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IN FOCUS

ENERGY LAW

The nuts and bolts of carbon recapture

The legal machinery for a critical technology still needs to be engineered.

By Frederick R. Eames
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A GENERATION AGO, Nobel Prize-winning economist Ronald Coase observed that social cost—the detrimental side effects of a particular economic activity—is essentially a problem of a reciprocal nature. Citing the example of cattle straying onto farmers' fields, he famously wrote, "The nature of the choice is clear: meat or crops." Ronald Coase, "The Problem of Social Cost," *J. Law & Economics*, October 1960.

The great social-cost issue of our time is greenhouse gas emissions from the combustion of fossil fuels, implicating many of the most important life-improving technologies in history. Some would describe the nature of the choice more alarmingly: modern life on earth or life on earth.

The choice is neither so diametric nor so apocalyptic. In reality, there are a number of technologies to produce energy with few or no emissions of greenhouse gases, including from fossil fuels. A leading candidate is carbon capture and storage (CCS) technology.

CCS involves separating carbon dioxide (CO₂) from the gas emission stream of an industrial facility, compressing the CO₂ into a liquid-like state and pumping it underground, in most cases with the intent of permanent storage. The United States has many large underground formations that could be suitable for CO₂ storage, although site-specific research will be needed.

The United States and the world need CCS to

work. Coal, which emits more CO₂ than other fossil fuel on a per-BTU basis, is used to generate half of the electricity in the United States and is the most important CO₂-emitting fuel among stationary sources (from which CO₂ emissions can be more readily captured than from cars, for example). Coal and other fossil fuels arguably are indispensable to our energy supply and energy security. If we are to dramatically reduce greenhouse gas emissions, CCS will be indispensable.

Addressing greenhouse gas emissions through CCS would, like any other response, have its own social costs. The U.S. Environmental Protection Agency (EPA) has proposed to regulate geologic storage of CO₂ to protect drinking water. Other concerns include fouling or making inaccessible other underground resources, property damage, trespass, atmospheric escape and the potential for personal injury.

While carbon capture technologies have been used for years in other contexts, and humanity has long experience pumping fluids and gases, including CO₂, underground, CCS as envisioned would constitute a new activity. In the world today there are three "large-scale" CCS facilities, sequestering on the order of 1 million tons of CO₂ per year. Just among coal-fired electric generating units, and not counting industrial facilities that use fossil fuels for other purposes, the United States alone would require perhaps 2,500 large-scale sites to store emissions. The footprint of each such site is likely to be measured in dozens of square miles.

Potential risk from such a new activity on such an unprecedented scale poses legal questions that must be addressed if CCS is to happen on a widespread basis:

- What are the potentially applicable regulatory and liability schemes?
- What are the potential costs of regulation and liability?
- How long is the period of financial responsibility?

Owners and operators of geologic sequestration

sites and third-party risk managers will need answers to these questions.

Furthermore, policymakers must recognize now, so that the concept can be built into regulatory regimes, that the public will have to bear some of the risk. Geologic sequestration will be, in most cases, intended as permanent. Granger Morgan, principal investigator for Carnegie Mellon University's CCS Regulatory Project argues that risk managers, such as insurers, "don't know how to write a policy that goes on forever." Evan Lehmann, "Wanted: 1,000 Year Insurance Policy, *ClimateWire*," Aug. 19, 2008, at www.eenews.net/climatewire/2008/08/19/1/. It is not a matter of knowing how—it is a matter of not being willing to manage risk for such a duration.

The following are some principles that policymakers might want to consider in devising a risk-management regime for geologic sequestration of CO₂.

Clear, reasonable, limited

To begin with, policymakers should consider establishing a single, clear and reasonable regulatory structure. CCS developers will be willing to abide by reasonable rules that protect human health and the environment, but they do not want to bear the costs of requirements that do not contribute to health and environmental protection. Nor do they want to face liability via multiple state and federal statutory and common law pathways, with the possibility of expensive, contentious remedies.

At the federal policy level, the potential applicability of the Resource Conservation and Recovery Act and the Comprehensive Environmental Response, Compensation and Liability Act is a key concern. These statutes simply were not designed with the safe and widespread deployment of a new technology in mind. Rather than apply environmental statutes with contentious and litigious histories, Congress could enact a new regulatory and liability framework for CCS in place of the multiple regimes that now may apply. CCS could be subject to a single, clear regulatory structure and a single, clear liability structure.

Policymakers must recognize that private risk managers will not manage risk beyond a defined time frame, perhaps 30 years. Since private-market financial assurance may be scarce for some CCS phases, policy could authorize a broad array of financial-assurance instruments and could encourage the development of financial-assurance offerings for CCS.

