

CURRENT CHALLENGES FOR CARBON CAPTURE

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Carbon capture and storage (CCS) is a key strategy for using coal and natural gas fuels in carbon-conscious ways—by capturing the carbon before, during or after combustion so it does not add to atmospheric concentrations, and then by “sequestering” it. In the case of geologic sequestration, carbon dioxide (CO₂) is injected and stored in deep subsurface voids such as depleted oil, gas or coal bed methane reservoirs, or briny groundwater aquifers. When politicians speak of “clean coal,” they usually have CCS at least partly in mind.

Considered by some an essential pathway to reducing carbon emissions over the long term, sequestration is regarded by others as a distraction from the progress of society to renewable or nuclear energy sources. The legal challenges have proven to be as formidable as the technological, economic and political ones. Yet many observers and decision-makers believe attention to CCS must continue to be paid.

A Bumpy Ride

It has recently been a roller-coaster time for the fortunes of CCS. In the United States, there was much anticipation throughout 2007 over the Department of Energy’s (DOE) “FutureGen” project, which was to showcase a single, large-scale zero-emissions power plant with

CCS features. States including Texas and Illinois jockeyed for site selection privileges and offered one-off legislation dealing with some of the toughest regulatory problems; Illinois was chosen.¹ But cost estimate increases to \$1.8 billion were followed by an announcement in January 2008 that the single-site project would not be pursued. Instead, DOE offered to make grants via regional partnerships for multiple smaller-scale demonstration projects.²

In late 2007, the Interstate Oil and Gas Compact Commission (IOGCC) released a comprehensive report on the future regulation of CCS.³ The report stated, not surprisingly, that oil and gas agencies should have a leading role on CCS, and proposed model regulations to that end. IOGCC suggested that liability for CO₂ escape generally should transfer from individual CO₂ injection well operators to a state or industry-wide fund ten years following successful well closure and monitoring.

Energy states advanced the ball in 2007 and 2008 with legislation of their own, sometimes spurred by enhanced oil recovery (EOR) developers seeking incentives from their injection of man-made as well as naturally occurring CO₂ to produce oil and gas. Wyoming, Texas

and others passed legislation to address thorny regulatory and property ownership issues, and more bills are in the works.⁴ Power projects that are capable of carbon capture are moving forward in several states, including West Virginia, Indiana, Arkansas and Illinois.⁵

In July 2008, the U.S. Environmental Protection Agency (EPA) proposed its own comprehensive rules on CO₂ wells for CCS purposes. The federal agency's proposal addressed a number of questions that had been left open, such as defining technical criteria for well construction, operation and monitoring; mandating post-injection site care; and establishing site closure requirements protecting underground sources of drinking water. But if adopted, the EPA rules would limit the ability to inject CO₂ into many deep saline aquifers, and could keep well operators on the hook for monitoring and liability, typically for at least 50 years after well closure.⁶

For its part, Congress considered climate change legislation, notably the Dingell-Boucher draft bill in October 2008. This draft seeks to reduce greenhouse gas (GHG) emissions by roughly 80 percent over the next four decades, through a cap-and-trade program. The legislation would mandate that all coal-burning power plants put into service in or after 2009 sequester 60 percent of their carbon emissions by 2025.⁷

The future of this legislation is unclear, given Rep. Henry Waxman's replacement of Rep. John Dingell as chair of the House Energy and Commerce Committee.

Notwithstanding the change of the guard, Rep. Waxman sponsored a bill entitled "Moratorium on Uncontrolled [Coal] Power Plants Act of 2008,"⁸ and, along with other Congressional leaders, is supporting research and development efforts for CCS.

