

## SIF Discovery Round 3 Closedown Report

### Date of Submission

Apr 2025

### Project Reference Number

10104053

## Project Progress

### Project Title

Look North2

### Project Contact

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### Project Start

01/03/2024

### Project Duration (Months)

2

### Lead Funding Licensee

National Grid Gas Transmission

## Project Summary

Offshore Energy Hubs (OEH) integrate electricity/hydrogen production offshore between the UK and other European countries. OEHs could stimulate UK offshore wind rollout potential and support the development of a hydrogen economy. Many European TSOs are exploring this concept, but the UK is yet to fully consider this.

This project will explore potential benefits and associated costs of developing OEHs in the UK, developing scenarios that quantify benefits such as curtailment reduction, grid losses reduction and infrastructure optimisation.

Future phases will explore what commercial models and market designs are needed to integrate OEHs into the whole energy system and with Europe.

## Performance and Outcomes

### Summary key findings

Optimising energy production is key to achieving the 2050 net zero target at the lowest cost for consumers. The UK is set to rely on offshore wind for most of its final power and energy use. A centralised offshore energy hub concept may be able provide significant socio-economic and environmental benefits by integrating use cases.

Three potential zones for Offshore Energy Hubs have been identified based on ideal characteristics for their development.

All hub configurations and zones report financial benefits, with most occurring when the hub is developed far from shore.

Net financial benefits grow linearly with the magnitude of the offshore energy hub

The linear growth of benefits is largely driven by infrastructure optimisation. At 'Zone A', if the offshore wind capacity is 1.5 GW, the benefits from infrastructure optimisation are £669m compared to £6,932m if the capacity is increased to 15 GW. This results in more than a 10x increase in benefits with a 10x increase in capacity.

For other zones, infrastructure optimisation is also the main driver, but at a lower scale. This is due to 'Zone A' being further from the shore, maximising its benefits.

While more offshore wind will drive down wholesale power prices, if additional transmission infrastructure is needed to support it this can add network costs to consumer bills. Additionally, more renewables require higher system operation management costs, such as additional constraint payments, which are passed through to consumers. Finally, government incentives for renewables such as Contract for Difference are paid by energy consumers through environmental or social obligation costs.

To realise these benefits, OEHs require more integrated regulations and decisive action on aspects of market design.

Although there are several moving pieces in OEH regulations, increased alignment would be key to ensuring its success.

To achieve market design objectives, the ESO, Ofgem, DESNZ and industry should make concrete decisions in multiple areas.

### User needs

See final technical output for more information

### Impacts and benefits

Further work is required to progress the commercial codes and regulations required to unlock the development of a cross-zonal offshore whole system economy. For this project, the key metrics used will be financial cost savings stemming from curtailment reductions (£ associated with MWh saved), reduction in grid losses (£ associated with MWh saved), and in infrastructure overbuild reduction thanks to the development of Offshore Energy Hubs in the UK (£ associated with MW of infrastructure saved).

Financial - future reductions in the cost of operating the network:

The supply-side optionality provided offshore to developers through Power-to-Hydrogen and greater interconnection with Europe, could significantly reduce offshore wind curtailment, hence reducing constraint payments for the electricity system operator, that are foreseen to reach over £2.5bn/year over the next decade.

Better coordination between offshore hydrogen development and onshore hydrogen grid would facilitate and optimise hydrogen TSO operation.

Financial - cost savings per annum on energy bills for consumers:

As mentioned, a significant decrease in constraints payment will reduce consumers bill across the UK.

Better coordination between offshore and onshore hydrogen infrastructure development could reduce the potential for overbuilding infrastructure, hence providing savings on non-energy costs for customers.

Increased supply-side flexibility for offshore wind developers could help significantly reduce wholesale price volatility. Thus, reducing peak energy prices that particularly impact vulnerable consumers.

Revenues - creation of new revenue streams:

Offshore Energy Hubs can provide additional revenue streams for offshore wind developers through power-to-hydrogen, as well as the potential to export energy to Europe.

Environmental - carbon reduction -- indirect CO<sub>2</sub> savings per annum:

Additional revenue streams for offshore wind projects could accelerate the pace and scale of such developments by strengthening developers' business case.

New to Market -- Product, Process and services

This project will focus on the creation of new market products, processes and/or services that unlock the above benefits through enabling and optimising the development of cross-zonal Offshore Energy Hubs. The direct benefits realised through project delivery are the creation of new to-market products (e.g., joint or interlinked Offshore Bidding Zones), processes (e.g., co-optimised maritime spatial planning and permitting), and/or services that create new revenue streams for offshore wind developers, incentivising them to invest into Offshore Energy Hubs.

## Risks, issues and constraints

Project risks at closure:

- Key data required for the CBA cannot be made available by project partners
- Project does not achieve the desired targets and progress to reach alpha stage
- Cost overruns
- Loss of key personnel from project partners
- Insufficient resources
- Contract sign off delayed
- IPR and Exploitation
- Lack of engagement from important stakeholders
- Changing landscape and narrative around Offshore Energy Hubs during the project

These risks will be moved onto Alpha

## Working in the open

Our stakeholder engagement plan aims to gather gaps from all actors playing a role in the offshore energy hub value chain.

### Project Developers

Obtain insights on:

Cost/benefits of offshore energy hubs

Challenges faced by developers in developing a credible business case for offshore energy hub

### Public Bodies

Obtain insights on:

Existing offshore energy system planning

Existing market rules, policies and regulations on offshore energy development

### UK Networks

Obtain insights on:

Role of gas network in future H<sub>2</sub> development

Collaboration opportunities for gas and power offshore

## EU Networks

Obtain insights on:

European market rules, policies and regulations on offshore energy dev.

Key learnings from challenges and success

Collaboration opportunities

A long list of stakeholders has been identified and prioritised for engagement across the Discovery phase. Our stakeholder engagement will be conducted rapidly to ensure stakeholder insights feed into the project's analysis.

## Costs and value for money

The total project costs are £143,329, this includes £15,000 in contributions from NGT and also £11,000 and £2,000 in-kind contributions from Guidehouse and NG ESO respectively. The funding requested is £128,329. The funds are split:

National Gas Transmission - £29,233 (20% total project) (£15,000 contribution) seeking £14,233 for project management support, stakeholder engagement activities and requirements development.

Guidehouse - £98,968 (68% total project) (£11,000 in-kind contribution) seeking £98,968 for project lead delivery, the cost-benefit analysis, and identification of existing market and regulatory gaps.

National Grid ESO - £5,128 (5% total project) (£2,000 in-kind contribution) seeking £5,128 for whole system and future system operator advice, as well as contribution to the identification of existing market and regulatory gaps.

Orsted - £5,000 (3.5% project total) for offshore wind development expertise

Neptune Energy - £5,000 (3.5% project total) for offshore energy hubs development expertise

Contributions

£15,000 contribution will be provided between by National Gas which meets the 10% financial contribution requirement for this phase.

Partner support

Guidehouse is committed to the successful delivery of this project and providing value for money for GB consumers. Hence, £11,000 of additional expertise, resources and time will be contributed across all six work packages. This results in an extra 10 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. Hence, Guidehouse will be delivering the key deliverables across the project with a fair contribution of effort from Orsted and Neptune on gathering insights and data and NGT's engagement and programme management. The ESO will provide subject matter expert guidance, data if/when needed, as well as be tasked to challenge the work output for it to be as innovative as possible to inform their system planning work.

Project partner involvement will be conducted through hourly weekly calls and adhoc 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.

## Special conditions

n/a

Document Upload

File Upload

No documents uploaded

Documents uploaded where applicable?

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