SIF Alpha Round 3 Project Registration

Date of Submission

Mar 2025

Project Reference Number

10131011

Initial Project Details

Project Title

Look NortH2

Project Contact

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Challenge Area

Whole system network planning and utilisation to facilitate faster and cheaper network transformation and asset rollout

Strategy Theme

Whole energy systems

Lead Sector

Electricity Transmission

Other Related Sectors

Gas Transmission

Project Start Date

01/11/2024

Project Duration (Months)

6

Lead Funding Licensee

NGET - National Grid Electricity Transmission

Funding Mechanism

SIF Alpha - Round 3

Collaborating Networks

National Gas Transmission PLC

Technology Areas

HVDC

Hydrogen

Modelling

Offshore Transmission

Electricity Transmission Networks

Storage

Gas Transmission Networks

Green Gas

Project Summary

The scale of investment required to leverage Great Britain abundant offshore wind resource and decarbonise its economy by 2050 and power system by 2035 is vast. Developing the infrastructure connecting these resources to consumers, whether electricity or hydrogen, is expensive, technically complex, creates system operability challenges and can be disruptive to local communities.

This project seeks to explore and develop an open-source standard framework and accompanying capabilities to assess the impact of taking a cross-energy vector approach and co-locating assets offshore -- with a view to addressing partsof the challenges mentioned above and ultimately reducing costs to consumers.

Add Preceding Project(s)

10104053 - Look NortH2

Add Third Party Collaborator(s)

Copenhagen Energy Islands ApS

Guidehouse Europe Limited

National Gas Transmission PLC

Project Budget

£447,254.00

SIF Funding

£401,715.00

Project Approaches and Desired Outcomes

Animal testing (not scored)

- ○ Yes
- ⊙ No

Problem statement

The UK is currently undertaking a once-in-a-generation upgrade of its energy infrastructure. Electricity transmission infrastructure is being upgraded and extended, including offshore, at a scale not seen since the National Grid was created. Hydrogen and Carbon Capture Utilisation and Storage (CCUS) infrastructure is at a much earlier stage of development, as the first industrial clusters are formed and as market frameworks begin to develop. This infrastructure is critical to meeting Britain's legally binding net zero targets, ensuring secure and affordable energy in future and has the potential to create skilled jobs for the UK for years to come. The challenges involved in each energy vector are significant. However, as the energy sector becomes ever more integrated, it is vital that those challenges are addressed by working across sectors and vectors.

The GB Electricity system faces chronic and costly North-South congestion. Approximately £30bn of investment to upgrade the network is underway, with a significant proportion offshore. There are significant challenges in planning this infrastructure, particularly in securing the consents necessary to bring cables onshore.

The UK Hydrogen Strategy aims for 10GW of low-carbon hydrogen production capacity by 2030 and is at an early stage of market development. Enabling electrolytic hydrogen production from offshore wind (OSW) power will be key to meeting that target, but significant barriers to colocation currently exist.

The challenges prompt questions about using offshore hubs to optimise the energy system. OSW power could produce green hydrogen or charge batteries, and transmission lines could be utilised more efficiently. Interconnection to othermarkets is also a possibility.

The discovery phase of the Look NorthH2 concept focussed on the integration of OSW with repurposed Oil & Gas infrastructure for hydrogen production and carbon capture. The work identified potential significant benefits, including curtailment and grid loss reduction.

As the Discovery phase surfaced more questions, a decision was taken to expand the consortium to include NGET as a project lead, given their electricity transmission expertise, Copenhagen Infrastructure Partners, who have been involved in multiple energy islands developments across the globe, and Orsted,who are the UK's largest OSW developer and are planning a commercial-scale hub. National Gas will remain a project partner, delivering expertise on hydrogen and CO2. The ESO, despite not having the resources to commit to the project due to the challenging transition to NESO, has a significant interest in the project and sees it as being of strategic importance.

