SCCS Press Release

UNDER STRICT EMBARGO UNTIL 11:00am BST 10 SEPTEMBER 2015

Unlocking the North Sea's CO_2 storage potential: unique study reveals benefit of 'multiple user' storage sites

The secure and permanent storage of carbon dioxide (CO_2) within a single geological storage formation can be optimised by injecting CO_2 at more than one point simultaneously, according to results from an innovative study of rocks beneath the UK North Sea.

The findings could help to unlock an immense CO_2 storage resource underlying all sectors of the North Sea for the storage of Europe's carbon emissions, and will inform the work of those managing and operating this natural asset.

The process of storing CO_2 captured from power plants and industrial facilities in deep geological formations is known as Carbon Capture and Storage (CCS) and is a key technological solution for meeting climate change targets over the coming decades.

The research by scientists and prospective site operators has used a UK North Sea case study – the Captain Sandstone – to predict the performance of a potential CO_2 storage formation when the greenhouse gas is injected at two points at the same time over three decades.

The study's conclusions will help to increase confidence among regulators and investors in the secure containment of CO_2 within "multiple user" storage formations.

The work has informed how the UK can plan and manage subsurface geological CO_2 storage, and design CO_2 injection at more than one location by looking at regional-scale performance of an entire geological formation. It is an important step in the gradual process of developing the UK's vast CO_2 storage potential, which has been estimated at 78 billion tonnes [1].

The findings also suggest that the Captain Sandstone, which lies more than a mile beneath the Moray Firth off north east Scotland, could securely store at least 360 Million tonnes (Mt) of CO_2 in just one sixth of its area when CO_2 is injected at a rate of between 6 and 12 Mt per year over three decades. As a comparison, 360Mt is the amount of CO_2 emitted by Scotland's energy supply sector over 23 years [2].

Researchers on the CO_2MultiStore joint industry project used cutting-edge methods, which will, in future, reduce the effort and resources needed to characterise other extensive storage sandstones that could be suitable for CO_2 storage. As a result, generic learning from the project will be of considerable value to prospective site operators worldwide.

Download report and watch animation:
http://www.sccs.org.uk/expertise/reports/co2multistore-joint-industry-project

Energy Minister Fergus Ewing said: “Carbon Capture and Storage (CCS) has the potential to be one of the most cost-effective technologies for decarbonisation of our power and industrial sectors, as well as those of economies worldwide. With £2.5 million of funding already committed this year to undertake substantial industrial research and feasibility studies in Grangemouth, the Scottish Government is already playing a pivotal role in the development and commercialisation of this innovative, exciting technology.

“This research confirms how the huge CO_2 storage resource potential beneath the North Sea can be optimised, which, combined with the infrastructure already in place, again reinforces the huge opportunity for Scotland around CCS. CCS can contribute significantly to the diversity and security of electricity supply, and also has a unique role to play in providing a continuing supply of flexible clean fossil fuel capacity that is able to respond to demand in the way that other low-carbon technologies cannot.

“Many experts have set out the case that in order to achieve global climate change progress CCS technology must be developed and implemented to generating stations. We will continue to work with a range of partners to firmly establish this cutting-edge technology in Scotland, making full use of our huge potential.”

Dr Maxine Akhurst, British Geological Survey, who led the project for SCCS, said: “Our study is one of the keys that will unlock the potential CO_2 storage capacity underlying the North Sea and release this immense storage resource. Our results show that by using more than one injection site in a single sandstone operators can store greater volumes of CO_2 compared to using a single injection site, so increasing Europe’s capacity to reduce greenhouse gas emissions.”

Dr Ward Goldthorpe, Programme Manager, The Crown Estate, said: “As an active manager of the UK seabed, we’re committed to unlocking value from this natural asset, including working with industry to identify how carbon storage can help the UK decarbonise over the long term. The CO_2MultiStore project has provided invaluable insights that will help ensure regional management of offshore CO_2 storage formations is used to optimise the potential of this sector and the transition to a low-carbon economy.”

Paul Goodfellow, Upstream Director UK & Ireland, Shell, said: “This significant piece of work could help pave the way for the wider deployment of CCS in the UK. This project demonstrates the value of collaboration and knowledge sharing to build a new industry, and the results of this research will hopefully be of benefit to many different parties into the future.”

David Rennie, international sector head for oil and gas at Scottish Enterprise said: “Significant opportunities exist for Scotland around CCS and the collaboration and sharing of data between potential operators and the research community on this project has been invaluable. The study clearly reinforces Scotland as the ideal location to develop a CCS cluster, building on from a successful Peterhead project, and with this one area of the North Sea assessed to accommodate 360 million tonnes, the approach could be utilised in other areas of the North Sea to realise yet more storage and create a CO_2 industry for the future.”

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Notes to Editors

[1] http://www.sciencedirect.com/science/article/pii/S1876610214023558#

[2] http://www.gov.scot/Resource/0047/00478796.pdf Table B1

The **SCCS CO_2MultiStore Joint Industry Project** was led by Scottish Carbon Capture & Storage (SCCS) with support from the Scottish Government, The Crown Estate, Shell, Scottish Enterprise and Vattenfall. Generic learning from the study aims to support the economic and business case for developing two or more storage sites within a single regional CO_2 storage asset and inform the regulatory framework for such sites.

The Captain Sandstone is an extensive sandstone formation beneath the Moray Firth off the North East coast of Scotland. It hosts several oil and gas fields, and has been investigated in detail to assess its performance and capacity as a CO_2 store (SCCS, 2011). Its proximity to onshore sources of CO_2 and existing offshore pipelines further enhances its suitability. http://www.sccs.org.uk/images/expertise/reports/progressing-scotlands-co2/ProgressingScotlandCO2Opps.pdf

Carbon Capture and Storage (CCS) involves removing CO_2 from the exhaust of power plants and industrial processes, transporting it via pipelines or ships, and then pumping it more than a kilometre underground into stable geological formations, where it is stored permanently like the oil and natural gas accumulations of the North Sea. CCS is the only known way to decarbonise industries such as steel, cement and fertiliser production.

The first **CCS demonstration projects** are expected to use depleted hydrocarbon fields as geological stores for CO_2 injection. Regional sandstones have the potential capacity for the subsequent development of much larger CCS projects, whereby several operators could inject CO_2 into a single, extensive formation.

CO_2MultiStore project partners:

- Scottish Carbon Capture & Storage: www.sccs.org.uk
- Scottish Government: www.gov.scot
- The Crown Estate: www.thecrownestate.co.uk
- Shell: www.shell.co.uk
- Scottish Enterprise: www.scottish-enterprise.com
- Vattenfall: http://corporate.vattenfall.com