

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>.

The Current Status of European Regulation and Project Development

Interview with Dr. Monica Lupion

Dr. Monica Lupion is an Associate Professor at the Universidad de Sevilla and is currently undertaking research at MIT. She has kindly answered a few questions on the current state of regulation and CCS project development in Europe.

What is the European Union CCS Directive?

The CCS Directive on the geological storage of carbon dioxide was launched by the European Commission in 2009 to establish the legal framework for the environmentally safe geological storage of CO₂. It contains some provisions for capture and transport, as well as facilitating the integration of all the phases of the CCS chain. In order to be applicable to a project, the Directive needs to be transposed into national law in the corresponding European Member States (MS).

The Directive has been recognized as one of the most extensive approaches to CCS legislation worldwide. Nevertheless, it contains issues, primarily those related to long term liability that need to be clarified in order for CCS to move forward in Europe.

How fast was the Directive transposed into national law?

The deployment of the Directive has been different in each MS.



Table of Contents

Featured Article

- ▶ Interview with Dr. Monica Lupion on The Current Status of European Regulation and Project Development.....page 1

Regular Features

- ▶ State CCS Regulation Updates.....page 4
- ▶ Federal CCS Regulation News.....page 5

News

- ▶ International Regulatory News.....page 6
- ▶ CCS Project News.....page 7
- ▶ Publications and Releases.....page 8

CCS REGULATION NEWSLETTER

While some MS almost literally transposed the Directive, others included variations and amendments in the text. The speed of transposition of the Directive did not correlate directly with national CCS policy, financial situation or storage capacity in the MS. However by 2012, most of European MS with CCS projects underway had already implemented the Directive.

What is the status of CCS policy in individual Member States?

The situation in the UK is one of the most promising in Europe in view of the existing national policy programs and ongoing actions towards CCS. However, the UK and the Netherlands only permit offshore storage. Estonia, Ireland and Finland prohibited, or are planning to prohibit, CO₂ storage permanently in their countries except for research purposes. Poland and Sweden have taken measures to prohibit CO₂ storage for the present time. Belgium, Greece and Italy do not permit storage in selected areas, while Bulgaria has limited the amount of permitted CO₂ storage. Denmark has banned onshore storage until 2020 and subsequently abandoned its onshore demonstration projects. Norway, with well-established CCS activities like the Sleipner project, is also struggling to pursue a full scale CCS facility by 2020. The large-scale Mongstad CCS project in Norway has recently been cancelled, although small-scale CCS studies are still ongoing at the Mongstad test facility.

Please see table below for a summary of MS according to their advancement regarding CO₂ storage.

Table: Classification of European Countries according to their overall achievements regarding CO₂ storage (August 2012)

Category	Countries
Advanced	Norway, Italy, United Kingdom, France, The Netherlands
Progressing	Germany, Spain, Poland, Romania
Emerging	Hungary, Portugal, Slovakia, Lithuania, Greece, Bulgaria, Croatia, Belgium, Turkey
Rejecting	Finland, Serbia, Denmark, Slovenia, Sweden, Czech Republic, Ireland, Austria, Latvia, Estonia

Has failure to transpose the Directive affected any CCS projects?

Yes, the most well-known project affected was Vattenfall's Jaenschwalde project in Germany. Germany failed to fully transpose the Directive before the implementation deadline in June 2011. In September 2011, Germany's upper house rejected a bill allowing for underground storage of CO₂. Vattenfall, as a result, abandoned the Jaenschwalde CCS project and its €1.5 billion investment.

What are some of the problems with the Directive?

The Directive gives a general regulatory framework and introduces several key elements such as a monitoring plan, financial security provisions, long-term liability and financial mechanisms. Yet it only gives a general description of these elements and implementation of these factors are up to the MS.

While the Directive is a comprehensive piece of legislation, project developers and legislators in various MS have reported difficulties in understanding the provisions provided. This difficulty in understanding the legislation can serve as a potential legal and regulatory barrier to the further development of CCS in Europe.