We consider that the project is now better able to meet the first innovation challenge. Offshore development and coordination work is currently at a very early stage and there is currently no standard framework or accompanying capabilities to consider it. The Alpha phase will explore the business models required to make hubs a reality, will engage with a broad range of stakeholders and will create a set of assumptions and a modelling architecture which will allow concepts to be evaluated more quickly and consistently.
The project could deliver benefits to various users, such as:

- Identify a standard framework and common assumptions, that can help better understand the scale of opportunity for hub-type concept developers.
- Inform the ESO's analysis which needs to be undertaken as part of the Strategic Spatial Energy Plan (SSEP).
- Inform regulators who are increasingly raising questions about offshore coordination in consenting electricity transmission infrastructure, as well as networks and developers in showing whether such alternatives may be beneficial.
- Reduce the costs of network users, particularly GB consumers and help the UK government meet its binding net-zero targets.

Innovation justification

Challenge themes

This project is highly aligned with all Round 3 Innovation Challenges and could apply against most challenge themes, demonstrating its relevance to the current GB energy landscape. The Alpha phase proposes to develop an advanced whole-system modelling tool to facilitate offshore power and gas system integration to support network planning and development. This scope of work is highly aligned with project scope 1, challenge 1. The project is led by NGET and will leverage expertise from a gas network, National Gas.

Discovery Learnings

The Discovery phase provided several valuable lessons which informed the Alpha phase scope, plan and leadership:

- Offshore infrastructure coordination could provide significant cost savings benefits such as investment and asset optimisation, reduced energy losses and lower congestion costs. These potential benefits need to be validated through advanced whole-system modelling.
- There are significant regulatory, and commercial barriers to enabling offshore system integration which need to be addressed.
- The size of electricity transmission investments required in the next decade is large and networks are looking for ways to accelerate and optimise new connection development. This contextual challenge logically informed the decision to change the lead partner from National Gas to NGET.

Beyond incremental innovation

During the Discovery phase, we conducted interviews with policy makers, regulators, and industry players on offshore system integration. This helped us identify innovation gaps, with input from stakeholders shaping the activities of the Alpha phase. The latter will integrate the world-leading experience of Copenhagen Infrastructure Partners and Orsted.

Innovation justification

The project aims to develop a novel offshore whole system optimisation model architecture and underlying assumptions that assess options across electricity, hydrogen, and carbon to support offshore infrastructure optimisation. This model will be used to understand the interconnectedness between vectors and assess alternative approaches to designing and operating energy systems. Additionally, the project will outline a set of market modifications that are important enablers of offshore energy hub (OEH) development (incl. artificial islands). The resulting business case for OEH development will be the first of its kind in the UK to be supported by advanced whole-system modelling and a route-to-market framework.

Readiness level

TRL: 3 progressing 5
Through the development of a modelling tool skeleton and initial market blueprint, this Alpha phase will be progressing the concept to validation in relevant environment (TRL 5).

IRL: 4 progressing 6
This project aligns with current UK and European technological research efforts. The Alpha phase will develop the framework and processes to scale the pilot project for commercialisation, demonstrating the effectiveness of the integrated technologies in processing and organising information.

CRL: 3 progressing 5
Offshore infrastructure integration is in demand, and the tools and processes for development have been identified. The Alpha phase will establish a blueprint for the tools, assess integration feasibility, and advance CRL to 5.

Size and scale

The Alpha phase involves developing a basic model and framework for offshore system infrastructure planning, including gathering necessary data and stakeholder insights. The Beta phase allows further development of the tool and framework to enable efficient infrastructure investments, meeting the innovation challenge goal.

Funding

This project investigates long-term network development, includes a high degree of risks in outputs and requires funded industry partner contribution. Thus, this cannot be funded as part of price control or other short-term network licensee BAU activities.

Counterfactual

This project counterfactual results in the planning and development of offshore infrastructure that fails to account for cross-vector consideration, potentially resulting in network overbuilt and higher costs for consumers.