The bailout bill for financial institutions included tax relief for CO₂ sequestration, with greater relief for CCS projects not associated with EOR.⁹ The federal effort to date has culminated in the recent "American Recovery and Reinvestment Act of 2009," which appropriated \$3.4 billion to fossil fuel development. Of this figure, \$1.52 billion is designated for a variety of industrial carbon capture and efficiency projects, while \$800 million is allocated to clean coal power projects—giving FutureGen the possibility of a relaunch.¹⁰

Worldwide CCS prospects moved ahead in Tokyo in June 2008. The energy ministers of the Group of 8 nations, including the U.S., set an ambitious goal of launching 20 large-scale CCS projects by 2010.¹¹

However, CCS encountered an international obstacle in late 2008. A United Nations scientific and technological advisory body meeting in Poznan, Poland, did not approve the counting of CCS projects toward the Kyoto Protocol's Clean Development Mechanism (CDM). (CDM allows an emission-reduction project in a developing country to generate credits that can be sold to emitters in industrial countries, in order for them to meet their emission reduction targets.) In Poznan, Brazil led the charge against Australia and other developed

economies by questioning the safety and stability of storing large quantities of carbon, and by stating that the host governments should be held accountable for liabilities arising from escape of the sequestered CO₂.¹²

Behind the Controversies

Some nongovernmental organizations like the Natural Resources Defense Council are squarely in support of CCS, while others, like Greenpeace International, are staunch opponents.¹³ Why is there such controversy? In short, the benefit of sequestration—reducing emissions from existing carbon sources—is in the eye of the beholder. Those who want all research and development efforts focused on renewable or nuclear energy sources and efficiency gains see carbon sequestration as an unproven crutch for an outmoded fuel. The initial extraction of fossil fuels involves emissions, and when CCS is used for EOR to produce more fossil fuels, the detractors' concern is heightened.

Many policymakers and academics have concluded that further efforts to develop CCS are essential. The Intergovernmental Panel on Climate Change (IPCC) estimated that sequestration may contribute anywhere from 15 to 54 percent of the emission reductions needed to achieve its goals.¹⁴ Coal and gas are abundant and relatively inexpensive in the U.S., China, India and Australia, and make use of expensive infrastructure already in place. These fuels will remain a very important part of the energy mix even as renewables, nuclear and energy efficiency make considerable, but limited, medium-term impact.

Indeed, the Massachusetts Institute of Technology's (MIT) Laboratory for Energy and the Environment concluded that CCS "is the critical enabling technology that would reduce CO₂ emissions while also allowing coal to meet the world's pressing energy needs."¹⁵

To date, the public and press have generally allowed politicians to promote emission reduction goals without disclosing a price tag on them. The political salability of such goals without CCS is questionable, especially when economies are pinched. The EPA has forecasted that the impact on gross domestic product of a particular climate change bill would be significantly higher without the ability to use carbon sources via CCS.¹⁶ Sequestration can ultimately require large public works and valuable infrastructure, as has been the case in Canada.¹⁷

Even if the political will is mustered to confer emission-reduction treatment and research and development dollars on CCS, there remain a host of other challenges to development of this technology. It is hard to compare the state of the art of sequestration to the status of renewables, as the latter are now well established and incremental efficiency gains in wind, solar and biofuels can be observed. CCS still needs to be proven on projects of large scale, an economic means of carbon capture at power plants needs to be identified and improved over time, and management techniques must be developed for the transportation of CO₂ from where the emissions are generated to injection points.

Nonetheless, years of experience with EOR, and several large-scale oilfield storage projects in Norway, Algeria and Canada, confirm the promise of CCS. MIT's Laboratory for Energy and the Environment and Stanford University's Program for Energy and Sustainable Development, among other institutions, are collecting data and assessing the potential technologies and development pathways.¹⁸

The Legal Twists

On the legal front, there are further obstacles to deployment of CCS that are being examined, both state by state and in broader settings.

An immediate question is which agencies will have jurisdiction over the various stages of sequestration: emissions capture at power plants, transportation of CO₂ to the injection site, injection and well closure. Undoubtedly, public utility commissions, oil and gas agencies and water boards will all joust with environmental agencies for control. Public entities acting in their commercial capacity, such as the U.S. Department of the Interior's Bureau of Land Management, will influence how government-owned property is used. And federal, state and local agencies will have to hash out preemption and lead agency rules on CCS development. The IOGCC's call for state oil and gas agency participation, followed by the EPA's immersing itself into the CO₂ injection and storage realm, are likely to be succeeded by further regulatory and legislative salvoes.

There are unanswered questions on the private property front as well. When mineral or water rights in a land parcel have been severed from

the surface rights, who must consent to the injection of CO₂? In many states, the issue is not resolved, though the majority result in cases from the oil patch states is that the right to inject CO₂ into naturally occurring pore spaces belongs to the surface owner.¹⁹ Additional uncertainty exists in some states whether eminent domain authority is available to obtain CO₂ pipeline corridors and injection and storage rights. Many participants, including the IOGCC, are urging that these uncertainties be addressed by new legislation.

