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 2024

Project Reference Number

NIA2_SGN0040

Project Registration

Project Title

Hydrogen Storage Legal Assessment

Project Reference Number

NIA2_SGN0040

Project Licensee(s)

SGN

Project Start

November 2023

Project Duration

0 years and 3 months

Nominated Project Contact(s)

Johana Duran Santos

Project Budget

£19,995.00

Summary

To achieve the UK governments Net Zero by 2050 targets and decarbonise UK's the energy network the use of hydrogen is a potential solution. However, to enable the widespread uptake of hydrogen across the UK there is a need to establish sufficient hydrogen storage facilities to minimise any risk to the nation's energy security.

A solution to this is large scale, seasonal hydrogen storage in geological formations. However, to progress project planning and delivery around potential storage sites, a comprehensive understanding of property rights and land consenting needs to be developed.

This project seeks to establish the planning, consenting and regulatory requirements surrounding the development of subsurface hydrogen storage infrastructure across Scotland, England, and Wales.

This project will provide insight into any legal restrictions surrounding hydrogen storage and will facilitate the identification of potential pushbacks in decarbonisation objectives and strategy.

Third Party Collaborators

Addleshaw Goddard

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 and hydrogen has a critical role to play in achieving these targets. One of the major uses of hydrogen could be in the replacement of carbon intensive natural gas across the UK gas network which would contribute significantly to SGN's decarbonisation strategy. However, for widespread hydrogen uptake

to be facilitated, network resilience and security of supply obligations must be met. One of the key principles in security of supply is sufficient energy storage capacity to balance supply and demand fluctuations. As it stands, hydrogen can be stored in high pressured tanks to meet the hydrogen storage needs of small scale, localised projects e.g., H100. However, surficial storage technologies are unable to provide the scale of storage required for full network transformation, thus large-scale storage needs to be developed. The most promising solution to the large-scale storage problem is subsurface storage in geological structures. This method of storage will need to be developed to ensure UK energy security is not compromised throughout the energy transition.

Subsurface facilities of the required scale have been proven with natural gas, and historically towns gas, being stored in this manner. There are several examples of salt caverns being utilised for gas storage across the UK's gas grid. The geological feasibility of large-scale subsurface hydrogen storage to meet SGN's strategic aims has been supported by studies such as the Balgonie feasibility study proximal to H100. Additional work has been undertaken within the NIA2_SGN0013 Long-Term, Large-Scale Hydrogen Storage Database project and the NIA_SGN0002 Energy Storage Strategy project. The NIA2_SGN0013 project conducted preliminary feasibility work by undertaking a desktop geological and infrastructural assessment which identified areas where large scale storage of hydrogen in the subsurface is possible. Furthermore, SGN are currently initiating an Emerging Energy Technology funded project through the Scottish Government (Storage Upscale) to identify opportunities to adopt geological hydrogen storage at intermediate scales to enable the upscaling of hydrogen trials following the H100 pilot project.

It is evident that significant work is being undertaken to identify geologically feasible subsurface storage opportunities to meet SGN's and the wider energy networks strategic needs. However, due to the relatively low TRL of subsurface hydrogen storage, the legal requirements and regulations surrounding storage sites are poorly constrained. This is particularly apparent when considering land rights across Scotland, England, and Wales. Existing subsurface gas storage legislation is specific to legacy gases such as natural gas and does not cover the storage of hydrogen. Therefore, prior to the development of subsurface storage projects, any legal restrictions upon facilities must be understood to ensure compliance. This project seeks to establish the planning, consenting and regulatory requirements surrounding the development of hydrogen storage infrastructure across Scotland, England, and Wales.

Method(s)

This project will be conducted as a desktop study. The successful delivery of this project is dependent on the completion of three stages as outlined below:

Stage 1: Determine project scope and deliverables.

This stage will determine the scope and expected outcomes in the legal review which will be undertaken. The main areas of legislation that need to be assessed will be determined and the required inputs from all involved parties will be agreed upon.

Stage 2: Undertaking research and analysis.