Impact and benefits (not scored)

Financial - future reductions in the cost of operating the network

Financial - cost savings per annum on energy bills for consumers

Financial - cost savings per annum for users of network services

Environmental - carbon reduction – indirect CO_2 savings per annum

New to market - services

Others that are not SIF specific

Impacts and benefits description

In a Business-As-Usual (BAU) scenario, offshore electricity, hydrogen, and carbon infrastructure are developed separately without considering potential efficiencies that could be gained by integrating these systems. This approach could lead to missed opportunities for cost savings and slow down the transition to a low-carbon economy in the UK. This project aims to explore the benefits and opportunities of taking a multi-vector approach to planning offshore energy infrastructure including systems based on artificial islands. The evidence supporting the decision to develop an offshore energy hub approach will be assessed using the following metrics:

Financial – Future reductions in the cost of operating the network
Electricity Transmission:

- Potential reduction in infrastructure costs thanks to reduced offshore transmission line requirements and improved utilisation of the existing infrastructure.
- Potential decrease in system operation costs and operability benefits thanks to improved capability to connect directly less constrained areas of the onshore grid, and enhanced stability in power flows from the hub to shore.
- Potential decrease in transmission losses attributable to offshore green hydrogen production and reduced loss factors in transmitting power to shore viaa dedicated hydrogen pipeline.
- Potential expedited transmission project delivery leading to reduced opportunity costs and a more rapid decrease in constraint payments.

Gas Transmission:

- Potential for identifying repurposing routes offshore, which could significantly decrease offshore hydrogen/CO_2 transportation costs.
- Potentially further integration with the European hydrogen market leading to greater operational efficiency to deliver energy to GB.
- Greater coordination with the onshore hydrogen network development plan (e.g., Project Union) could result in onshore network investment savings.

- Greater volume of low-carbon hydrogen introduced at scale in the network is likely to increase the utilisation of the national hydrogen transmission network, resulting in a reduced cost per kilogram of H2 transported.

Financial – cost savings per annum on energy bills for consumers

Consumer electricity bills are significantly linked to network costs (~25%) and system operation costs (~20%). Reducing these costs could result in significant cost savings for consumers.

Financial – cost savings per annum on energy bills for users of network services

Offshore wind developers currently pay on average £12.5/kW in transmission charges (TNUoS). Greater offshore network coordination could help reduce network costs and TNUoS compared to the BAU scenario and as a result, making the UK a more attractive market for renewable investments.

Environmental -- carbon reduction -- indirect CO2 savings per annum

- Reduced transmission infrastructure would reduce energy sector's indirect emissions.
- Potential reduced grid losses would enable more low-carbon energy fed into GB energy mix.
- Potential acceleration of offshore wind and green hydrogen, thus accelerating carbon abatement in GB's energy mix.
- Potentially reduced nature and biodiversity impact

New to market -- services

Offshore energy infrastructure can enable new offshore commercial services such as maintenance of offshore infrastructure assets. Additionally, the developed infrastructure can serve military purposes, including surveillance and environmental monitoring.

Others that are not SIF specific

- Increased value of the offshore wind located close to an offshore hub, consequently creating benefits to the Crown Estate.
- The Discovery phase estimated job creation/maintenance benefits to be up to 3,740 jobs.

The project will help us understand if using a cross-vector approach could benefit UK consumers through lower infrastructure and system operability costs, and reduced environmental and community impact. The estimated benefits in the Discovery phase by National Gas and Guidehouse were significant (see Discovery report and attached CBA). This simplified approach needs to be revisited for a more precise assessment accessible to developers and networks and used to take multiple planning options into development. The Alpha phase aims to develop a comprehensive system modelling tool for investments in offshore energy hubs infrastructure.

Teams and resources

The Project Partners for Alpha Phase will consist of National Grid Electricity Transmission (NGET), National Gas Transmission (NGT), Guidehouse, Orsted, and Copenhagen Infrastructure Partners (CIP). This mix of partners will provide depth of expertise across hydrogen, electricity and carbon capture and storage offshore infrastructure planning and development. This is critical in achieving this project’s objective of developing the modelling and market capabilities needed to support whole system offshore infrastructure development.

