

THE HYPNET NW PROJECT

Designing a support package for a full-scale CCS and hydrogen demonstrator

May 2018

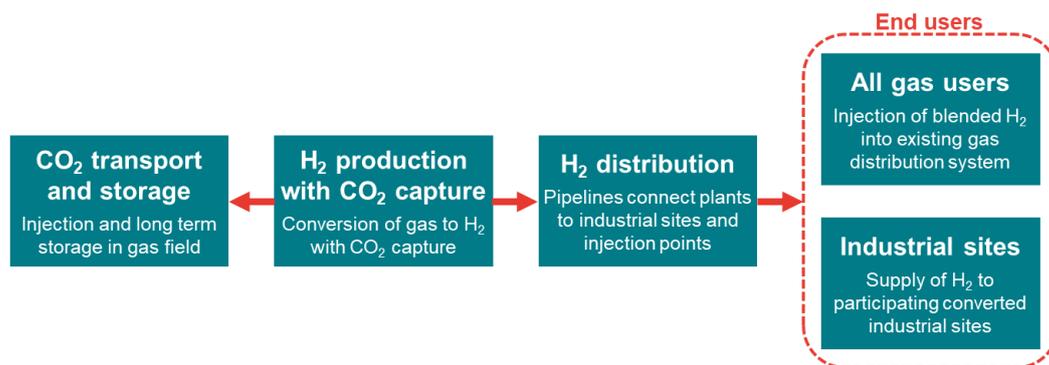


EXECUTIVE SUMMARY

The low carbon energy transition will require the development of projects that deliver innovation and learning. Without support, many of these will not be taken forward given the barriers facing the private sector in delivering them. As the projects move towards large-scale testing of concept, the complexity of the required support will increase. This is because they are more likely to involve multiple parties, across multiple energy vectors. The value of support will also need to increase to match the larger project size.

This report considers how the HyNet NW project could be supported. HyNet NW is a full scale Carbon Capture and Storage (CCS) and hydrogen project situated in the North West of England. Its structure is shown in Figure 1. This project aims to deliver innovation and learning across the CCS, heat and transport vectors over timescales compatible with meeting the 2050 targets and carbon budgets. In addition to providing learning for the future, we understand that HyNet NW will result in a reduction in actual emissions in the region of 1.5 million tonnes of CO₂ per annum¹ by decarbonising industrial processes and using a blend of hydrogen and methane to meet wider network demand.

Figure 1 HyNet project structure



The FOAK nature of the project and the lack of established funding mechanisms for CCS means that the government will need to lead the direction of a funding solution to enable this project to be progressed.

Report findings

While designing a funding mechanism presents challenges, these should not determine whether or not the project goes ahead. If this is a worthwhile project, then an appropriate funding solution should be found.

¹ Progressive Energy (2017), *The Merseyside Hydrogen Cluster: A Low Cost, Deliverable Project*

Finding 1: Government decisions are needed now to enable demonstration of CCS and hydrogen in the 2020s

The CCC has identified low-carbon hydrogen with CCS as one of the main options for the decarbonisation of buildings on the gas grid and industrial clusters in the 2030s and 2040s. To enable a move to hydrogen in this timeframe, the CCC has said that it will be vital to undertake demonstrations in the 2020s.²

In addition to the wider context around the need for such projects to be demonstrated in the early 2020s, HyNet NW also has a specific need to be developed to similar timescales. This is because the closure of the Liverpool Bay oil and gas complex in the early 2020s represents a limited window of opportunity to offset field decommissioning costs against the project.

Finding 2: Government support is needed to co-ordinate funding and underwrite risks

Low-carbon technologies face barriers to demonstration and deployment.

- **Externalities** arising from the lack of effective carbon price mean there is insufficient private incentive for investment into low-carbon technologies.
- **Risks and uncertainties** associated with HyNet NW as a FOAK project mean government will need to underwrite key risks. This is because individual commercial investors are likely to be more risk-averse, and require faster paybacks than society as a whole. Therefore, the optimal outcome for society may not be realised without government intervention.
- **Knowledge spillovers** from project learnings will benefit future projects. These benefits cannot be captured by HyNet NW, implying insufficient investment incentives.

These barriers currently result in an insufficient private incentive to invest, and therefore a need for government to lead the direction of CCS and hydrogen development.

Finding 3: Benefits of HyNet NW are widely spread, meaning that taxpayers or energy customers should provide support

Where direct support is needed to meet the costs of the project, over and above that which the private sector can be expected to deliver, there is a basic question about whether this is funded from taxation or from energy customers. The benefits of the project are widely spread across two main groups:

- **Those in the locality of the project.** This is largely those who will gain improved air quality and a greater level of inward investment into the local economy.
- **A wide range of future beneficiaries across sectors and the nation.** This is because the learning that this project will be expected to deliver will be wide reaching, as it covers a number of aspects of decarbonisation policy. The

² Committee on Climate Change (2016), *Next steps for UK heat policy*, <https://www.theccc.org.uk/wp-content/uploads/2016/10/Next-steps-for-UK-heat-policy-Committee-on-Climate-Change-October-2016.pdf>

project will also help meet the carbon budget and reduce the need for emissions reductions elsewhere in the economy.

