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

Dec 2022

Project Reference Number

SGN_EFFU0038

Project Registration

Project Title

H2London Feasibility Study

Project Reference Number

SGN_EFFU0038

Project Licensee(s)

SGN

Project Start

November 2022

Project Duration

0 years and 8 months

Nominated Project Contact(s)

Alexander Webb

Project Budget

£393,000.00

Summary

The project will seek to build an understanding of the potential opportunities for hydrogen supply, distribution and blending around London and the South East. This will involve determining potential hydrogen producers in the area, potential hydrogen demand and available infrastructure to transport the hydrogen. This information will be utilised to identify the optimal route and injection points into the grid, from a short-list of potential scenarios, for a dedicated 100% hydrogen pipeline from the Isle of Grain production facility to London and the South East region.

The study will identify relevant wayleaves and easements, devise a strategy for planning consent and provide cost and time analysis for the full FEED study and associated pipeline design to be funded under RIIO GD2 reopener.

Third Party Collaborators

Arup

DNV

Nominated Contact Email Address(es)

sgn.innovation@sgn.co.uk

Problem Being Solved

Currently the only project of its kind in the South East of England aiming to produce hydrogen at scale whilst offering solutions for storage and carbon sequestration is Project Cavendish, located at the Isle of Grain LNG terminal.

In order to decarbonise London and the South East a dedicated 100% hydrogen pipeline from the Isle of Grain is essential, supporting hydrogen reaching a significant domestic consumer base for heat, providing opportunities for transport and offering solutions for

commercial and industrial consumers. It could also provide a method for balancing the supply of hydrogen produced for local CCGT plants.

Extensive analysis is required to determine the optimal routing and injection points into the grid for the dedicated hydrogen pipeline. Current plans will see hydrogen gas flowing from Isle of Grain in late 2026 therefore, the timely delivery of the H2London feasibility study is paramount to ensuring that the full design and construction phase align with these timescales to offer a network decarbonisation option at the earliest opportunity.

Method(s)

The H2London Feasibility Study will look to address a series of details regarding the pipeline design which will ultimately provide confidence in pricing for Net Zero Reopener submission. The project scope will focus around a series of workstreams, including:

Discovery Phase

This phase will gather 'as is' data to build an understanding of the potential opportunities for hydrogen supply, distribution and blending around the south east and ultimately into London.

Scenario Identification & Base Case Development

Utilising the data gathered during the discovery phase, a short-list of potential scenarios for hydrogen supply and distribution within the south east will be created. These scenarios will be reviewed at a high level to determine which might have the biggest positive impact on the distribution of hydrogen in the south east.

Route Analysis & Outline Scheme

Once the preferred option has been confirmed, an assessment of possible pipeline routes from location of scale hydrogen production to point of chosen blending location will be undertaken.

Planning & Consenting Strategy

An assessment of planning consent regulations and requirements for a hydrogen pipeline will be carried out, alongside an Early Environmental Impact Assessment and Early Land and Legal assessment.

Desktop Assessment of Infrastructure Readiness

A detailed desktop assessment to assess the infrastructure readiness of existing SGN assets will be performed.

Completion Phase

During this phase the study will be concluded, developed and the final report presented.

Scope

A consortium of local energy producers formed with a view to developing the hydrogen production, storage and carbon sequestration infrastructure at Isle of Grain, have continued to progress their planning work under the title of Project Cavendish (see www.projectcavendish.com). Their work is building on the initial feasibility study project which we carried out alongside National Grid Gas Transmission and Cadent.

In line with the Isle of Grain hydrogen infrastructure development, we are seeking to progress a pipeline project (H2London) which will support the distribution of both blended and 100% hydrogen in our South East LDZ, including an ambitious plan to reach London,

providing low carbon options for heat, industry and transport.

The scope of the H2London Feasibility Study will seek to address a series of details regarding the pipeline build including:

- Determining the viability and readiness of utilising existing infrastructure to supply a hydrogen blend to London and the wider South East.
- Ascertain what additional infrastructure would be required from the location of large-scale hydrogen supply in the South East, with a view to unlocking the network to enable the distribution of large volumes of hydrogen to homes and industry during the 2020s.
- Find the technical and economic 'sweet spot' for a second blending point in the South East for a first phase hydrogen pipeline, with a view to further phased build out to take hydrogen in to London and beyond, as well as south to Rochester and AGIs surrounding London.
- Generate a business case showing the economic and environmental benefits of a new pipeline and hydrogen blending to consumers.

Objective(s)

This project seeks to identify a route and injection points into the grid for a dedicated hydrogen pipeline from the Isle of Grain production facility to London and the South East region The study will identify relevant wayleaves and easements, devise a strategy for planning consent and provide cost and delivery timescale analysis for the full FEED study and associated pipeline design to be funded under RIIO GD2 reopener.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

Not applicable

Success Criteria

The success criteria for each workstream are outlined below:

Discovery Phase: Delivery of a report outlining the potential opportunities for hydrogen supply, distribution and blending around London and the South East, including determining potential hydrogen producers in area, potential hydrogen demand and the available infrastructure to transport the hydrogen.