Have any projects started the permitting process?

The ROAD project in the Netherlands is the only European project that has filled the storage permit application. The Directive was implemented in the Dutch legislation in its original format without adding any national provisions. After two years of negotiation, the European Commission concluded that the application confirms the suitability of the chosen CO₂ storage location. However, the project still

CCS REGULATION NEWSLETTER

does not have the final storage permit as the ROAD project developers could not submit all the required plans at the time of the permit application. The information on the storage site is to be completed after a final investment decision on the project is made, which in turn requires a granted storage permit. It was then agreed the final plans will be submitted one year before the injection of CO₂ starts, which is expected by 2015.

What is the effect of the collapse of the EU Emission Trading System (ETS) on CCS projects in Europe?

The Directive is closely linked to the EU ETS. This is the first, and still the largest, international system for trading greenhouse gas emission allowances. In order to provide complementary financing, CCS was included in the scope of the revised ETS. It ensures that stored CO₂ is not regarded as emitted and provides a financial incentive for CCS.

Chances that CCS projects can be successfully implemented in Europe have significantly declined after the collapse of the carbon price under the EU ETS. Under these circumstances, the incentive provided by the EU ETS is not sufficient, in particular for the operators who only use CO₂ storage and do not include any Enhanced Oil Recovery (EOR) in the project. In addition to affecting the EU ETS, the low carbon price has reduced the stimulus for the NER300 Programme that was to have been funded by the ETS allowances.

Does the Directive address post-closure transfer?

The Directive does not provide clear details about the transfer of responsibility of CO₂ storage sites. It outlines the post-closure pre-transfer phase should be at least 20 years. However, national competent authorities are allowed to reduce the period, if assured the stored CO₂ will be completely and permanently contained beforehand. The Directive does not adequately define when and how to prove the stored CO₂ is completely and permanently contained and who would assess this. In theory, the transfer could be postponed indefinitely. If individual MS have too strict

long-term liability regulations, then there is the possibility for a longer time frame to be imposed before the liability of the storage site can be transferred to the MS. This has the potential to dramatically increase cost uncertainty and thereby make the decision-making analysis much more difficult.

What happens in case of a leak from the storage site?

In the event of a leak, an emission certificate for every tonne of CO₂ leaked has to be surrendered. There is considerable uncertainty about the future prices of the credits which would be priced according to the value of the European Union Allowances (EUAs) at the moment the CO₂ might leak. Projects will need to purchase CO₂ credits equivalent to the volumes released since these emissions would have been counted as "not emitted" under the ETS.

What is the potential market for EOR in Europe?

In Europe, the potential for CO₂-EOR is markedly different from that in North America. Europe's oil fields are mainly located offshore adding technical complexity and expenses to a project. However, current activities in the North Sea indicate that CO₂-EOR might prove commercially viable. The UK's Don Valley project combines geological storage of CO₂ and CO₂-EOR for additional revenues in the North Sea. The project represents a rather different approach to EOR than has previously been seen in places such as the USA. Rather than maximizing the oil production efficiency of each tonne of CO₂, which leads to storage of the lowest possible amount of CO₂, the primary objective of the project is to store a given volume of CO₂. Nevertheless, in order to be considered geological storage of CO₂, all the provisions of the Directive still apply to the project. However the Don Valley project failed to secure both UK Government funding and European NER300 funds. This was due in part to the reliance on revenues from CO₂-EOR which was viewed as increasing the project's risk.

What financial security is required from the project operator?

The operator needs to prove they are able to finance the storage operation, the closure and the post-closure corrective measures. The Directive and its guidance documents describe financial instruments that can be used to provide the security requested. However, it is not clearly defined which activities must be included in the financial security, which instruments would be acceptable for the competent authority at the time of the injection and how to estimate the cost of an adequate level of financial security.