In this stage, an extensive review of legislation, consenting, regulatory procedures and existing practices will be carried out to determine the current status and applicability to hydrogen storage. The legal analysis undertaken will be summarised in a project report. The work will identify any gaps, discrepancies or changes in legislation that need to be addressed.

Stage 3: Reporting, dissemination of findings and project closure.

A summary report will be complied by Addleshaw Goddard to outline the findings of the legal review. The report will be assessed to ensure project deliverables have been met and that all management services are supplied as specified in NIA project deliverables.

Scope

The legal review will be undertaken by Addleshaw Goddard who have specialist partners with prior experience working on hydrogen storage projects. Legal analysis will be undertaken specifically related to underground storage operations across Scotland, England and Wales and will be centred around subsurface legal rights. The main scope of the project will centre around three focus areas and their associated legislation.

1. Property
2. Consenting
3. Regulations

The three focus areas will cover a wide breath of legislation and will assess a variety of considerations that need to be made when undertaking subsurface hydrogen storage operations. Property will cover activities such as setting out land rights which may impact a storage project and associated title interests required in Scotland, England & Wales. All relevant planning and environmental consents

will be addressed in a general overview with focused being placed on activities and consents critical to the implementation of storage such as potential compulsory powers of acquisition. All relevant legislation that is currently applicable across the gas industry will be considered with regards to the large-scale storage of hydrogen. The scope of works will also include identifying pertinent regulatory requirements and consequent questions for the industry.

Objective(s)

The objective of the project is to identify how SGN can approach hydrogen storage considering the property, consenting and regulatory processes involved in this activity. Objectives of the project outputs will be to support the overall network in hydrogen storage planning to transition into 100% hydrogen network and system decarbonisation.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The success criteria for each work package are described below:

Stage 1: The deliverables of this stage (agreed scope and expectations from the legal review) will be reviewed and approved by SGN.

Stage 2: The legal assessment process will be monitored, reviewed, and approved by SGN.

Stage 3: The summary report and agreed deliverables will be reviewed and approved by SGN.

Project Partners and External Funding

The project will be developed by Addleshaw Goddard.

Potential for New Learning

The project will provide key learning on the identification of legal and legislative procedures that need to be addressed and/or followed in the identification, acquisition, and operation of underground hydrogen storage facilities across Scotland, England and Wales.

Scale of Project

This project is relatively low budget but provides an opportunity to clarify the existing legislation surrounding subsurface hydrogen storage with respect to important legislative considerations e.g., land rights and title interests. Given the fundamental requirement of large-scale hydrogen storage facilities to enable full network conversion to hydrogen, the findings of this study can greatly influence strategic planning of storage facilities for all interested parties.

The findings of this study will cover all UK territories (excluding Northern Ireland) so will be of interest to all of the wider industry working within the subsurface hydrogen storage space. The project will also inform the wider DESNZ programme assessing the viability of hydrogen and the role it will for its potential use in the network. The scale of the output of this project is large given the relatively small investment.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL4 Bench Scale Research

Geographical Area

Outputs of the project can be applied on a UK-wide scale (excluding Northern Ireland).

Revenue Allowed for the RIIO Settlement

n/a

Indicative Total NIA Project Expenditure

£19995

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:

Surficial storage facilities (currently the main mechanism for storing hydrogen) cannot provide the capacities needed to meet storage demands. For this reason, subsurface hydrogen storage in geological mediums is of significance and could help to achieve strategic objectives across the energy network. However, due to the relatively low TRL of subsurface storage, commercial examples are limited and thus the understanding of legislation which could impact geological storage is poor. The legal requirements and regulations surrounding storage sites are poorly constrained, particularly when considering land rights across Scotland, England and Wales. Existing subsurface gas storage legislation is specific to commonly used gases such as natural gas and does not cover the storage of hydrogen. Therefore, prior to the development of subsurface storage projects, any legal restrictions upon facilities must be understood to ensure compliance. Upon identification of relevant legislation, all interested parties that operate across the UK (excluding Northern Ireland) can inform their decision making surrounding strategic storage facilities. Better understanding of legislation will help to identify potential legal blockers for storage projects which in turn will help improve the successful implementation of projects and increase the uptake of hydrogen across the entire network. Subsurface storage will help to upscale pioneering local projects such as H100 by providing the storage capacities required to scale up operations. Scaling up projects is key to the successful roll out of hydrogen across the wider UK network and facilitating the energy system transition.

