

Delivering Cost Effective CCS in the 2020s: an overview of possible developments in Wales and areas linked to Welsh CCS activities via shipping

Event location: University of Cardiff (and remote by telephone/webinar)

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Date: Wednesday, 22 June 2016

Start: 12.30 End: 15.30

Background

CCS is a key technical response to control energy costs and ensure security of supply under future requirements for reducing, and eventually achieving net zero, global GHG emissions. Shaping current infrastructure planning to facilitate CCS is an effective way to future-proof major investments in energy-intensive assets, including power plants, industry and gas supplies.

Wales has an important energy intensive industry sector, existing large gas and coal (and biomass) power plants and a major LNG import terminal. CCS is therefore potentially important for achieving very low CO₂ emission levels in Wales, as in the rest of the UK, but historically CCS in Wales has received relatively little attention due to lack of an obvious route for a pipeline-based CO₂ transport and storage system, particularly from the South Wales region where a significant fraction of the large emission sources are located. More recently, however, there has been a growing awareness that CCS will need to be implemented using shipping and/or other more flexible transport options for regions with geographically-isolated energy intensive industries, the prime current example being Norway (e.g. <http://www.maritime-executive.com/article/norway-examines-feasibility-of-co2-shipping>).

In many areas of the UK a shared CCS pipeline and offshore CO₂ storage infrastructure for the power sector, energy intensive industry and other possible uses such as hydrogen production would have significant advantages over CO₂ shipping. Pipelines are the only likely option if CCS is to be deployed at significant scale in the UK (order 100 MtCO₂/yr total), but CO₂ handling terminals attached to such pipeline 'clusters' would be effective destinations for CO₂ shipped from other areas and perhaps would also be used to provide temporary CO₂ export capability during fault periods or when an overcapacity occurred. In Wales, with the possible exception of a region in North Wales which could link to a North West UK pipeline cluster storing CO₂ in the Irish Sea, CCS based on CO₂ shipping is, however, the only way to achieve deep emission cuts and net zero emissions. The options for CO₂ shipping from Wales must therefore be understood and developed, and also be included in current planning, if CCS is to be part of a future-proofing strategy for Wales.

The technology for CO₂ shipping is relatively well understood, with some long-standing commercial operations for CO₂ commodity sales. Storage via on an onshore CO₂ receiving terminal connected to a pipeline could also be based on established technology, although this has not yet been proven at large scale. Transshipment to storage offshore, either via a floating handling facility or direct from the transport vessel, has been studied conceptually but has not yet been implemented. Petrobras are (or soon will be) injecting CO₂ directly from floating LNG facilities

in the Lula project, but this does not involve the same demands for preconditioning the CO₂ for injection or coping with intermittent flows.

The London Protocol has not, however, been ratified to permit offshore storage of CO₂ transferred across national boundaries. The Protocol was amended in 2006 but since then more countries have subscribed to the Protocol than have ratified the amendment to allow CCS and no definite date can be envisaged for achieving the necessary 75% ratification to bring the amendment into force. This London Protocol restriction is particularly relevant for countries bordering the North Sea that might want to ship CO₂ to Norway and (probably later) to the UK for storage. It is worth noting, though, that all transfers of CO₂ for commercial purposes (e.g. beverages, EOR) and the transfer of CO₂ for storage onshore are not within the jurisdiction of the London Protocol.

This workshop will bring stakeholders together to discuss possible elements in a future CCS deployment in Wales based primarily on shipping CO₂, with a time horizon for investment in the 2020s and beyond.

Versions of the presentations and a Chatham House Rule summary of the discussion will be made publically available on the UKCCSRC web site.

Activities

(timing may be adjusted to suit the way the discussions develop, but with a hard stop at 15.30)

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| 12.30 | 1. Jon Gibbins, UKCCSRC | Introduction |
| 12.50 | 2. Phil Bowen, UoC | CO ₂ sources in Wales, roles envisaged for CCS |
| 13.10 | 3. TBC | CO ₂ shipping for storage overview: technical and possible UK CO ₂ reception terminals |
| 13.30 | 4. Ingvild Ombudstvedt, GCCSI | International shipping, London Protocol, liability and other legal issues |
| 13.50 | Break | |
| 14.00 | 5. TBC | Norway's CCS plans and scope for inward shipping of CO ₂ |
| 14.20 | 6. Barry Worthington, USA | Shipping CO ₂ to North America for EOR |
| 14.50 | 7. Discussion/further Q&A around presentations with a focus on CO ₂ sources, onshore infrastructure, shipping destinations and market drivers | |
| 15.10 | 8. Full group review of options plus potential links to other CCS activities | |
| | <ul style="list-style-type: none">• WHAT HAVE WE LEARNED?• WHAT NEEDS TO BE DONE NEXT?• HOW TO PROGRESS IT? | |
| 15.30 | End | |

Joining instructions

If you wish to join please contact Ciara O'Connor/Fay Campbell.

Email: info@ukccsrc.ac.uk Tel: +44 (0) 131 650 8564

Most attendees and some speakers are expected to join by webinar and dial-up phone connection (links to follow).

The physical meeting will be held at:

Cardiff University – School of Engineering
Queen's Buildings
The Parade
Cardiff CF24 3AA

There are downloadable maps on the website here:

<https://www.google.co.uk/maps/dir/51.4844253,-3.1694754/@51.4857937,-3.1734079,16.25z>

And directions here:

[http://www.cardiff.ac.uk/osheu/resources/maps/Trevithick%20Building%20The%20Parade .pdf](http://www.cardiff.ac.uk/osheu/resources/maps/Trevithick%20Building%20The%20Parade.pdf)

Attendees need to report to the Porters' Lodge/Security, Trevithick Building (on the Queen's Buildings site). The porters will direct them to the South Building Entrance. On entering the South Building, there will be ample signage to direct them to the room.