

# CCS REGULATION

## NEWSLETTER

Welcome to the CCS Regulation newsletter. This is produced by the **MIT Carbon Capture and Sequestration Technologies Program**. It is a quarterly report designed to keep the reader up to date with the current regulatory news and issues surrounding Carbon Capture and Storage (CCS).

For more information about the program please see <http://sequestration.mit.edu>

### Interview with Dr. Kurt House, C12 Energy

C12 Energy is the first purely commercial entity entirely dedicated to identifying and developing commercial sites for geologic carbon storage. C12 was co-founded by Kurt Zenz House and Justin Dawe in 2008, while Dr. House finished his Ph.D. at Harvard University, involving the physics and chemistry of CO<sub>2</sub> storage. We were pleased to be able to interview Dr. House and discuss what C12 Energy does and some of their projects.

#### **What is C12 Energy and what does it do?**

C12 Energy is trying to implement CO<sub>2</sub> sequestration. The company's goal is to identify the resource of geologic CO<sub>2</sub> sequestration capacity and bring it to the market. We are developing CO<sub>2</sub> storage projects that are reliable, secure, and affordable, and that enable clean fossil fuel projects to be built. The first step in this process is to prospect for the best large scale CCS sites.

#### **What is the process of identifying a geologic site for CCS?**

We start off with the identification of the areas that have geologic potential for CCS and research the geology. C12 uses vast public geologic data to assess the potential regional structural and stratigraphic traps favorable for CO<sub>2</sub> storage and injection, similar to those used in the petroleum industry. When there is insufficient geologic data C12 Energy will do our own exploration wells and seismic analysis exploration.

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The majority of the C12's activity has been in oil and gas regions where the geology is generally conducive to safely storing CO<sub>2</sub> long-term.

Furthermore, EOR potential makes these areas very attractive. After assessing the different parameters, C12 identifies the best site in the region. There is usually a large difference between a good site and an amazing site which have materials advantages with respect to both cost and risk.

## ***What happens after you have constrained the likelihood of a viable prospect?***

We then obtain the necessary subsurface rights. To determine which specific subsurface rights we need for the proposed CO<sub>2</sub> injection site, we define two boundaries: the legal boundary and injection boundaries. CO<sub>2</sub> can only be injected within the inner injection boundary, while the legal boundary is defined by the maximum extent that the CO<sub>2</sub> is expected to migrate within the geologic formation. After mapping these boundaries, we contact the landowners whose land falls within the legal boundary. Our land team goes from landowner to landowner to obtain injection rights. If the project advances, the landowners receive royalties for allowing CO<sub>2</sub> storage on their land. They are generally accustomed to the process of leasing sub-surface rights, and are keen to the concept of CO<sub>2</sub> storage on their land provided they receive appropriate compensation. C12 currently has rights to inject CO<sub>2</sub>

under many 100,000's acres across the USA corresponding to multiple gigatonnes of CO<sub>2</sub> storage capacity.

## ***What is next after obtaining injection rights?***

Once we have the obtained injection rights, we then validate the existence of the suitable storage formation. C12 is just now getting into the site characterization phase. We have significant property holdings, and are validating our hypothesis that the sites are great places to store CO<sub>2</sub>. After site characterization we apply for the necessary permits and unitize the site so it can be operated as a single site. As this takes time it is generally done in parallel with commercial dealings. C12 is working in about 10 different states and in some cases we are involved with defining injection and exploration regulation for CCS. We also have 2 EPA class 6 well applications ready for submission.

To date we have not encountered any major regulatory issues.

## ***What can you tell us about your project which was one of the 3 finalists for FutureGen 2.0?***

The most advanced project that we have is the Loudon project located in Fayette County, Illinois. Willow Grove Carbon Solutions, a subsidiary company of C12, manages this project. (Individual sites are all managed by their own company, which are 100% owned by C12 Energy). Willow Grove has been working on this project since 2010, and we bid, in 2010, to provide the Loudon site for FutureGen 2.0. We

were excited about this opportunity to improve our confidence in the viability of the 12,000 acre site. C12 also has 3 other potential storage sites in Illinois.

Loudon site information: <http://willowgrovecarbon.com/intro.php>

## ***In light of the recent FutureGen site selection announcement can you tell me what is going to happen to your site at Loudon?***

We were disappointed by FutureGen's decision not to work with us to develop the Loudon site. Nonetheless, we do hope FutureGen succeeds in their efforts, and we wish them good luck. We believe strongly that the Loudon site is the best CO<sub>2</sub> storage site in Illinois by some measure, and we are committed to continuing its development. Indeed, we continue aggregating the necessary legal rights, and we are moving forward with both permitting and characterizing the site. The Loudon anticline is an extraordinary geologic asset, and we are committed to bringing through commercial development.

## ***Are other companies interested in the Loudon site?***

Yes, we are in discussions with multiple parties who are interested in using the Loudon site.

