



## **IEAGHG Information Paper: 2016-IP21; Lessons Learned from UK CCS Programmes, 2008 – 2015**

The Carbon Capture and Storage Association (CCSA)<sup>1</sup> of the UK have recently published a report entitled “*Lessons Learned – Lessons and Evidence Derived from the UK CCS Programmes, 2008 – 2015*”. A particular focus of the report is on the recent UK CCS Competition, which was cancelled in November 2015. The report sets out 36 key lessons for industry and policy makers. These lessons are based on interviews with the two preferred bidders in the previous CCS Competition; the Shell Peterhead project and the Capture Power White Rose project, as well as interviews with a number of other companies interested in developing CCS projects.

The full report can be found at:

[http://www.ccsassociation.org/index.php/download\\_file/view/1023/503/](http://www.ccsassociation.org/index.php/download_file/view/1023/503/)

For a technical organisation like IEAGHG the message from the report that there were no technical barriers to the implementation of the Peterhead and White Rose projects is clear and comforting. The main barriers were; financial, business model and policy related.

### ***Overall Project Outcomes***

The report suggests that under the UK completion rules that the Peterhead Project using the Goldeneye store could have been delivered by Shell and that Shell would have made a Final Investment Decision on the project.

The White Rose project however would have “required important adjustments to the structure of the risk allocation and to the terms of the Commercialisation Programme. Issues of concern relate to the risks associated with a possible failure of the pipeline system and financing of the storage component in the Endurance field.

### ***Project costs***

The expected Contract for Difference (CfD) Strike Prices<sup>2</sup> from the projects were consistent with those predicted by the UK CCS Cost Reduction Task Force. Later CCS projects would have benefited from the fact that the competition projects had borne the full costs of the entire CO<sub>2</sub> transport and storage (T&S) infrastructure of their projects, which was in both cases oversized. These subsequent projects it was considered would have had CfD Strike Price that were competitive with the strike prices for other low carbon generation technologies in the UK.

### ***Issues with the “full chain” business model***

The “full chain” business model proposed under the competition is considered as inoperable for future projects. The principal reasons were:

- It is not an attractive investment proposition for the private sector.
- There is the potential for cross-chain default by the generation operator, the capture operator, the transport operator or the storage operator in the “full chain” model which caused significant concerns to both debt and equity investors in all parts of the CCS chain

### ***Benefits of depleted gas fields for CO<sub>2</sub> storage***

The completion has shown that Depleted gas fields with proven storage capability and comprehensive production history may already be fully appraised for CCS service to the level of confidence that would

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<sup>1</sup> The Carbon Capture and Storage Association (CCSA) was founded in 2006 to represent the interests of its members in supporting the development and deployment of Carbon Capture and Storage (CCS) in the UK, EU and internationally, for more details see <http://www.ccsassociation.org/about-us/our-purpose/>

<sup>2</sup> A contract for difference is a method used in the UK to incentive investment in new low carbon technology in the UK, for a more detailed explanation see: <https://www.emrsettlement.co.uk/about-emr/contracts-for-difference/>



be required to obtain a storage permit with seismic appraisal, model construction and without further appraisal wells being drilled.

### ***Benefits of developing an oversized pipeline infrastructure.***

Over-sizing of the CO<sub>2</sub> transport and storage infrastructure for use by several future projects will generate the best value for money if a number of projects can share the same T&S infrastructure in the future.

### ***Concerns about EU regulations and State Aid requirements***

*It was concluded "that Guidance Document 4 of the EU CCS Directive on Financial Securities and Financial Mechanism (GD4)<sup>3</sup> risks imposing additional and onerous financial obligations on storage operators that go beyond the specific requirements of the Directive. Whilst the Guidance Documents themselves are legally non-binding, there is a risk that their literal interpretation by a Competent Authority could act as a major deterrent to CO<sub>2</sub> storage development" in Europe*

In the UK, CCS projects with CfD's granted under the Electricity Market Reform (EMR) regime will be deemed in receipt of State Aid, and will require State Aid approval from the EU under the existing Guidelines State Aid approval is likely to add considerable time to the project approval process.

One underlying concern expressed in the report was policy changes over the last 10 years by the UK Government, which have led to the cancellations of programmes like the recent competition have not enthused project developers and financiers to look for future opportunities in the UK for new CCS projects.

### **Summary**

The report provides a timely and valuable critique on the UK competition process. The UK completion was designed to deliver a full chain CCS project and has been fully road tested as part of the exercise, although unfortunately a project was not delivered. For countries looking to develop a CCS commercialisation programme this should provide a valuable reference volume.

The issues are clear that it was the business model design and financial issues along with policy changes that are the principal reasons the competition did not work but as indicated there are valuable lessons to be learnt here for the future. Disassembling the full chain model might be more effective for early projects but might require Government investment on the storage and transport aspects.

Clear messages from this are that:

- Depleted gas storage fields are an ideal starting point for CCS projects from the perspectives that there have a long production history and are already extensively appraised.
- Developing a pipeline infrastructure that can be used by many projects is an early mover for CCS projects in a country or region

Concerns about the CCS regulations in Europe have also been raised that suggest on the finance side the requirements may be too onerous. The CCS Directive has just been reviewed so is unlikely to change in the near future. For the UK EC regulations and rules on State Aid may not be such an impediment in the future.

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<sup>3</sup> [http://ec.europa.eu/clima/policies/lowcarbon/ccs/implementation/docs/gd4\\_en.pdf](http://ec.europa.eu/clima/policies/lowcarbon/ccs/implementation/docs/gd4_en.pdf)