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

May 2022

Project Reference Number

NIA_NGGT0185

Project Registration

Project Title

Hydrogen Skills & Competencies (HGR&D NSIB)

Project Reference Number

NIA_NGGT0185

Project Licensee(s)

National Gas Transmission PLC

Project Start

August 2022

Project Duration

1 year and 2 months

Nominated Project Contact(s)

Helen Dugdale Box.GT.Innovation@nationalgrid.com

Project Budget

£410,186.00

Summary

Over the next 5 years there is an ambitious work plan within the UK's gas transmission and distribution industry to prove the capability of hydrogen in the current assets and begin trials. There is a clear need for the development of skills and competencies from education/early career to experienced staff both technical and commercial. This project looks to develop methodologies for skills training and the development of hydrogen competencies in the gas industry of the UK (both transmission and distribution). Work has been undertaken through Hy4Heat to develop a hydrogen competence framework including an interim training specification and an interim assessment module for hydrogen in residential and commercial buildings and gas appliances. This work will be considered as a baseline for the activities in this project and provide an insight into the current state of the art in Hydrogen competence.

Third Party Collaborators

Energy & Utility Skills

Nominated Contact Email Address(es)

Box.GT.Innovation@nationalgrid.com

Problem Being Solved

A key technology in the energy transition is Hydrogen as an alternative for carbon fuels in heat, transport, and industrial uses. To ensure supply across the UK of this gas and connecting renewable energy producers to customers is an opportunity for the National Transmission System (NTS) and Grid Distribution Networks (GDNs) and a potential to extend the use of assets already paid for by the UKs consumers. However, the UK transmission and distribution networks were not designed to transport Hydrogen and learning needs to be developed on the capability of these assets in this new use case.

NTS

The NTS in the UK offers a resilience to the UKs varying energy demand and supply. It both enables suppliers to input gas at one location of the country and transport it to its end customer via the distribution networks whilst acting as a storage system to ensure there is energy even on the coldest day of the year. The NTS currently stores Methane gas which on use produces carbon dioxide/monoxide which causes global warming. The UK, like countries around the globe, has promised to reduce its net carbon emissions to zero by 2050. National Grid and the GDNs are currently developing its internal skills and competencies management systems for current NTS/GDN applications. The project will consider this activity and how we can utilise it to manage our migration to a hydrogen network.

GDNs

The UK networks will be required to ensure that those working with hydrogen are correctly trained and can demonstrate the competencies for the activities being undertaken. Each network has a different method for demonstrating this capability, through this work it may be possible to standardise this approach and assist in recognition of skills and competencies as people move between UK gas networks.

Training identified for the development of hydrogen skill sets in operational tasks should be linked to the relevant procedure and standard designed specifically for the hydrogen related activities and the hazards related to these activities; these standards are still in development and therefore it will not be possible to deliver all required training courses in the timeline of this project.

Along with the operational and activity led skills and competencies there will be more general training for those working alongside operational teams such as work practices in the hydrogen industry, complying with environmental policies and procedures, application of health and safety and transporting hydrogen.

Method(s)

Phase 1a and 1b

The first phase of the project will deliver several elements of analysis to inform subsequent phases of work. A detailed stakeholder analysis has begun and will be completed early in the project to identify, and engage with, an appropriate range of individuals within National Grid and GDNs, as well as standards setting, regulatory bodies and international partners. As part of a project initiation EUS proposes to identify key stakeholders from National Grid and the GDNs to form a 'Steering Group'. This group would be responsible for identifying and assigning critical resource from within their business to contribute information e.g. providing job profiles, and key decisions including efficient sign off of phase completion, such as scope of roles already mentioned, identifying and assigning individuals in their businesses to contribute to outputs e.g. providing job profiles and providing training information, as well as approving outputs as well as phase requirements and progression to subsequent phases.

It is proposed that initial work is undertaken as early as possible to gather specific job role information from key stakeholders at National Grid and the GDNs, and an initial assessment of the impact of hydrogen is undertaken, so that the number of impacted roles can be understood, and a more accurate plan and costs can be produced for phase 1 and subsequent phases. Provision of job profile information will be important to successful delivery of phase 1 in line with plan. Further understanding will also be sought of National Grid's internal skills and competencies management system. The comparative analysis report already produced under Hy4Heat will be used as a source document and will form the basis of the initial analysis of hydrogen skills knowledge and understanding needed by distribution personnel. For the roles that initial analysis determines will be impacted by changes to policy, technical standards or procedures bought about by the impact of hydrogen on the UK networks, a skills matrix will be produced detailing the required knowledge, understanding and skills in relation hydrogen. An understanding of the current training requirements for the role will also be sought in preparation for phase 2 activities.