NGET will be the lead partner on the project. As owner and maintainer of the high-voltage-electricity-transmission network in England and Wales, NGET plays a key role in enabling the connection of offshore electricity infrastructure to the onshore network. NGET has led numerous NIA and SIF projects and has a deep understanding of the requirements of executing SIF projects and delivering the best value for consumers. With project support time allocated for the Head of Policy, Commercial and Regulation: Offshore Delivery, Project Director East Coast, and innovation engineers, NGET will be leading the delivery of WP3Offshore infrastructure market options, WP5 Stakeholder Engagement, and WP6 Business Case. NGET will also provide Infrastructure planning and modelling in-house experts to support WP2 Offshore infrastructure whole system modelling architecture with a clear role of providing critical electricity infrastructure inputs.

Guidehouse will lead WP1 Project Management, WP2 Offshore Infrastructure Whole System Modelling Architecture and WP4 Offshore hydrogen and CO2 planning considerations. With a proven track record in whole energy system model development across gas, electricity and hydrogen, Guidehouse are well placed to lead the alpha phase model architecture development. In addition, Guidehouse currently leads several capital infrastructure projects that are exploring pipeline repurposing from natural gas to hydrogen or CO_2 transportation. Guidehouse has also acted as the programme management lead for several SIF projects through to Beta phase, and understand the level of rigour required to manage the programme through to successful delivery.

NGT will support WP4 Offshore hydrogen and CO_2 planning considerations. As owner and operator of the national gas network, NGT is actively exploring the role its existing network could play in enabling the hydrogen and CO_2 energy transition. Through the learnings from SCO2T Connect and Project Union, NGT can provide key intelligence on enabling hydrogen and CO_2 pipeline networks. Where hydrogen will connect to onshore infrastructure, and the market design to support this will be a key consideration that NGT experts will provide input on to support the delivery of WP4. NGT has also delivered numerous NIA and SIF projects and understands the value for money and innovation objectives outlined by the SIF programme.

Orsted will play a key support role across WP2 Offshore Infrastructure Whole System Modelling Architecture, WP3 Offshore infrastructure market options, WP5 Stakeholder Engagement, and WP 6 Business Case. Orsted is the global developer in offshore and onshore wind, and will bring key insights and stakeholder connections to support many areas of the project. A critical input that will be provided is the lessons learnt from an offshore energy hub project being developed at a small-scale in the UK.

CIP will also play a key support role across WP2 Offshore Infrastructure Whole System Modelling Architecture, WP3 Offshore infrastructure market options, WP5 Stakeholder Engagement and WP6 Business Case. CIP is a global leader in renewable energy investments and will bring insights on what impacts the bankability of offshore energy hubs. With several ongoing offshore energy hub projects being evaluated across Europe, CIP will bring key learnings and insights that will support the cost-benefit analysis and market options assessment.

Additionally, ESO will support this project as an independent party supporting WPs through expertise and discussion. (see Letter of Support in Q12)

Project Plans and Milestones

Project management and delivery

How will you manage your project effectively? What is your project plan? What are your milestones? What are the risks associated with your project?

Guidehouse will lead the project management of the programme, using well-established methodologies refined over many large-scale delivery projects and SIF innovation projects.

Our project management processes will leverage the Project Management Institute’s Body of Knowledge Methodology and agile methodology. We will implement the project management processes for governance, schedule, finance, risk, quality and knowledge management, and change and stakeholder management.

Governance:

We will develop a project charter and stand-up project governance including: a monthly steering committee, two-weekly project status meetings, and weekly project reporting.

Schedule:

We will develop more detailed plans for each work packages, noting that additional activities will be defined as we go and that the approach will have to be continually aligned and iterated following an agile approach. This is typical for innovations projects given the nature of reacting as ongoing outputs become apparent.