Spain was the first to transpose the Directive in 2010. What issues did they encounter?

The Directive was directly transposed into the Spanish national law without major issues. However, the Commission later released four guidance documents in March 2011, which caused a delay in the process of implementing the CO₂ storage regulation. The CCS Compostilla project was greatly affected as it had to re-apply for the already obtained exploration permits for two potential storage sites. Spain is also affected by the lack of specific legislation in the Directive covering CO₂ transportation. As a result, this presently does not allow the CO₂ transport permitting process in Spain.

What input does public opinion have on the progress of CCS in Europe?

Public resistance to CCS projects in Europe has been significantly greater than in other countries such as the USA. Higher population density in Europe and certain regulatory aspects primarily related to CO₂ storage are potential reasons for this. Understanding public acceptance and opposition to CCS is therefore very important and research is being undertaken to better understand these factors. However, public opinion remains a formidable force as was recently seen in the cancellation of Barendrecht in The Netherlands and Belchatow in Poland that occurred primarily as a result of strong public opposition.

We thank Dr. Monica Lupion for this contribution.

Additional information can be found at the following websites:

Directive 2009/31/EC of the European Parliament and of the Council
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0114:0135:EN:PDF>

Implementation of the CCS Directive
http://ec.europa.eu/clima/policies/lowcarbon/ccs/implementation/index_en.htm

State CCS Regulation News and Updates

Nebraska

January 16, 2014. Nebraska Attorney General Jon Bruning says his office is suing the EPA over GHG standards for new power plants that were released by the EPA last year. Bruning said: "The impossible standards imposed by the EPA will ensure no new power plants are built in Nebraska."

<http://www.nebraska.tv/story/24471564/nebraska-files-suit-against-epa-over-greenhouse-gas-standards>

Kentucky

February 20, 2014. State Rep. Jim Gooch (D) has sponsored HB 388, a bill relating to best system emission reduction for existing electric generating units. HB 388 would instruct the Kentucky Energy and Environment Cabinet to create a plan to reduce GHG emissions from existing power plants, without increasing energy bills and won't require a switch from coal to other fuels, such as natural gas, or using CCS. The bill has already passed the House Committee on Natural Resources and the Environment without opposition.

<http://www.kentucky.com/2014/02/20/3099566/house-panel-advances-bill-that.html>

CCS REGULATION NEWSLETTER

Federal CCS Regulation News and Updates

January 8, 2014. The EPA issued a revised proposal of the New Source Performance Standard (NSPS) to regulate CO₂ emissions from new electric utility generating units. The proposed rule, if finalized, will be the first NSPS for GHG emissions established by the EPA. It has the potential to lay the groundwork for broad CO₂ regulation from source categories already currently regulated under the NSPS provisions, including those in the petrochemical and manufacturing industries. The proposed rule replaces an earlier proposal issued by the EPA in April 2012.

<http://www.mondaq.com/unitedstates/x/287554/Climate+Change/Proposed+NSPS+for+GHG+Emissions+from+Power+Plants+Could+Have+WideRanging+Implications+For+Other+Sectors>

January 17, 2014. Congress has approved the FY 2014 Omnibus Appropriations Bill which supports DOE funding for CCS. The package provided \$392.34 million to the DOE's CCS and Coal R&D Program. In relation to the President's request, the bill increased funding for carbon storage by 78% to \$108.9 million and decreased funding for carbon capture by 20% to \$92 million.