Last but not least, many private parties interested in CCS say they will not proceed until they are confident that generators or operators are released from liability for CO₂ escape at some point after successful well closure and monitoring.²⁰ Proposals range from express government ownership of sequestered CO₂ (as was offered by Texas for the DOE's "FutureGen" initiative) to an industry assumption of limited liability akin to the nuclear industry's Price-Anderson Act.²¹ The IOGCC suggested that fees be imposed on storage site operators and invested in a state-administered trust fund, with individual operators being released from liability after 10 years of satisfactory well closure and monitoring.²² But no such liability relief proposal is very far along.

Conclusion

Despite all these obstacles, proponents of CCS keep pressing to address them. It is not just the EOR, coal and conventional power industries, although to be sure they have the most investment at stake on the outcome. Many disinterested

policymakers and academics, too, believe that keeping climate policies antiseptically clean of fossil fuels is not economically practical. They consider that serious emission reductions may not be achievable without pursuit of this bridging technology.

Steven Chu, the newly appointed Secretary of Energy, while not an avid coal supporter, has publicly encouraged further research and development efforts for carbon capture.²³ President Obama has made similar calls for clean coal development.²⁴ The assemblies on the road to the 15th United Nations Climate Change Conference in Copenhagen in November 2009, including a March session in Bonn, will again address CCS and the CDM. Those meetings, and the early word from the EPA and DOE in the new administration, should confirm whether 2009 will be a turning point or just another volatile year for CCS.

Pillsbury was among the first law firms in the nation to launch a Climate Change & Sustainability practice. As pressure to curb greenhouse gas emissions increases around the world, companies are concentrating on their sustainability policies and grappling with how to manage their own climate-affecting actions and related litigation risks. Drawing on lawyers from the firm's energy, environmental regulation, litigation, public policy, project finance, corporate and real estate practices, Pillsbury's Climate Change & Sustainability group takes a multidisciplinary approach to climate change issues. Team members are based in the major policy and industry centers of California, New York, Houston, Washington, DC, London and Shanghai.

End Notes

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- ⁴ See, e.g., H.B. 0089 (Wyo. 2008); H.B. 0090 (Wyo. 2008); H.B. 3732, Leg. Sess. 80(R) (Tex. 2007); H.B. 1967, Leg. Sess. 80(R) (Tex. 2007).
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- ¹⁰ American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, div. A, tit. IV (2009).
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- ¹⁷ Alberta, Canada Department of Energy, Fact Sheet: *Carbon Capture & Storage* (July 2008), available at http://www.energy.alberta.ca/Org/pdfs/FactSheet_CCS.pdf.
- ¹⁸ See *supra* note 15; Varun Rai, David G. Victor & Mark C. Thurber, *Carbon Capture and Storage at Scale: Lessons from the Growth of Analogous Energy Technologies* (Stanford Program on Energy and Sustainable Development Working Paper No. 81, Feb. 2009), available at http://pesd.stanford.edu/publications/ccs_analogs.
- ¹⁹ See *supra* note 3 at Appendix III (listing authorities).
- ²⁰ Mark de Figueiredo and Adeeb Fadi, *Emerging Property and Liability Issues for Carbon Sequestration*, Bloomberg Law Reports, Sustainable Energy (Sept. 2008).
- ²¹ See 42 U.S.C. § 2210.
- ²² See *supra* note 3 at 11-12.
- ²³ U.S. Senate Committee on Energy and Natural Resources, Statement of Steven Chu, Secretary of Energy-Designate (Jan. 13, 2009), available at http://www.energy.senate.gov/public/_files/DrChuENRTestimony.pdf.
- ²⁴ Barack Obama and Joe Biden, *New Energy for America*, available at http://www.barackobama.com/pdf/factsheet_energy_speech_080308.pdf; see also White House Website, The Agenda, *Energy and the Environment*, at http://www.whitehouse.gov/agenda/energy_and_environment (identifying the development and deployment of clean coal technology as a "green job" catalyst).