Alongside this skills analysis, research into global activities in the space of skills and competence development focussed on hydrogen will be undertaken. Global partners are anticipated to be based the US, Australia, Northern Europe, and may be engaged through partner organisations such as The European Gas Research Group (GERG) and 'Gas for Climate'. It is also proposed that adjacent sectors, for example chemical industry and mechanical engineering, could also be included in this research.

A continued robust and efficient consultation approach with National Grid and GDN stakeholders is considered key to ensuring the quality of outputs. This will be achieved through a range of methods identified through Stakeholder Analysis and consulting the Steering Group, and include 1:1 interviews, sharing outputs on our online consultation tool for feedback, and virtual workshops.

Phase 2a and 2b

A review of novel training opportunities will begin with conversations with global partners and stakeholders in adjacent industries

instigated in phase 1, which will explore novel training mechanisms used elsewhere and how they may improve retention of information, speed of delivery and ease of access. As EUS has established relationships with other highly regulated industries, water and power, case studies can be sought from these sectors also. From previous work, EUS is aware of some novel approaches already adopted by GDNs and lessons learned from past interventions can also be considered.

Phase 2 will explore ways in which the knowledge and skill requirements, identified in phase 1, can be developed. This will be derived from the understanding gained of current training methods for the roles and novel training mechanisms, and will in summary, produce a training matrix and assessment methodology for developing each of the capabilities identified. Each proposed training intervention will be 'tested' against the skills challenges set out in National Grid's RFQ to ensure that it is robust and relevant. This may involve basic awareness training, minor updates to current training, or more comprehensive development of new training solutions. A methodology for assessing competence will be proposed, following best practice guidelines to ensure a robust outcome.

Phase 3

In terms of understanding critical activities for enabling hydrogen transition, phase 3 will require a review of the position with development and update of relevant policies, technical standards and procedures identified as relevant in phase 1. As timelines for deployment of training are dependent on updates to technical standards on which the training will be based, we will develop a draft road map including optimum timelines, resource and costs required to deliver the identified changes to skills and competencies.

Although included within phase 3 in the RFQ, relevant Stakeholder engagement will be undertaken, directly with relevant individual stakeholders at National Grid and the GDNs, and as appropriate with the Network Safety Impact Board (NSIB) stakeholder groups, throughout the project including:

- Regulators – in particular in phase 1 and phase 3, as a source of relevant policies and their implementation timelines.
- Standards setting bodies – as a source of relevant technical standards and timelines for their future development
- Gas Transporters – through the Association of Independent Gas Transporters to ensure buy-in to, and feasibility of supporting deployment of the roadmap
- Training Providers – where relevant, regarding timelines and costs for deployment of updated or new training mechanisms
- Industry Bodies – relevant industry bodies and relevant groups including ENA Gas Futures Group, ENA Gas Governance Group

Phase 4

Phase 4 will deliver high quality, robust and relevant Technical Report and ENA Closure Reports to meet National Grid's requirements.

Data Quality Statement (DQS):

The project will be delivered under the NIA framework in line with the agreed Energy Networks Innovation Process document NGGT internal policies. Data produced as part of this project will be subject to quality assurance to ensure that the information produced with each deliverable is accurate to the best of our knowledge and sources of information are appropriately documented. All deliverables and project outputs will be stored on our internal SharePoint platform ensuring backup and version management. Relevant project documentation and reports will also be made available on the ENA Smarter Networks Portal and dissemination material will be shared with the relevant stakeholders.

Measurement Quality Statement (MQS):

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 medium level of data assumptions. No additional peer review is required for this project.

Scope

· Recommendations for all National Grid Gas Transmission skills and competencies, current activities, transition and future hydrogen requirements

· Recommendations for all distribution network (Cadent, SGN, NGN, WWU) skills and competencies, current activities, transition and future hydrogen requirements

· High level training course objectives and content

· All operational activities between network entry points (terminals) and the ECV (Emergency Control Valve) of a property

Objective(s)

The Hydrogen Skills and Competencies project aims to review the current skills and competencies landscape and provide insight into the areas of focus and key activities that need to be undertaken in the transition to Hydrogen. There are various training and competency gaps identified to date with a range of projects by the networks (including NIA and NIC) and the wider industry including Hy4Heat which are identifying further gaps. In addition, ongoing programmes are developing bespoke training to satisfy their needs and facilitate delivery. Development of training and competency materials, including the physical assets facilities to train at/on will take some time. Additionally, there is a cost impact, dependent on the quantity of additional training and facilities required. The following questions will be answered through this project:

· Who needs training?

· What training is required?

· Do existing courses need to be adapted or are new courses required?

· Are our existing tools and techniques relevant?

· What are the certification requirements?

· Where are the links to updates and changes in policies and procedures?