Risk management strategy

The overall risk management and escalation strategy for the project will be overseen by the steering committee. This will act as the forum for addressing project strategy, high-level financial issues progress, work dependencies, risks, and issues.

A detailed risk log is included in the Project Management Book. However, an in-depth risk assessment will be carried out at project inception and updated throughout the delivery phase.

We do not foresee any immediate risks with management of intellectual property(IP). All project partners have agreed to adhere to IP clauses stipulated in the SIF governance documents. If in future, new vendors are onboarded for the Beta Phase, we will highlight the IP requirements document in the governance and ensure that the commercial contracting arrangements are in the interest of all GB customers.

Project plan and outputs

The Alpha Phase will be split into six work packages. The tasks and timescales are outlined in the Project management book. To help manage risks and dependencies, particularly for WP2 Offshore infrastructure whole system modelling architecture, the following stage-gates have been added:

Define underlying principles for whole system model

Agree baseline assumptions for data inputs

Outline system architecture for whole system model

Develop plan for beta phase model development

This will ensure the following dependencies flow through between work packages seamlessly:

Learnings from WP3 Offshore infrastructure market options and WP4 Offshore hydrogen and CO2 market considerations flow directly into the modelling assumptions and principles.

Findings from WP6 Business case align with the overall system architecture for the whole system model which will make up the foundation of the beta phase plan.

The project will have no impact to existing consumer services or supplies.

Key outputs and dissemination

Alpha Phase Deliverables

The alpha phase will utilise an offshore energy hub concept as a case study to develop a blueprint for the offshore infrastructure whole system modelling and commercial market capabilities needed to scale critical net zero offshore infrastructure. These capabilities will focus on offshore infrastructure whole system optimisation to reduce cost to consumers and support network operability, with an eye on how to integrate with onshore infrastructure plans.

The main output of this phase is a conceptual design for the creation of a multi-vector optimisation model and an assessment of key market and regulatory enablers to feed directly into Beta phase development. As per the project management book, the project partners will be working through six work packages of which their key outputs are:

WP1 - Project management and delivery:

Project governance and project management regular updates, final report that summarises all WP outputs across the Alpha phase to support wider dissemination -

Guidehouse

WP2 - Model architecture and underlying assumptions development:

A report detailing model approach, data flows, key assumptions, final conceptual software design and a development roadmap for execution in Beta phase -

Guidehouse, NGET, NESO, CIP, Orsted

WP3 - Assessment of commercial market modifications fundamental to offshore energy hubs:

a report detailing current state market evaluation and offshore infrastructure market options/enablers that need execution to support offshore energy hub scaling --

NGET, Orsted, CIP

WP4 - Role of repurposed pipeline assets assessment:

a report that assesses the key barriers and enablers for repurposing offshore pipelines for hydrogen and CO2 transport, coupled with onshore network integration considerations --

Guidehouse, NGT

WP5 - Stakeholder Engagement:

Stakeholder interview summary report detailing findings from UK/EU energy system engagement which aims to provide direct inputs to support WP2, WP3, WP4 and WP6 -

NGET, Orsted, Guidehouse, CIP

WP6 - Business case:

Conduct a CBA for different energy hub concept designs to support early quantification of the net benefits for the optimal energy hub design --

Guidehouse, NGET, CIP

Responsibilities

1.

Guidehouse will be responsible for bringing together all the partner outputs and combining them into a single output document. NGET will approve all deliverables.

2.

Guidehouse and NGET will lead on the development of a Beta application, taking the outputs from the Alpha project, particularly WP2 and WP3 to formulate the key activities and costs for Beta phase execution.

3.

NGET will be responsible for assessing the commercial modifications/enablers required to support, the CBA and the policy gap analysis, supported by Orsted and CIP.

4.

NGT will be responsible for signing off deliverables for WP4, providing critical insights from learnings developed through SCO2T Connect and Project Union.

5.