<http://ghgnews.com/PDFs/vol-9-issue-2.pdf>

February 4, 2014. Sen. James Inhofe (R-OK) introduced SB 1988, which would allow states to waive the EPA regulations to set limits on CO₂ emitted by power plants under the Clean Air Act.

http://climate.bna.com/climate/summary_news.aspx?ID=261654

February 4, 2014. A NY Times article stated the EPA staff were struggling to write a new regulation for existing power plants, which is due to be released on June 1, 2014. They explain the difficulty in writing a regulation that if too loose would have little environmental impact, but if too stringent could lead to the shutdown of power plants before there is alternative power to replace them.

http://www.nytimes.com/2014/02/05/us/epa-staff-struggling-to-create-rule-limiting-carbon-emissions.html?_r=1

March 4, 2014. The EPA has finalized the amendment of regulations for hazardous waste management. The regulations conditionally exclude, as a hazardous waste, CO₂ streams that are captured from emission sources and are injected into the subsurface for geologic sequestration via the UIC Class VI well.
https://www.fedcenter.gov/Articles/index.cfm?id=25060&pge_id=1854

March 4, 2014. The White House budget for FY 2015 has been released. It allocates \$27.9 billion for the DOE, which is a 2.6% increase from 2014. The Office of Energy Efficiency and Renewable Energy (EERE) received \$2.3 billion. The Office of Science will receive \$5.1 billion for research into clean energy infrastructure.

<http://breakingenergy.com/2014/03/10/fy-2015-budget-proposal-highlights-clean-energy-and-climate-resilience/>

March 6, 2014. The House of Representatives passed HB 3826, The *Electricity Security and Affordability Act* sponsored by Sen. Joe Manchin (D-WV) and Rep. Ed Whitfield (R-KY). This bill aims to curb the ability of the EPA to set limits on carbon emissions from power plants. The bill would require any standards for new coal-fired power plants to have already been achieved by at least 6 plants in the US.

The bill passed the House by a 229-183 vote but faces tough challenges in the Democrat controlled Senate. President Obama has already threatened to veto the bill.

News: <http://www.reuters.com/article/2014/03/06/us-usa-congress-Bpowerplants-idUSBREA251ME20140306>

HB 3826 Summary: <http://energycommerce.house.gov/fact-sheet/whitfield-manchin-discussion-draft-plan-keep-american-electricity-affordable-and-reliable>

March 24, 2014. Sen. Heidi Heitkamp (D-ND) introduced the *Advanced Clean Coal Technology in Our Nation* bill. This bill would increase tax credits and set aside \$2 billion in loan guarantees for CCS projects.

<http://www.bna.com/heitkamp-bill-set-n17179889054/>

CCS REGULATION NEWSLETTER

International Regulatory News

EU

January 22, 2014. The EU Parliament passed its 2030 Climate and Energy Framework report. This report sets the EU's climate and energy goals until 2030 and addresses emission targets until 2050. The report has set the emission reduction target of 40% by 2030, compared with emission levels from 1990 and it is now the world's toughest reduction target. It has also set targets aimed to cut GHG emissions by 2050 to 80-95% from 1990 levels. The goal is to meet these targets through domestic measures alone. The annual reduction in emissions from EU ETS sectors would be increased from the current 1.74%/year to 2.2%/year after 2020.

The report has also pledged to generate 27% of Europe's energy from renewable sources. However, this would not be translated into national targets through legislation, thereby allowing flexibility for Member States.

Part of the plan also covers the reformation of the flailing Emissions Trading Scheme which is one of the main financing avenues for CCS projects in Europe. The Commission proposed to establish a market stability reserve at the beginning of the next ETS trading period in 2021. The creation of such a reserve, in addition to the recently agreed delay in the auctioning of 900 million allowances until 2019-2020 (back-loading), is supported by a broad spectrum of stakeholders. The aims of this energy framework are to develop energy security, in addition to a decrease in GHG emissions.

<http://oilprice.com/Latest-Energy-News/World-News/EU-Sets-Worlds-Toughest-Emission-Reduction-Target-of-40-by-2030.html>

Denmark and UAE

January 29, 2014. Denmark and the UAE have signed a pact to collaborate on advancing renewable and sustainability developments.

