the detailed project work following consultation with the networks.
- Create a database to map all the evidence in a single location.
- Identify knowledge gaps using existing gap analyses generated by HSE and BEIS NSI programme of work.
- Detail interventions required outlining what needs to be done, the parameters that need tested and any risks associated with the knowledge gaps.
- Phase 3 – Reporting
- An interim report will be published in April 2022 in time for networks' bids to Ofgem including outcomes from Phase 1 and the key outcomes that had been agreed for Phase 2.
- It is proposed that DNV maintain and update the database using a SharePoint site or similar with access granted to an approved list of gas network stakeholders.

### Measurement Quality Statement

The project will use the above phased approach to ensure all parties agree the process before proceeding to future phases. The main approach of the project will be to identify and record what work has been done and the work that needs to be done with the project information stored in a database accessible to all key stakeholders.

### Data Quality Statement

Regular meetings will be held with key stakeholders from each network and DNV to agree the format for the sharing and storage of project data. This is important as it will allow the gas networks to demonstrate to BEIS and Ofgem that there is no unnecessary duplication within the various hydrogen projects and trials, and justify any additional research required for the Hydrogen Village trials. DNV's involvement in the project will ensure a consistent approach in the presentation of the evidence and data due to their involvement in ongoing projects including H21 and H100.

## Scope

The gas networks currently share findings from their trial projects either directly with project partners or through industry groups like the ENA. This project will aim to document a detailed framework of all the areas that need to be addressed, the research and development work produced to date, the status and acceptance level of this work, and identify any remaining gaps.

The scope of work will take inputs from the gas networks and any relevant supporting hydrogen transition research projects. The information gathered will be shared with the ENA and the gas networks and peer reviewed. The output of this scope of work will support the FEED phase of successful Hydrogen Village application during 2022.

Each stage will be followed up with a group presentation of the work developed to date to facilitate group discussion and the transfer

of information. The project aims to bypass potential issues that gas networks have with sharing information of ongoing projects by collating information on the nature of the research, sharing preliminary findings, assessing how successful the research has been in addressing gaps i.e. any red flags or further gaps identified and indicating when the research report will be released for sharing/peer review with other gas networks.

The project database will link to research reports as they are made available either through the gas network website or the IGEM Hydrogen Knowledge Centre. A SharePoint site (or similar) will also be created for any additional reports/information that are not publicly available but can be shared amongst named personnel who are stakeholders within this project. DNV will create and initially manage the database.

## Objective(s)

The main objectives of the project are to analyse and collate the existing information from previous relevant hydrogen projects, produce a categorisation framework to identify any gaps in the evidence, detail the proposed interventions required to close these gaps, prepare a report detailing the work undertaken, and develop and maintain a database to monitor the progress of the intervention work undertaken through future hydrogen projects.

## Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

A successful trial has the potential for the roll out of hydrogen as a form of energy for heating to those currently not connected to the gas grid. This could mean those financially not able to use natural gas to heat their home may be able to with hydrogen. The outcomes of the project will not adversely affect vulnerable customers but feeds into a wider piece of work to decarbonise the gas network. Other projects will explore how vulnerable customers will not be left behind on this journey.

## Success Criteria

The key success criteria of the project include:

- An agreed framework categorisation with detailed sub-categorisation to allow easy gap analysis assessment.
- An interim database representing the agreed framework, completed with the current information status per sub-category, including links to relevant available reports.
- An interim report summarising the methodology and findings of the work.
- A final database and report, building on and completing the interim database and report.

## Project Partners and External Funding

DNV, SGN, Cadent, NGN and WWU.

Project wholly funded through NIA.

## Potential for New Learning

This project will highlight gaps in the knowledge required to convert the existing gas networks to 100% hydrogen and identify the interventions required to close these gaps.

## Scale of Project

This project will be a combination of desktop study, collaborative meetings and 1-2-1 reviews with the main objective being to create a database of learning so far in the role hydrogen can play in the energy systems transition. This is the appropriate scale for this project, ensuring there is a beneficial output, with minimal risk on non-delivery.

## Technology Readiness at Start

TRL3 Proof of Concept

## Technology Readiness at End

TRL4 Bench Scale Research

## Geographical Area

The project will aim to be representative of the whole of the GB gas network.

## Revenue Allowed for the RIIO Settlement

Not applicable

## Indicative Total NIA Project Expenditure

SGN External – £51,250

SGN Internal – £17,066

Cadent External – £102,500

Cadent Internal – £34,170

NGN External – £25,625

NGN Internal – £11,769

WWU External – £25,625

WWU Internal – £8,542

Total – £276,547

## 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:

The project will assist with the energy system transition through enabling future projects to be targeted towards gaps in the knowledge and demonstrating where a trial will need to conduct further research and testing to support the transition. It will encourage a high degree of collaboration through regular meetings and peer review, and provide the gas networks with a regularly-updated resource of information.

#### 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

There is a lot of work ongoing to identify the most effective route to achieve the net zero targets set by the UK and Scottish governments and this project is one of the many that will look to evidence the role of converting the existing gas networks to 100% hydrogen can play. Repurposing the UK gas networks to 100% hydrogen has the potential to save millions of pounds with minimal gas customer disruption versus alternative decarbonisation solutions.

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

The project will be a collaboration of the all the GB gas distribution networks with an emphasis on knowledge sharing. For the Hydrogen Village trial, the project will ensure that all results are representative of all GB gas networks by keeping a record of what was tested including different makes, models, size, materials, operational history, maintenance etc.

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

All the gas distribution networks are involved in this project and the output will be a database that will be free for all to use to identify and close out any remaining knowledge gaps. The roll out costs will therefore be minimal.

### 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

This project will assist with identifying gaps in the knowledge required to convert the gas networks to 100% hydrogen. This will assist all network operators in preparing the scope for any future trials. Findings from the project will be available to all relevant stakeholders through the report and associated database.

#### 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.

Through the creation of a central database for all previous, ongoing and upcoming research on hydrogen projects to ensure there is no duplication in any future hydrogen projects and trials.

#### 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

As hydrogen use as a fuel gains momentum and becomes a key energy system for the UK, there is a requirement for use to identify and close out any remaining gaps in our knowledge base.

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 and this project will collate all this information in one central database accessible by all relevant stakeholders.

## Relevant Foreground IPR

Not applicable

## Data Access Details

Relevant data from the project will also be shared with key network stakeholders through the interim database and regular collaborative meetings. Information relating to the project will be published on the ENA Smarter Networks Portal at <https://smarter.energynetworks.org/>

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

This project isn't being funded as business as usual because it is deemed an essential part of the Hydrogen Village trials process which is a key step towards conversion of the existing gas network to 100% hydrogen.

## 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 NIA framework offers a robust, open framework to support this work and ensures the results are disseminated to all licenses. The conversion of the GB gas network to 100% hydrogen is a key step on the road to net zero.

## This project has been approved by a senior member of staff

Yes