Guidehouse, NGET, CIP and Orsted will be responsible for stakeholder engagement, NGET will be responsible for implementation, safety and competitiveness outputs.

NGET will be responsible for ensuring implementation post the Beta phase.

Dissemination

NGET will take the lead on ensuring the project outcomes are publicised via the Smart Networks Portal, social media, Alpha Show and Tell, with support from the project partners. We will potentially look to share learnings at ENA's flagship conference -- EIS 2024. Lessons learnt will be shared by NGET in any other future or parallel projects to ensure the successful delivery of future activities.

Competitive markets

At the heart of this project is the desire to make findings and model architecture open source, to support all players to align on the same underlying assumptions when optimising offshore infrastructure development. The outputs of this project therefore support competition by not creating any barriers to entry. The project fosters competitive market creation to drive the lowest cost of enabling net zero for the consumer.

Commercials

Intellectual property rights, procurement and contracting (not scored)

For SIF projects, each Project Partner shall own all Foreground IPR that it independently creates as part of the Project, or where it is created jointly then it shall be owned in shares that are in proportion to the work done in its creation. The exact allocation of Foreground IPR ownership will be determined during the contractual negotiations with the Project Partners on the agreement for the project. On creation of Foreground IPR the creator of the IPR will notify the project partners to enable it to be recorded and ownership agreed in line with the contract terms.

Also if the party appoints a sub-contractor, the agreement with that sub-contractor should have similar IP provisions to those in this agreement and which at least achieve the same aims as the agreement regarding IP. Once the Project is completed, Relevant Background IPR will be licensed for use by the Project Partners in connection with another Project Partners' Foreground IPR solely to the extent necessary to use that Foreground IPR, upon terms to be agreed.

We intend to ensure each Project Partner will comply with Chapter 9 SIF Governance Document through the contractual terms governing the project. However, precisely how this is done will be subject to contractual negotiations with the Project Partners on the agreement for the project.

Commercialisation, route to market and business as usual

We are beginning to see these topics around offshore infrastructure development raised in a variety of contexts -- both in the UK and in Europe:

The evolution of GB electricity network planning - The UK's network planning is evolving towards a Strategic Spatial Energy Plan (consistent with the conclusion of the Winser report). That plan will consider multi-vector issues in the round. Current structures, such as the Holistic Network Design and Transitional Centralised Network Development Plan have looked solely at electricity infrastructure needs.

The ENTSO-E Offshore Network Development Plan -- The European Network of Transmission System Network Operators for Electricity (ENTSO-E) has recently released the first offshore network development plan -- assessing electricity infrastructure needs across all European sea basins.

The ENTSO-E/ ENTSOG interlinked model -- ENTSO-E and its gas equivalent, ENTSOG, is working on an interlinked European network model to better understand the interactions between vectors.

The UK has set hydrogen production targets as part of its Hydrogen Strategy, with the bulk of green hydrogen production expected to be produced through onshore and offshore wind. Several projects are exploring how best to capture and optimise the interactions between offshore wind and hydrogen production to maximise the strength of underlying business cases.

Calls for greater coordination in planning enquiries -- Consenting electricity infrastructure is challenging and opposition often significant. This opposition often takes the form of calls for alternative options. These claims can be difficult to dispel, due to a lack of modelling capability.

Route-to-market

The outcome of this project will have a direct, positive impact on electricity and hydrogen network planning in GB and is consistent with the direction of travel envisaged by Government. The development of offshore infrastructure planning capabilities, that are made open-source to the market, will support the part-alleviation of many of these barriers to offshore infrastructure scale-up.

The route to market will focus on direct engagement with the value chain to disseminate the open-source framework and assumptions developed through this project. This will be led by key project partners, as well as through incorporation into the business-as-usual activities of NEGT, NESO and NGT.

Incorporation into business-as-usual

NGET, through involving key people across Strategic Infrastructure planning, will actively look at how to adopt the capabilities developed through this project into business-as-usual. The NGET personnel who will be involved in the project include the following senior resource:

Zac Richardson -- Offshore Delivery Director will sponsor the project.