<http://www.renewableenergyworld.com/rea/news/article/2014/01/denmark-and-uae-sign-renewables-and-sustainability-pact>

UK

February 3, 2014. The UK CCS Association and the Trades Union Congress released a joint report stating pursuing CCS

could create a new industry in the UK worth £15-£35 billion by 2030. The report also said CCS could eventually cut UK electricity bills by about £80 a year.

<http://www.theguardian.com/environment/2014/feb/03/uk-carbon-capture-industry-potential>

EU

February 12, 2014. The European Investment Bank sold 22.4 million EU carbon permits in January, which raised 113.2 million euros (\$154.8 million) which will fund renewable energy and CCS projects. The allowances were sold for delivery in December 2014 at €5.06 each.

<http://www.reuters.com/article/2014/02/12/carbon-eib-sales-idUSL5N0LH43120140212>

US and China

February 15, 2014. China and the US have pledged to work together to limit GHG emissions. The world's two largest emitters of GHGs will collaborate through policy dialogue and information sharing regarding their respective post-2020 GHG reduction plans.

<http://www.reuters.com/article/2014/02/15/us-china-usa-climate-idUSBREA1E05320140215>

China

February 28, 2014. Guangdong Province held an auction for 2 million carbon permits to participants in its Emission Trading Scheme with a floor price of 60RMB(US \$9.86)/t. This is the third auction held by Guangdong province.

<http://www.pointcarbon.com/news/reutersnews/1.4219556>

Norway

February 28, 2014. Norway is currently developing its CCS policies and will provide an update on this process in the late spring. It is aiming to continue its pledge to build a full-size CCS plant by 2020. Norway is currently struggling to meet its goal to reduce GHG emissions by at least 30% by 2020, with emissions in 2012 already 5% above 1990 levels.

<http://www.marinelink.com/news/relaunch-capture-norway364859.aspx>

CCS REGULATION NEWSLETTER

CCS Project News

January 13, 2014. TCEP has experienced a serious set back by losing the buyer of its electricity. At the end of 2013, CPS Energy pulled out of a 25 year agreement to buy power from the Texas Clean Energy Project, run by Summit Power Group.
<http://dailycaller.com/2014/01/13/epa-agenda-suffers-setback-as-clean-coal-plant-project-is-derailed/>

January 14, 2014. Mitsubishi Heavy Industries, Ltd. (MHI) and Southern Company Services, Inc. (SCS) have successfully completed the initial demonstration phase of their CCS test. The 500 metric tons per day project, at a SCS's coal-fired power plant in Alabama, started in August 2012.
<http://www.mhi.co.jp/en/news/story/1401141755.html>

January 16, 2014. The US Federal Government has announced it will spend \$1 billion on the FutureGen 2.0 CCS project, provided private financing will cover the remainder of the \$1.68 billion project.
<http://www.sj-r.com/article/20140116/NEWS/140119554/11680/BUSINESS>

January 17, 2014. The US DOE has issued FutureGen 2.0 a Record of Decision, which approves the project and allows the FutureGen Alliance to start construction. The DOE said the project developers have sufficiently addressed the EPA's concerns about potential air pollution and other matters.
<http://www.dailyherald.com/article/20140117/business/701179924/>

January 23, 2014. Statoil is reported to be looking to reduce costs on loss-making onshore oil and gas facilities in Norway. The Mongstad CCS test facility is also a possible target for cutbacks.
<http://www.upstreamonline.com/epaper/article1350016.ece>

January 23, 2014. Wyoming Governor Matt Mead has proposed to set aside \$15 million for a CCS research test facility at the University of Wyoming. There is a demand for CO₂-EOR in Wyoming and this facility would compliment ongoing EOR research and explore other potential CO₂

markets.