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

A core principle of SGN's business and responsibly of the wider energy network is to ensure the security of energy supply to customers and end users. The UK government placed significant emphasis on the importance of the nation's energy security in the British Energy Security Strategy of 2022 with particular emphasis on investment into domestic hydrogen infrastructure. Increased energy security will ensure the most vulnerable people across society are protected whilst helping meet Net Zero 2050 targets by enabling network transformation using sustainable solutions e.g., hydrogen. A critical element in providing energy security is to ensure that sufficient storage facilities are established to balance system constraints, geopolitical threats and increased usage during adverse weather conditions. Sufficient storage is particularly key when considering sustainable hydrogen being used in a 100% hydrogen grid as it could support the stability of prices across the hydrogen market in times of peak demand which will ensure affordability to the customer. Furthermore, the nature of green hydrogen production means it is inherently unreliable due to the intermittency of renewable power used to drive electrolysis, thus large-scale storage facilities are required to balance seasonal supply and demand and improve energy security. This project will help to hasten the development of storage facilities by limiting potential legal pushbacks, therefore helping to provide increased energy security across the UK network during the energy transition.

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

n/a

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

The potential outcome of this project are referenceable across GDNs. The legislation covers all activities across Scotland, England and Wales.

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

n/a

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 project will provide a legal report that can be referenced by network operatives across Scotland, England and Wales when identifying and planning geological hydrogen storage facilities to ensure the security of supply to downstream users.

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.

This project will supplement the work completed within the NIA2_SGN0013 Long Term, Large Scale Hydrogen Storage Database project. The NIA2_SGN0013 project conducted preliminary feasibility work by undertaking a desktop study focused on the geological and infrastructural elements of subsurface hydrogen storage. The study outputs included compiling a GIS database which identified areas where large scale storage of hydrogen in the subsurface is technically possible and any associated opportunities. Additionally, SGN are currently undertaking an Emerging Energy Technology funded project 'StorageUpscale' which aims to identify and evaluate the technical and economic suitability of Scotland's geology to accelerate intermediate scale hydrogen storage technologies – StorageUpscale will build on the GIS database created in the NIA2_SGN0013 project.

Another project to note is the NIA2_SGN0002 Energy Storage Strategy. This was a desktop study led by SGN (supported by Cadent) which outputted a report that summarised the requirements for and strategic opportunities surrounding long term energy storage across the UK.

The work undertaken in this project will not duplicate any aspect of the NIA2_SGN0013, StorageUpscale or Energy Storage Strategy projects as this project will focus solely on the legality and legislation in place surrounding geological hydrogen storage. No technical assessments regarding geology or infrastructure will be conducted.

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

Key stakeholders across the gas industry currently have no clear overview of the legal requirements and legislative frameworks that may impact the development of subsurface hydrogen storage facilities to meet their strategic needs. This project will offer a comprehensive review of the main legal considerations that need to be made when developing geological hydrogen storage projects. This report could help to investigate opportunities for underground hydrogen storage and identify areas where they are legally able to operate within their respective boundaries.

Relevant Foreground IPR

n/a

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 report that will be written in this project will relate to future large scale hydrogen storage facilities which is a key component of converting the existing gas network into 100% hydrogen for the purpose of home heating. This 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 conversion of the GB gas network to 100% hydrogen is key on the road towards net zero. A reliable gas supply and the assurance of energy security for end users is crucial to support the viability of the hydrogen transition. The NIA framework can support works that ensure results that play an essential part in the roll-out of hydrogen. As subsurface hydrogen storage operations are not a part of any GDN's current BAU activities NIA funding is required.

This project has been approved by a senior member of staff

☑ Yes