## ***Are there any other projects that you can talk to us about?***

C12 is negotiating with 3 other projects, 2 are very large utilities and 1 is a smaller independent developer. All of these projects, for various reasons, need to store a portion of the CO<sub>2</sub>. .....Continued on next page

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In one case the power-purchase agreement depends on CO<sub>2</sub> storage. C12 is also working on a new technique involving combined CCS and EOR. Since industrial sources or power stations produce CO<sub>2</sub> at a relatively high volume it is therefore very challenging to hook it directly up to an EOR site that has a varied demand for CO<sub>2</sub>. C12 is evaluating several opportunities that involve a sub-surface storage site where the CO<sub>2</sub> may be injected if it is not needed

for EOR and where CO<sub>2</sub> may be drawn from if and when it is needed for EOR.

### ***Where does C12 Energy receive its financing from?***

Our financing is entirely private. We are very fortunate to have partnered with some of the most respected investors in the world. These investors include the venture capital firms Sequoia Capital and General Catalyst Partners as well as the private equity firm Reservoir Capital and the Walton Family among some of our investors.

To date, we have not receive any government funding.

### ***Is C12 going to expand overseas?***

Currently all of C12's work is within the USA. There is, however, a good chance that we will, at some point, expand overseas. The most probable country would be Canada.

*We thank Kurt House for his time and contribution to the newsletter.*

*Contact information: C12 Energy, Kurt Zenz House, Ph.D. (617) 674 2478.*

## Publications and Releases



### **GCCSI: Global Status of CCS:2010**

March 9, 2011. The GCCSI has released its annual global review of project developments and issues relevant to the deployment of CCS. It is intended as a comprehensive reference guide for industry, government, research bodies, etc.

<http://www.globalccsinstitute.com/global-status-ccs-2010>

### **DOE CCS Site Selection Best Practices**

January 5, 2011. DOE released a Best Practices Manual that focuses on the most promising methods of site selection for CO<sub>2</sub> Storage.

[http://fossil.energy.gov/news/techlines/2011/11002-Best\\_Practices\\_Manual\\_Released.html](http://fossil.energy.gov/news/techlines/2011/11002-Best_Practices_Manual_Released.html)

### **DOE CCS RR&D Roadmap**

January 11, 2011. The US DOE and NETL have released a CO<sub>2</sub> CCS Research development and demonstration (RD&D) roadmap. This provides an overview of RD&D efforts to supply cost-effective, advanced CCS technologies for coal-based power systems.

[http://fossil.energy.gov/news/techlines/2011/11003-New\\_CCS\\_Roadmap\\_Released.html](http://fossil.energy.gov/news/techlines/2011/11003-New_CCS_Roadmap_Released.html)

### **DOE CO<sub>2</sub> Pipeline Study**

February 1, 2011. A DOE funded report: *A Policy, Legal, and Regulatory Evaluation of the Feasibility of a National Pipeline Infrastructure for the Transport and Storage of Carbon Dioxide* was released. This report analyzes a potential pipeline infrastructure that would transport CO<sub>2</sub> from large point sources, such as power plants, to designated underground storage locations. It recommends a private sector model with a state based regulatory framework.

<http://groundwork.iogcc.org/topics-index/carbon-sequestration/iogcc-white-papers/a-policylegal-and-regulatory-evaluation-of-the>

### **IPAC-CO<sub>2</sub> Develops a Global Standard for Geologic Storage of CO<sub>2</sub>**

The IPAC-CO<sub>2</sub> (International Performance Assessment Centre for Geologic Storage of Carbon Dioxide) has partnered with the Canadian Standards Association and CSA America to develop the world's first standard for geologic storage of CO<sub>2</sub>. The draft bi-National standard is currently being reviewed by a technical committee.

<http://www.ipac-co2.com/ipac-co2/projects>

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## Federal CCS Regulation News and Updates

March 3, 2011. Energy Tax Prevention Act of 2011 (S.482). Sponsored by Sen. James Inhofe (R-Ok) and Reps. Fred Upton (R-MI) and Ed Whitfield (R-KY). This bill aims to permanently revoke the EPA's authority to regulate greenhouse gas emissions. The bill is focused on greenhouse gases and ignores pollutants covered by the Clean Air Act that have a "direct public health impact". It will take away the EPA's right to make legislative decisions and thereby stop the EPA from making any cap and trade regulation. The Obama administration has said that it will veto any bill that limits EPA's climate authority.

<http://senatus.wordpress.com/2011/03/03/inhofe-introduces-the-energy-tax-prevention-act/>

January 31, 2011. EPA Stationary Source Regulations Suspension (S.231). Sponsored by Rockefeller (D-WV) and 6 Democrat co-sponsors. This bill aims, for 2 years time, to prohibit the EPA from taking any action under the Clean Air Act, with respect to stationary source permitting requirement or requirement concerning standards of performance for new stationary sources relating to CO<sub>2</sub> or methane.

<http://www.opencongress.org/bill/112-s231/show>

## State CCS Regulation News and Updates

### Mississippi

March 2, 2011. Gov. Barbour signed SB 2723 which establishes standards for geologic CO<sub>2</sub> sequestration and monitoring for the purpose of EOR.

