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NIA Project Registration and PEA Document

Date of Submission

Aug 2022

Project Reference Number

NIA2_SGN0026

Project Registration

Project Title

Hydrogen Village Trial Hydrogen Appliance Supply Chain

Project Reference Number

NIA2_SGN0026

Project Licensee(s)

SGN

Project Start

August 2022

Project Duration

0 years and 8 months

Nominated Project Contact(s)

Houra Mozaffar

Project Budget

£263,993.00

Summary

SGN were nominated by BEIS and Ofgem, as part of the Hydrogen Village Trial to assess the supply chain of hydrogen appliances from a network compatibility perspective. The term appliances encompassing the end user appliances such as the boilers, cookers and fires but also ancillary devices (e.g. meters), and any other necessary equipment required for a trial aiming to convert from natural gas to hydrogen. The assessment will cover both domestic and light commercial appliance. Furthermore, the program will inform the gas distribution networks on the requirements from the end users in a future with hydrogen and will help the networks identify how to this demand can be met.

Third Party Collaborators

Arup

Nominated Contact Email Address(es)

sgn.innovation@sgn.co.uk

Problem Being Solved

For achieving the UK government net zero policy by 2050 (the Scottish government targeting 2045) one of the key low carbon alternatives to natural gas, is replacing it with hydrogen which can provide a decarbonised energy source for heat, transport, industry and power generation. Currently there is no clear understanding and documentation on the availability and readiness of domestic and commercial hydrogen compatible appliances in the UK market. Hence assessment of the required range and volume of appliances, ancillary devices (e.g. meters), and any other necessary installations is essential for the rollout of hydrogen and success of the hydrogen system transformation in the HVT which underpins both the town and FEED studies. So as part of SGN's commitment to collaborate towards the success of this project, we are leading on a project with the objective to assess the readiness of the supply chain for hydrogen appliances. This will include setting out the actual delivery timescales of certified equipment and appliances to be used within the final hydrogen village project, town and FEED.

Method(s)

In this project we will do the following:

- 1) Lead an assessment of the required range and volume of appliances, ancillary devices, and other necessary installations
- 2) Develop commercial agreements or proposals from OEMs
- 3) Complete an analysis of existing and new technology or products required to enable a hydrogen village trial
- 4) Commission Arup to assist with quick and efficient delivery of this project using their knowledge acquired in previous projects and through the Hy4Heat program

Scope

From the requirements set out by BEIS in their HVT Bid Proforma and the BEIS Completion Requirements, the following tasks will be carried out:

- 1) Supply chain analysis: Effectively engage with Original Equipment Manufacturers (OEM) to understand what appliances (domestic and non-domestic) will be necessary and available for the trial, town and FEED. This will enable the development of a comprehensive portfolio of appliances and thus give the consumers taking part in trials a wide range of choice of appliances to choose from but also identify gaps where appliances have not been developed, or do not meet network requirements. The project will also need to inform the OEMs of the type and range of appliances that will be required for the trials and subsequent work and when these will be needed to ensure the production lines will be ready in time. Therefore, liaisons with the trial's survey teams will be required (Note that where gaps are identified, these will need to be raised at the earliest point with the OEMs to allow as much time as possible for the gaps to be closed. It is the GDNs understanding that this will be time critical so we will be looking to accelerate all aspects of the project where possible / sensible).
- 2) Assessment of Appliance Reliability: To understand the OEMs processes for certifying appliances and guaranteeing reliability (accelerated life testing, etc) and ensuring this is complete before entering the procurement stage of the appliances.
- 3) Development Strategy: Where appliances have not yet been developed, the project shall seek to identify alternative routes to get appliances converted to hydrogen (potentially more of an issue for commercial appliances).
- 4) Develop commercial arrangements: between the GDNs running the HVT and the OEMs and devise a procurement strategy to give confidence in availability of appliances. This will mean that a timeline will be made that will show the process for procuring the appliances with deadlines that will be backed up by firm commitments from the OEMs (with details of duration, volumes and any assumptions/special conditions).
- 5) Develop written reports: that can be presented to BEIS and Ofgem to answer the completion requirements as set out.

Objective(s)

Objective of this work is to assess the readiness of the supply chain for hydrogen appliances the network requires to service for the HVTs, Town and FEED. For this purpose, it is required to collect details of the types and quantities of all hydrogen appliances required, what has been already developed, what is going through the development stage and confidence in availability of such appliances. Furthermore, detailed procurement strategy should be put in place for all conversion work, including appliances, ancillary devices and all necessary components.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

Success of the HVT, which is highly dependent on the outcome of this project, has the potential to impact the roll-out of hydrogen as a form of energy for heating to current NG consumers and even those currently not connected to the gas grid. All hydrogen appliances will be installed and used regularly within consumer properties, hence consumers will be directly impacted by the HVT. With current net zero targets and the rising NG prices, the success of the HVT will not adversely affect vulnerable customers. Moreover, a successful HVT could benefit consumers by replacing NG with a green and potentially cheaper source of energy.

Success Criteria

Delivery of a final report to fulfil requirements set out by BEIS and Ofgem by the end of Q1 2023; the report should include a complete supply chain analysis, assessment of appliance reliability, development strategy for appliances that have yet not been developed and a commercial arrangement between the GDNs running the HVT and the OEMs.