Asheya Patten -- Programme Director, Marine Grids will input significant time.

Mark Copley -- A contractor to NGET who offers 20 years of experience of working across GB and EU markets, including working with Ofgem, ACER,CEER, BEIS, ENTSO-E and EFET, will lead the project.

The wider team involves resource from NGET's market analytics, power system modelling and innovation teams.

In terms of concrete development projects, Belgium is in the process of constructing an artificial island (Princess Elisabeth island) to act as an energy hub. Denmark took forward two similar energy island projects, though one is now on hold. Tennent is pursuing a standardised approach to designing offshore platforms to connect wind power, while the French grid company, RTE, is following a ‘simplification, standardisation, massification' strategy. CIP and Orsted have direct experience in these projects which they can bring to bear.

Given CIP and Orsted are actively involved in the project, learnings and capabilities developed from this project will also be integrated into business-as-usual activities for active offshore energy hub developers. Both companies will have senior representation (CIP - Thomas Koopmann, Director Energy Islands -Investment Team and Orsted - Bridgit Hartland-Johnson, Chief Specialist/Director Project Development System Integration).

Policy, standards and regulations (not scored)

At this stage, we envisage that no derogation or exemption from any project-related regulatory requirement is required for the Look NortH2 Alpha phase.

Insights from the discovery phase policy gaps report suggest that the key problem faced in developing Offshore Energy Hub (OEH) is likely to lie in the fragmentation of regulations, where sector-specific frameworks and processes inadvertently impede system integration.

At the highest level, we expect the following subjects (and inevitably a lot more) to require exploration.

Integrating network planning for gas and power, with a focus on moving towards a Strategic Spatial Energy Plan. It's important to consider cross-vector options in planning processes, especially given the current focus on electricity or gas. This may need to be extended Europe-wide for more integrated designs, such as interfaces with the ENTSO-E Offshore Network Development Plan.

Reviewing GB electricity market rules, including REMA and offshore bidding zones. Any decision regarding zonal or nodal considerations would significantly impact commercial arrangements, especially if there were offshore bidding zones.

Understanding technical rules and standards, which include the requirements of existing industry codes in electricity, such as the Balancing and Settlement Code, Grid Code, and Connection and Use of System Code. Of particular importance is the Security and Quality of Supply Standards (SQSS), as it greatly influences infrastructure sizing, including the size of electricity transmission lines.

Assessing the compatibility of UK/EU planning, market, and regulatory frameworks, particularly if interconnection style options are being considered. This involves considering how trading would work with the EU, especially in electricity where common trading rules in different timeframes are not yet established.

Evaluating licensing requirements, especially concerning transmission licenses, which are currently limited geographically. Any developments or changes, especially outside the 12 nautical mile limit, would require amendments.

Understanding the rules for awarding offshore wind leases. Traditionally, leases in the UK have been granted in large geographic areas. However, an energy hub approach may require smaller sites closer to a hub to be tendered. Engaging with the Crown Estate will be crucial in this aspect.

Assessing how offshore hubs could participate in subsidy schemes and compete in auctions for capacity payments or support mechanisms.

Developing hydrogen market regulations for production and transport, which are currently non-existent. Their interfaces with ongoing onshore development, from a network planning and wider hydrogen market development perspective will need to be carefully thought through.

Understanding the role of Guarantees of Origin and Green Certificates in a scenario where green hydrogen production is central to the business case. This includes understanding how Energy Attribute Certificates could be produced and traded.

Exploring these questions is an important part of the project covered under work packages 3, 4 and 5. This includes working with numerous stakeholders, including policymakers and regulators already engaged during Discovery.

Throughout the project, we will continue to review any changes to government strategy, policy or regulation and consequential impact on Look NortH2. If project learning leads to the identification of any changes required to enhance the rollout of Look NortH2, this will be highlighted in any project progress reporting.