<http://e-lobbyist.com/gaits/view/229575>

### Kentucky

February 23, 2011. The Kentucky Senate Natural Resources and Energy Committee approved a bill that will support CCS deployment in the state. The bill, introduced by Rep. Yonts, supports pursuit of up to five underground storage demonstration projects in Kentucky to advance CCS. The bill, already approved by the Kentucky House, will now move to the Senate.

[http://www.businessweek.com/ap/financialnews/](http://www.businessweek.com/ap/financialnews/D9LIONK00.htm)

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### California

January 20, 2011. The California Carbon Capture and Storage Review Panel released their final report which concluded that California would benefit from long-term CCS. The report lays out the legal, regulatory and financial issues that need to be resolved to create a standard way of reviewing, permitting, and maintaining oversight of CCS

facilities in the state.

[http://www.energy.ca.gov/releases/2011\\_releases/2011-01-20\\_carbon\\_capture.html](http://www.energy.ca.gov/releases/2011_releases/2011-01-20_carbon_capture.html)

### Wyoming

February 19, 2011. House Bill 63, a CO<sub>2</sub> water bill which was to require that the water produced from CO<sub>2</sub> sequestration be put to beneficial use, failed (3-2) in a Wyoming Senate Committee.

[http://trib.com/news/state-and-regional/govt-and-politics/article\\_aab5b965-0ebc-5b56-9971-ea4fa0f8d7d5.html](http://trib.com/news/state-and-regional/govt-and-politics/article_aab5b965-0ebc-5b56-9971-ea4fa0f8d7d5.html)

### Illinois

January 12, 2011. The Illinois Senate rejected SB 2485, Tenaska's rate subsidy bid for Taylorville coal-to-gas power plant with CCS.

<http://www.bloomberg.com/news/2011-01-06/illinois-senate-rejects-clean-coal-plant-support-update1-.html>

January 12, 2011. Illinois Senate passed legislation, SB 1927, that will require the state to buy about a 1/4 of its heating gas for 10 years from a new gasification plant operated by Power Holdings. The legislation was vetoed by Illinois Governor Pat Quinn in March.

[http://www.stltoday.com/news/local/govt-and-politics/political-fix/article\\_5512400a-1e21-11e0-8bc9-0017a4a78c22.html](http://www.stltoday.com/news/local/govt-and-politics/political-fix/article_5512400a-1e21-11e0-8bc9-0017a4a78c22.html)

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## CCS Project News

### FutureGen, USA

February 28, 2011. FutureGen Alliance announced that it had selected Morgan County, IL, as the site for FutureGen 2.0 Carbon Storage Facility.

<http://www.futuregenalliance.org/>

### Mountaineer, USA

February 17, 2011. AEP announced that its commercial-scale CCS project is on track. AEP also received \$4 million

from the GCCSI to support initial work on the project.

<http://seekingalpha.com/news-article/615911-aep-carbon-capture-plant-construction-on-schedule>

### Buggenham, Netherlands

February 9, 2011. Vattenfall, through subsidiary Nuon, started its 20MW CCS capture pilot project in Buggenum, Netherlands. The project will last 2 years.

<http://carbon.energy-business-review.com/news/nuon-commences-carbon-capture-pilot-program-in-netherlands-090211>

## International Regulation News

### Alberta, Canada

February 25, 2011. The Albertan Government's 2011-12 budget revealed cuts to the environmental department causing a delay for financing of CCS projects. However the budget for EOR projects increased by 21% increase.

<http://www.calgaryherald.com/business/story.html?id=4342386>

### Netherlands

February 15, 2011. The Dutch government has decided to not allow CO<sub>2</sub> storage on land as a result of lack of local support. This comes after the government officially rejected the Barendrecht project in November 2010.

<http://www.icis.com/heren/articles/2011/02/15/9435644/dutch-ccs-in-disarray-as-on-land-storage-ruled-out.html>

### UK

9 UK CCS projects have applied for the European Union's New Entrant Reserve (NER) funding. The funding offers

between EUR4.5bn to EUR9bn (US \$6.3-\$12.5bn) to support renewable projects across the EU.

<http://www.reuters.com/article/2011/02/10/us-britain-ccs-drax-alstom-idUSTRE71938H20110210>

### GCCSI

February 15, 2011. The Global CCS Institute has released a toolkit on ensuring best practice regulations and permitting processes around carbon capture and storage projects, providing a blueprint for nations seeking to roll out the technology.

<http://www.globalccsinstitute.com/resources/publications/carbon-capture-and-storage-regulatory-test-toolkit>

<http://www.carboncapturejournal.com/displaynews.php?NewsID=738>

### Norway

March 1, 2011. The Norwegian Government has again delayed a decision to invest in the CCS project at Mongstad until 2016.

<http://www.reuters.com/article/2011/03/01/us-norway-ccs-idUSTRE72036Q20110301>

### Images:

Page 1: Sleipner [www.npd.no](http://www.npd.no)

*This newsletter was constructed using information from internet searches. All the websites used have been cited.*

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