Given the reach (in both time and place) of this project, it would be justified to support the project either through taxation, or through current and future energy customers.³

- **Taxpayers:** Taxpayer funding for a project of this kind could be justified on the basis of the wide ranging project benefits and the national importance of investment in clean growth, as led by the Government's Industrial Strategy. This would involve socialising the costs either regionally or across the UK through taxation, which is likely to be the least regressive option. Whilst access to taxpayer funding in the current climate is a real challenge, innovation funds linked to the Government's Industrial Strategy may represent one route to supporting certain elements of the Project.⁴
- **Energy customers:** Given this approach has been taken for supporting the development of low carbon electricity generation infrastructure, this option may be most appropriate. However, it is also not without its challenges, given the political pressure to keep energy bills down. The current higher policy costs included in electricity bills means there may be a case for putting the costs solely on gas customers, even though the benefits are wider. Further, there is then a question about whether the funding should be regional (potentially socialised on this basis via distribution charges) or national (through transmission charges). Given that many of the benefits will be realised on a national basis, this would point to at least partial recovery through transmission charges.

Finding 4: Feasibility is likely to determine the best support mechanism for HyNet NW

Economic theory alone will not provide an answer for funding - practical considerations will also play a role in determining the best option. Potential funding mechanisms which require changes to primary legislation are unlikely to be suitable. This is because such changes are unlikely to be feasible within the timeframes required for this project, given the projected decommissioning date for the Liverpool Bay gas complex. The optimal support mechanism will be defined by this constraint set.

HyNet NW covers many activities across a large part of the value chain. In deciding on the most appropriate overall support package, it is necessary to look at the individual activities.

- **CO₂ transport and storage:** There is a widely recognised need for this activity to be separated from the carbon capture element. Capex requirements can be offset against savings from gas field decommissioning costs, and regulated payments based on volume could provide ongoing support. The funds for these payments will most likely come from energy customers through transmission charges, depending on relative legislative

³ It should be noted that our work has not included an evaluation of the project itself. Instead we have focused on how such a project could best be supported to deliver value for money as part of the delivery of the low carbon energy transition.

⁴ Taxation funding has been used for other energy schemes, such as the Renewable Heat Incentive

and political feasibility. In any funding arrangement, government are expected to need to bear key risks around storage leakage and cross-chain default.

- **Hydrogen production and CO₂ capture:** The cost profile involves significant upfront capital and ongoing operation costs, which means an ongoing support mechanism is required. The plants will sell hydrogen conversion and carbon capture services, rather than trading the actual gas commodity.⁵ A cap and floor arrangement could be used, which incentivises investment while limiting risk to the owner. This mechanism can be revisited periodically, which will provide flexibility in the event of widespread hydrogen deployment leading to competitive hydrogen markets. The responsibility for administering the contract could sit with National Grid Gas. The cost of this could then be recovered from either taxpayers or energy customers.
- **Hydrogen distribution and network blend:** These are activities that are likely to fall within the remit of the gas DNO. As such, decisions about how they are funded will sit with Ofgem. Ofgem is currently consulting on its approach to the forthcoming RIIO-2 price controls. As part of this review, it will need to consider how it would fund this type of project given that it is larger than those traditionally funded through specific innovation stimuli such as the Network Innovation Competition.
- **Industrial conversion:** To the extent possible, industrial participants should be made to contribute to the costs of conversion as they will receive some benefits, such as those associated with EU ETS exemptions. However, we understand that this benefit may be insufficient to cover the full cost of conversion. Further support is therefore very likely to be necessary, and so the final finance package for industrial conversion could consist of part industrial customer contribution, and part government/LEP support. The requirement for external funding must be balanced with the risk that any funding support given to industrial customers will be wasted if they choose to relocate away from the area or close down. Commitment mechanisms and/or penalties for cessation of usage will therefore also be needed, which could include network user commitments.

The overall project must be co-ordinated to ensure successful delivery. A project of this scale and importance will need to be led by government and form part of its Clean Growth Strategy. This holds regardless of the funding delivery arrangements used. At the project funding level, there are two overall approaches that have different implications.

- **Taxation led approach.** If the funding for most activities is from taxpayer sources, the government can lead directly on the project through putting together a package of existing and new funding around saved decommissioning costs, specific CCS funding, and Industrial Strategy funding.
- **Gas customer led approach.** An alternative approach would see taxation playing a much smaller funding role, outside of the government underwriting some key CCS and policy risks and contributing the saved costs associated

⁵ We assume that shippers/suppliers will trade natural gas and hydrogen to end users.

with decommissioning. The funding would instead largely be met by gas customers.

Ultimately, it is likely that a hybrid of these two approaches will be most appropriate.