Finally, the letter of support detailing ESO's appreciation and support of this project has been attached.

Value for money

The total project costs are £473,254 with a funding request of £425,115. The10% compulsory contribution will be provided by National Grid Electricity Transmission, Guidehouse, Orsted and Copenhagen Infrastructure Partners(CIP). The total contribution amount to £48,139.

The balance of costs and SIF funding across the consortium is:

National Grid Electricity Transmission

- £199,092 (42% total project) (£19,912contribution) seeking £179,180 for the assessment of offshore infrastructure market options (WP3), participation in stakeholder engagement (WP5) and the development of the business case (WP6).

Guidehouse

- £184,212 (39% total project) (£19,212in-kind contribution) seeking£165,000 for project management and reporting (WP1), assessment of offshore infrastructure whole system modelling architecture (WP2), review of offshore hydrogen and CO2 market considerations (WP4), and participation in stakeholder engagement (WP5).

Copenhagen Infrastructure Partners

- £57,510 (12% total project) (£5,771 in-kind contribution) seeking £51,739 for support across all WPs particularly for the assessment of offshore infrastructure market options (WP3), participation in stakeholder engagement (WP5) and the development of the business case(WP6).

National Gas Transmission

- £6,440 (1.4% total project) (£644 in-kind contribution) seeking £5,796 for support on WP4.

Partner support

Guidehouse is committed to the successful delivery of this project and providing value for money for GB consumers. Hence, £19,212of additional expertise, resources and time will be contributed across all six work packages. This results in an extra 18 days to be spent on the project at no additional cost.

The funding across partners is balanced by the responsibilities of the activity, with the size of the funding representing the level of responsibility.

The finances of all project partners are included in the milestones summary.

Total costs(£)

Funding sought(£)

Contribution to project (%)

Contribution to project (£)

Other funding (£)

199,092

179,180

10.00%

19,912

0

Project partner involvement will be conducted through hourly weekly calls and ad-hoc workshops to use time and budget most effectively on the project. This will ensure that the project benefits from a wide range of expertise and resources to ensure the best outcome and value for money.

No subcontractors are required.

No additional funding is coming from other innovation funds.

Guidehouse and NGET office space will be available to all project partners and stakeholders throughout the duration of the project.

GUIDEHOUSE EUROPE LIMITED incorporated and registered in England and Wales (No. 05167021) whose registered office is at Levels 7 & 8 Angel Court. 1Angel Court. London, EC2R 7HJ. United Kingdom

NATIONAL GRID ELECTRICTY TRANSMISSION PLC incorporated and registered in England and Wales (No. 10841592) whose registered office is 1 -3 Strand, London, WC2N 5EH. United Kingdom.

Partners also agreed on inviting other stakeholders to better understand different products available in the market and how these can help with the project objectives. The project is costed mostly in terms of labour cost.

This project demonstrates value for money for the following reasons:

Daily rates are at UK industry norms for similar engineering or consulting services.

Significant scope is being attempted addressing the most important aspects related to feasibility of offshore energy hubs.

The size of the benefits associated with better decisions on the energy hubs connecting offshore production and onshore consumption outweighs the cost of the project.

Associated Innovation Projects

- ○ Yes (Please remember to upload all required documentation)
- ◉ No (please upload your approved ANIP form as an appendix)

Supporting documents

File Upload

202506_LookNorth_Alpha_Full Report_Final.pdf - 5.0 MB
202505_LookNortH2 Alpha_WP2 Report_Model Approach, architecture and concept design.pdf - 1.9 MB
20250513_LookNortH2_Alpha_Report Deck.pdf - 2.1 MB
20250411_LookNortH2 Alpha_Offshore H2 and CO2 Considerations Report.pdf - 3.0 MB
SIF Alpha Round 3 Project Registration 2025-03-26 10_58 - 87.3 KB
10131011 LookNortH2.pdf - 215.0 KB

Documents uploaded where applicable?

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