Project Partners and External Funding

While this project is led by SGN and is mainly funded through SGN and NIA, it is a collaborative work between all GDNs and British Gas. All partners will share their relevant information to fill the gaps and assist with the effective delivery of the work .

Potential for New Learning

There is yet no clear understanding of the readiness of the hydrogen appliance UK market so this project will help understand what is currently available in addition to clarifying what is in development to meet the market needs. Consequently, it can initiate a number of R&D project with the aim of building the required components or finding a suitable alternative to any unavailable appliances and ancillary products.

Scale of Project

Around 1000-2000 properties are required to take part in the hydrogen village trial. To understand the market requirements, surveys will be carried out over at least 2000 properties within the HVT locations. In the meantime, this project will reach out to as many available relevant domestic and commercial appliance manufacturers as possible both within the UK and Europe where necessary. The more potential hydrogen appliance manufacturers contacted, the higher the chances of finding suitable hydrogen appliances for the HVT and as a result the more households and commercial businesses we can bring on board to take part in this trial.

Technology Readiness at Start

TRL5 Pilot Scale

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

The project aims to fulfil the whole of GB.

Revenue Allowed for the RIIO Settlement

Not applicable

Indicative Total NIA Project Expenditure

Recoverable through NIA (Innovation): £237,594

SGN Internal Net Cash Flow: £26,399

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 evaluates the extent of hydrogen appliance readiness in addition to identifying gaps and assisting with finding solutions for overcoming these gaps. Readiness of the supply chain for hydrogen appliances will play an important role in the success of the hydrogen village trial. Success of the HVT will be a determining factor in the UK government decision for the potential role out of hydrogen and decarbonising the gas network over the entire GB.

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

With current net zero targets and the rising NG prices, the success of the HVT could benefit vulnerable consumers by replacing NG with a green and potentially cheaper source of energy and even provide an opportunity for those currently not connected to the gas grid to join the network and benefit from this clean energy source.

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

To achieve the net zero targets set by the UK and Scottish governments by 2050 and 2045 respectively, there are many different routes that are currently being investigated. However, the hydrogen village trial which this project supports, can form the evidence of converting the existing GB gas networks to 100% hydrogen. This conversion 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

If the HVT is proved to be a success for rolling out 100% H2 as the replacement for NG across 2000 properties, it can be replicated in the town trial which is expected to cover 10,000 properties. Following the success of the town trial, roll-out of 100% H2 can be replicated across GB.

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

The cost for rolling out hydrogen appliances across GB is not part of this project. This project evaluates the requirements and availability of hydrogen appliances for the roll out of 100% Hydrogen across the HVT area and helps facilitate the transition at this level.

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

While SGN is leading this project, this is a collaborative work between all GDNs with different GDNs showing their supporting through sharing their findings such as HVT consumer surveys, communications with different OEMs, etc. Moreover, SGN have created working groups with representatives from all GDNs to enhance collaboration and knowledge transfer as the projects unfolds. Findings from the project will be available to all relevant stakeholders through the ENA Smarter Networks Portal at <https://smarter.energynetworks.org/>.

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

Please demonstrate how the learning from the project can be successfully disseminated to Network Licensees and other interested parties.

All the information and knowledge gained will be shared with other GDNs through HVT Appliance Supply Chain working group weekly meetings. Also, the information will be available to all relevant stakeholders to review through the ENA Smarter Networks Portal at <https://smarter.energynetworks.org/>.

Please describe how many potential constraints or costs caused, or resulting from the imposed IPR arrangements.<

SGN were nominated by BEIS and Ofgem, as part of the HVT to lead this project by doing both the research and covering the funds required. £237,594 of the budget is recoverable through NIA but the remaining £26,399 is the SGN net cash flow for this project.

Please justify why the proposed IPR arrangements provide value for money for customers.

There are a number of collaborative projects that are contributing to the HVT, town and FEED. The understanding between the GDNs running these projects is that the lead GDN is responsible for the funding of that project. The ENA is monitoring the spend across all of these projects so that the overall costs is distributed across the GDNs according to the normal license split (i.e. the 4:2:1:1 split). Through this model all GDNs can benefit from each other's findings and help one another in the development and success of different trials which will in turn determine the future of using Hydrogen and hence the future of all gas networks.

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.

SGN have been nominated by BEIS and Ofgem, for undertaking this project and details of the project has been discussed with the other networks to ensure there is no duplication of work. The findings from the project will be shared with all key stakeholders.

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

Gas distribution networks have yet no clear overview on the requirements from the end users in a future with hydrogen and how this demand can be met. This work will be the very first comprehensive investigation to assess the readiness of the supply chain for hydrogen appliances the networks will need for a HVT, and Town trial.

Relevant Foreground IPR

Some of the initial information used in this project will come from conclusions in the Hy4Heat program which are publicly available and can be used by others without any IPR limitation.

Data Access Details

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 work is deemed an essential part of the 100% hydrogen trials process which is a key step towards conversion of the existing gas network to 100% hydrogen which is yet not a business-as-usual activity for SGN or any other GDN.

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 is a robust, open framework which can support the work and ensure the results which play an essential part on the roll-out of Hydrogen, are fully circulated 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