Current skills and competencies activities mapped out against hydrogen requirements

· Early career and management training and other future opportunities for hydrogen identified and documented

· Holistic view of the required activities in the transition to hydrogen and the key stakeholders

· Review of current skills and competencies mechanisms and their usability with hydrogen

· Understanding of the roles and likely associated training required to enable the energy transition

· Demonstrative examples of how the findings can be brought to life

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

The insight this work supports will help to establish a clearer view of the impacts of the transition to Net Zero one of these will be cost and the impact on the customer.

We conclude that this project will have a low impact on consumers in vulnerable situations. This is because the project methodology and the solution will not deliver outputs that will impact the financial or well-being of any consumers. It is envisaged that this project will enable a future low carbon safe, secure, and reliable energy supply.

Success Criteria

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

Hydrogen has been used extensively in the process industries for many years and it has been demonstrated that with the appropriate standards, regulations and best practices Hydrogen can be handled safely. The workstream described will not look to duplicate current understanding but develop a framework for a range of job classifications who will be affected by the Net Zero transition of the gas

industry.

Success will be defined by a standardised list and set of processes for the development of skills and competencies for the safe and pro-active use of Hydrogen within the gas network. Underpinned by a roadmap to fulfil these processes.

Project Partners and External Funding

The project will be delivered by Energy & Utility Skills, with National Grid Gas Transmission as the lead network.

Partner - EXTERNAL COST;
Cadent
£138,066.66

Southern (Scotia) Gas Networks
£69,033.33

Wales and West Utilities
£34,516.67

Northern Gas Networks
£34,516.67

National Grid Gas Transmission
£34,516.67

Total
£310,650

Potential for New Learning

The learning from this project will compile the skills and competencies for individuals required to operate and maintain a National Transmission and Distribution Networks that uses Hydrogen.

Scale of Project

As a desktop exercise the scale is appropriate as it considers mainland UK – this parameter has been set within the overall Hydrogen Grid R&D programme. Smaller scale would create insufficient information to support the understanding of the National Transmission System and distribution network.

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL5 Pilot Scale

Geographical Area

The results from this project will be applicable across the gas networks throughout the UK, with application beyond the UK.

Revenue Allowed for the RIIO Settlement

Not applicable to this R&D project

Indicative Total NIA Project Expenditure

£410,186.04

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 support the evidence building on conversion of the gas grid to hydrogen. It is the initial project that will determine the baseline requirements of skills and competencies needed for individuals to safely work and operate a Hydrogen Transmission and Distribution network.

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)

RIIO-1 Question – N/A

Please provide a calculation of the expected benefits the Solution

This is a research project so there is no calculation of the expected benefits

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

This is a research study and it is not possible to provide indicative implementation costs before this work has concluded.

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

This is a research study and it is not possible to provide indicative implementation costs before this work has concluded.

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 Hydrogen Skills and Competencies project aims to review the current skills and competencies landscape and provide insight into the areas of focus and key activities that need to be undertaken in the transition to Hydrogen. There are various training and competency gaps identified to date with a range of projects by the networks (including NIA and NIC) and the wider industry including Hy4Heat which are identifying further gaps. In addition, ongoing programmes are developing bespoke training to satisfy their needs and facilitate delivery. Development of training and competency materials, including the physical assets facilities to train at/on will take some time. Additionally, there is a cost impact, dependent on the quantity of additional training and facilities required.

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

RIIO-1 Question – 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.

There is no previous work that is duplicated by this project it builds on work already published and develops it for the Network Safety and Impact Sub-programme (NSIB) needs.

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

As hydrogen use as a fuel gains momentum and becomes a key energy system for the UK, there is a requirement for us to identify the skills and competencies required by a range of workers undertaking hydrogen related activities.

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

This project and the resultant outcomes/deliverables will conform to the default treatment of IPR as set out under the agreed NIA Governance (where the default requirements address two types of IPR: Background IPR and Foreground IPR).

The foreground IP created in this project are determining the required skills and competencies to create a consistent view and a defined process of applying the skills and competencies for a Hydrogen sector.

Data Access Details

Current expectation is that all data used in this project will be sourced from published documentation, the test cases will be available upon request. 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:

Data for this project, and all other projects funded under the Network Innovation Allowance (NIA) funding scheme, can be found or requested in a number of ways:

· A request for information (RFI) via the Smarter Networks Portal at https://smarter.energynetworks.org. National Grid Gas Transmission regularly publishes much of the data arising from our innovation projects on the ENA portal, before submitting a RFI check this website.

· Via our managed mailbox box.GT.Innovation@nationalgrid.com. Further data can be shared upon request through the innovation mailbox. Each request will be assessed by the GT Innovation Team for its merits and viability.

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

The current work in this area is sufficient for natural gas networks, to understand hydrogen is not a BAU activity and is currently wholly funded via innovation mechanisms

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

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. The technical, operational, and regulatory risks around hydrogen are elements being explored across the Hydrogen Grid R&D programme.

This project has been approved by a senior member of staff

☑ Yes