CARBON CAPTURE AND STORAGE (CCS)

liverpool bay ccs

INTRODUCTION

Liverpool Bay CCS Limited (LBCCS) is leading the development of the Liverpool Bay carbon dioxide (CO_2) transportation and storage project (The Liverpool Bay Transport and Storage Project) to serve the HyNet North West Industrial Decarbonisation Cluster.

HyNet North West is the UK's leading industrial decarbonisation project which aims to unlock a low carbon future in the north west of England and north Wales by tackling CO_2 emissions from industry and supporting economic growth in the region. This factsheet explains how CCS works and why it is needed.

WHY IS CCS NEEDED?

CO_2 released into the atmosphere is a major cause of climate change. Reducing CO_2 emissions into the atmosphere is an essential part of managing our climate emergency. In response to climate change, the UK Government has established a net zero emissions target. This means that by 2050, any CO_2 emissions to the atmosphere must be offset by equivalent emissions removal. International and domestic environmental agencies, including the Intergovernmental Panel on Climate Change[1] and the Committee on Climate Change in the UK[2], consider CCS to be vital in achieving these targets.

DID YOU KNOW?

The HyNet Project has the potential to capture up to 10 million tonnes of CO_2 per year by the early 2030s, the equivalent of taking 4 million cars off the road.

Some industrial processes produce a huge amount of CO_2 that is currently released to the atmosphere. To meet the UK's targets, we need to significantly reduce these emissions.

CCS is a vitally important process, particularly for industries like cement, chemicals and steel, which find it hard to lower their carbon emissions. These are known as 'hard-to-abate' industries, as CO_2 is a by-product of their manufacture.

Capturing CO_2 at the source of production at these industrial sites enables their operations to continue to provide the necessary products we need, while reducing their carbon footprint, safeguarding industry jobs in the process and enabling the UK's transition to net zero emissions.

HOW DOES CCS WORK?

CCS is a safe and proven technology that can capture and store up to 95% of CO_2 emissions produced in industrial processes.

1. The first step involves installing technology that will capture CO_2 emissions from industrial emitters.

2. The CO_2 is then transported from the industrial emitters via new and/or existing pipelines to connect to the Liverpool Bay Transport and Storage Project.

3. The CO_2 is then transported via new or repurposed pipelines to be stored approximately 1km under the seabed in carefully selected offshore sites. These storage sites beneath Liverpool Bay are depleted natural gas reservoirs which have previously held natural gas securely for millions of years.

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(1) Intergovernmental Panel on Climate Change (2022). Climate Change 2022: Mitigation of Climate Change. Available at https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_FullReport.pdf (accessed 30/10/2024).

(2) International Energy Agency (2024). CCUS Projects Database. Available at: https://www.iea.org/data-and-statistics/data-product/ccus-projects-database (accessed 30/10/2024).

DID YOU KNOW?

We are repurposing existing infrastructure, such as natural gas pipelines and platforms, as part of our proposals to improve cost-efficiency and reduce the burden on UK taxpayers.

PROVEN AND TESTED TECHNOLOGY

CCS is a well-established technology that has captured and stored CO_2 from industrial processes in Europe since 1996. There are currently over 40 operational CCS projects worldwide[2] and we are working with the international CCS community to share key results and lessons learned on other large-scale CCS projects.[3] We are making use of these valuable insights from international best practice as we develop our proposals. In the UK, CCS is regulated by the UK Government's Department for Energy Security and Net Zero (DESNZ) and we are working closely with them to ensure that our CCS projects comply with their standards.

ENSURING LONG-TERM SAFETY

The UK is home to a range of high hazard industries and has developed a world-class safety regulatory regime. Safety of the Liverpool Bay Transport and Storage Project will be regulated by the Health and Safety Executive (HSE) and the North Sea Transition Authority (NSTA). Both regulatory bodies have a long track record of effectively regulating safety in the UK hydrocarbon sector.

LBCCS has extensive experience in designing, building and operating safe and effective high-pressure gas pipelines and it will use this expertise to develop the CO_2 pipeline to the highest safety standards. LBCCS will carefully monitor the Liverpool Bay Transport and Storage Project during all operational phases, CO_2 transportation, injection and safe containment within the reservoir, using state of the art techniques. This will include advanced methods such as geophysical surveys, pressure sensors, seabed surveys and specialised monitoring wells.

DID YOU KNOW?

HyNet North West could generate up to £17 billion for the regional economy by 2050 and will directly provide 6,000 jobs in the region.

To ensure the safety of the offshore storage under Liverpool Bay, a programme of monitoring, measurement and evaluation will assess the behaviour and integrity of the CO_2 throughout the planned 25-year life span. Following this, a 'post-closure' phase of works will take place to end the injection of CO_2 into the reservoir and ensure that it remains permanently enclosed within it. The post-injection monitoring period performed by the licence operator will be in compliance with legal and regulatory requirements and is not a subject of negotiation.

According to current UK legislation, measurement, monitoring and verification (MMV) activities must be guaranteed by the Operator for a period of 20 years after closure of the storage site. At the end of this period, the licence terminates, and responsibilities pass to the government, but the Operator will continue to bear the monitoring costs with a financial contribution for a subsequent period of a further 30 years.

(2) International Energy Agency (2024). CCUS Projects Database. Available at: https://www.iea.org/data-and-statistics/data-product/ccus-projects-database (accessed 30/10/2024).

(3) HM Government (2022). Carbon capture, usage and storage (CCUS) innovation: HyNet CCUS key knowledge deliverables Available at: https://www.gov.uk/government/publications/carbon-capture-usage-and-storage-ccus-innovation-hynet-ccus-key-knowledge-deliverables (accessed 30/10/2024).

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