Scenario Identification & Base Case Development: Delivery of a short-list of potential scenarios for hydrogen supply and distribution within the South East and a review of these scenarios highlighting which will have the largest positive impact on the distribution of hydrogen in the area.

Route Analysis & Outline Scheme: Delivery of an assessment of potential pipeline routes from the hydrogen production location to the chosen point of blending, featuring an outline scheme design and cost estimates for the selected route.

Planning & Consenting Strategy: Delivery of an assessment outlining; the planning consent regulations and requirements for a hydrogen pipeline, identification and definition of required environmental surveys and a review of activities associated with land referencing.

Desktop Assessment of Infrastructure Readiness: Delivery of a report assessing the infrastructure readiness of existing SGN assets, including a review of the safety case for hydrogen in the existing gas networks and how this compares to timelines of hydrogen production, UK government and SGN targets.

Completion Phase: Delivery of a final report featuring recommendations and lessons learned, that outlines the vision to take the hydrogen pipeline to London and next steps required to achieve this.

Project Partners and External Funding

The project will involve Arup and DNV as partners.

Potential for New Learning

The project will provide key analysis for the routing of a dedicated 100% hydrogen pipeline linking the Isle of Grain production facility to London and the wider South East region. Relevant wayleaves and easements will be identified as part of multi criteria analysis process informing the preferred pipeline routing. A strategy for planning consent will be devised along with cost and time analysis for the full FEED study and associated pipeline design to be funded under a RIIO GD2 reopener.

Although the outcomes of the project are location specific, the working principles adopted during the study could be applied to other hydrogen pipeline routing projects across GB.

The Final Report will be made available for license holders, on request.

Scale of Project

In order to provide a robust business case and accurate costings for a follow up FEED stage, this project will carry out extensive modelling to understand the routing and phasing of a dedicated hydrogen pipeline from the Project Cavendish production site at the Isle of Grain. Recommended injection locations will be determined and current vs new asset options will be assessed, aiming to provide cost certainty for subsequent follow up work.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL3 Proof of Concept

Geographical Area

The outputs of the project are specific to London and the South East of England, delivering high-level pipeline phasing and routing along with cost and timeline certainty. However, the methodology used in this project to determine the optimal pipeline route and injection points are applicable across GB.

Revenue Allowed for the RIIO Settlement

Not applicable.

Indicative Total NIA Project Expenditure

External Spend: £295,000

Internal Spend: £98,000

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 opportunities for hydrogen production in the South East of England are limited by geographical, geological and technical constraints. Industrial clusters or other proposed hydrogen production facilities are not always co-located with large scale demand centres therefore, a significant amount of hydrogen must be distributed via pipeline, either as 100% hydrogen or as a blended gas, in order to reach those demand centres across our distribution network. Understanding where customers who may be able to accept 100% hydrogen are located and identifying locations for blending into the network is key to ensuring optimisation of the hydrogen produced. The output of this work will be the first step towards the creation of the business case for a new hydrogen pipeline in the area and will inform the development of specific strategic infrastructure for a net zero future.

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

Not applicable.

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

This project is specific to a certain geographical region and therefore will not be directly replicable across GB, however, the outlined project methodology and lessons learned will be able to inform similar projects based in other regions.

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

As stated above, the project and costing methodology may inform similar studies conducted for other regions and help to provide a cost estimate, but due to the specific geographic location of this project exact costs cannot be determined.

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 aims to determine the optimal routing and injection points into the grid for a dedicated hydrogen pipeline running from the Isle of Grain production facility to London via the South East region. Although the outcomes of this project are relevant to a specific geographic location, the methodology used to determine the optimal pipeline route and relevant learning could be adopted by Network Licenses and applied to other geographic locations

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.

The H2London Feasibility Study is the only project of its type in the South East region seeking to determine the optimal route for a dedicated hydrogen pipeline from the Isle of Grain production facility providing potential hydrogen solutions for power, industry, transport and heat.

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

With Project Cavendish currently being the only deep decarbonisation solution to potentially serve London and the South East region, it is imperative that a dedicated 100% hydrogen pipeline from the Isle of Grain is constructed to have the largest possible impact on the South East LDZ.

The output of this work will be the first step towards the creation of the business case for a new hydrogen pipeline in the area and will

inform the development of specific strategic infrastructure for a net zero future.

Relevant Foreground IPR

The foreground IPR created in this project will be a final report detailing the findings of the study and will be publicly available.

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

The project is developing a dedicated 100% hydrogen pipeline from the Isle of Grain to London and the South East to stimulate the conversion from natural gas to hydrogen and support decarbonisation of the network. As such it is not part of the usual activities of the business.

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 offers a robust, open framework to support this work and ensures all relevant learning and outcomes from this project can be disseminated to all licensees. The development of a dedicated hydrogen pipeline and subsequent distribution of hydrogen is subject to novel commercial, technical, operational and regulatory requirements. The project will address all considerations and requirements to allow for the transport of hydrogen and delivery to end users.

This project has been approved by a senior member of staff

☑ Yes