<http://governor.wy.gov/media/pressReleases/Pages/GovernorProposesTestFacilityforCarbonResearch.aspx>

January 29, 2014. Southern Company announced the Kemper Coal Plants costs are still climbing and the project now costs more than \$5 billion.
http://article.wn.com/view/2014/01/29/Southern_Co_says_Kemper_coal_plant_costs_still_climbing

February 21, 2014. SaskPower has announced the Boundary Dam Power Station will not be ready for its planned start date in April. There were unexpected findings on the power plant side, which have caused this delay. SaskPower said that it will not be an extensive delay but has not given a new start date.
<http://www.leaderpost.com/technology/Carbon+project+delay/9533608/story.html>

February 24, 2014. The UK Government, as part of its £1 billion CCS competition, has awarded the Peterhead CCS project in Scotland and the White Rose Project in Yorkshire £100 million to fund their FEED contracts.
<http://www.bbc.com/news/uk-scotland-north-east-orkney-shetland-26321596>

February 25, 2014. Illinois regulators have approved a 30 mile underground pipeline to carry CO₂ from the FutureGen 2.0 CCS project to the storage site.
<http://www.sj-r.com/article/20140224/News/140229610>

February 26, 2014. Masdar and the Japan Bank for International Corporation (JBIC) have signed a Memorandum of Understanding (MoU) to work together in identifying, financing and executing renewable projects around the world, including CCS.
<http://www.captureready.com/EN/Channels/News/showDetail.asp?objID=3671&isNew=>

March 5, 2014. Shell UK has contracted Technip SA for the FEED contract for its Peterhead CCS project in Scotland.
<http://www.ogj.com/articles/2014/03/shell-uk-lets-contract-for-peterhead-ccs-project.html>

Publications and Releases

Bloomberg New Energy Finance Report

January 8, 2014. The Bloomberg New Energy Finance predicts the global carbon market will increase 15% in value in 2014. They forecast the market will reach €46 billion in 2014, which will be up 15% from last year but will leave it well below the historical high of €98 billion in 2011.

The primary driver of 2014's increase will be the plan to backload (postpone) into the later years of the decade, the auctions of the EU's carbon allowances that would otherwise have taken place in 2014-16. As a result, it expects the prices of the European ETS to rise to €7.5/tonne this year from 2013 prices.

<http://about.bnef.com/press-releases/value-of-the-worlds-carbon-markets-to-rise-again-in-2014/>

Congressional Research Services Report on Status of CCS at the US DOE

February 10, 2014. The Congressional Research Service has released *Carbon Capture and Sequestration: Research, Development and Demonstration at the US Department of Energy*. This document provides an overview of the DOE CCS program, including its current funding status and some discussion of the program's achievements and prospects for success in meeting its stated goals.

<http://www.fas.org/sgp/crs/misc/R42496.pdf>

GCCSI Global Status Report of CCS 2014



February 17, 2014. The GCCSI released its Global Status Report of CCS 2014, as a follow-up to the Global Status Report of CCS 2013, which was released in October 2013. The report, which looks at the progress of CCS worldwide in particular the progress of CCS projects, noted a decline of CCS projects from 65 to 60 in the previous 5 months. Of the 5 projects, which have either been cancelled or put on hold, 4 of them are in Europe. They are:

- OXYCFB 300 Compostilla Project in Spain
- Porto Tolle Project in Italy
- Getica CCS Demonstration Project in Romania
- Full-scale Mongstad project in Norway and
- Kentucky NewGas in the US

There are currently 12 large-scale projects that are operational, with 9 under construction. 6 projects are in an advanced states of development planning and will make a Final Investment Decision during 2014. They are:

- Lake Charles in the US
- NRG Energy Parish in the US
- TCEP in the US
- Yanchang in China
- Sinopec Qilu Petrochemical CCS Project in China
- ROAD project in the Netherlands

For the full report, please visit:

<http://www.globalccsinstitute.com/get-involved/in-focus/2014/02/global-status-ccs-february-2014>

Images: Page 1: <http://metrohomes.files.wordpress.com/2011/04/classic-one.jpg>

This newsletter was constructed using information from internet searches. The websites used have been cited.

For more information, questions and comments please email javedan@mit.edu. Thank you.