Both regulators and site owners/operators will

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benefit from the broad availability of financial-assurance instruments. Increased competition may reduce the cost of obtaining these instruments. Under present global economic conditions, in which there has been a severe contraction of available capital, the market is making less money available for new types of projects, especially if the risk profile is unclear, which means that arranging financial assurance for CCS may be difficult in the near term.

Under the financial-assurance regimes for existing environmental programs, instruments such as surety bonds, corporate guarantees, corporate strength tests and letters of credit commonly have been used. The surety market has contracted in other environmental areas. Some of the conditions that led to the contraction elsewhere are relevant to CCS. For example, some agencies have focused on very long-term risks that might arise after site care responsibility has ended. The result can be bond price increases by two orders of magnitude. Furthermore, at least one court has found that the EPA's financial-assurance requirements for bonds do not limit payment to the amount of the bond should an issuer choose to perform the cleanup rather than pay the bond. *People ex rel. Ryan v. Environmental Waste Res. Inc.*, 782 N.E.2d 291, 296 (Ill. App. Ct. 2003). Thus, for example, a bond issuer could pay \$100 million for cleanup, even if the bond amount was \$10 million. Policymakers could make efforts to avoid these problems with CCS.

Two other instruments bear special consideration: insurance and trust funds.

Who will insure the risk?

Insuring risk at a complex industrial facility requires specialty risk products, not ordinary property and casualty coverage. In the broader environmental risk insurance market, only four or five insurers offer products. In the energy market, the number is roughly the same. Private risk managers must have experts in place with appropriate perspective to analyze the risks and calculate probabilities of the activity. Few risk-management entities likely will develop this capability for CCS.

Several problems have made insurance less available and more expensive in the past. For example, regulators typically require an insurance policy to be written to require payment to an entity designated by the regulator, rather than to the insured. The requirement to pay the regulator or a designated agency creates potential for "double payment"—both to the regulator and to the insured. Policymakers could address this problem by making possible clear designation of sole beneficiary status, and by allowing parties to contract for express waivers by policyholders of their payment rights when the regulator requires a different beneficiary. Another problem is that regulators often prohibit cancellation of a policy if an operating permit is revoked or if the operator seeks bankruptcy protection, even if continued premium payments do not occur. This drives up the cost

of insurance, front-loads insurance costs as insurers require up-front payments and reduces insurers' willingness to offer policies.

Insurance is an important potential tool for managing CCS risks. Appropriate conditions could be established to encourage its availability.

Properly structured, trust funds can be another valuable tool for CCS. With a trust fund, a large reserve may be accumulated gradually. Costs can be spread over time. Policymakers could encourage mechanisms that can address any portion of the risk. They could allow flexibility in trust fund arrangements and link the amount of financial assurance for which an owner or operator is credited to the amount available in the fund.

In other words, an owner or operator could be considered to satisfy less of its financial-assurance obligation while the trust fund capitalization is ramping up than when the fund is fully funded.

Long-term, policymakers should consider the possibility that too large an amount might be accumulated in trust funds, relative to the risks they are designed to cover. A recently released assessment of a \$1 per ton sequestration fee for CO₂ sequestration, at levels required under climate policies required to stabilize concentrations of CO₂ in the atmosphere at either 450 or 550 parts per million), would accumulate up to \$1.5 trillion by the time the first 100 CCS facilities reached the end of their useful lives. James J. Dooley, Chiara Trabucchi and Lindene Patton, "Tipping Fees Can't Save us from the Tipping Point: The Need to Create Rational Approaches to Risk Management that Motivate Geologic CO₂ Storage Best Practices," ScienceDirect, GHGT-9, November 2008. Such wealth storage is not economically sound. Furthermore, in light of the history of trust funds managed by the federal government, it would provide an unfortunate temptation for policymakers with other fiscal priorities.

The type of mechanism or amount of the fee could be addressed by the policymakers establishing the trust. It may be that multiple trust funds could be applicable for portions of the risk associated with a CCS facility or facilities.

Both private and government-run trust funds may arise. The trusts could be privately administered in compliance with state insurance regulations; in this way, the state would have final governance authority by charter status, while private industry can bring fiduciary and engineering analysis resources to bear, something that would be expensive for the states to match.

The government's responsibility

Trust funds also could be structured to provide incentives for risk-mitigating behavior. As an example, their terms might be structured to limit eligibility to projects whose siting or operations meet

superior standards.

A government backstop should be in place to the extent the private market is not. The government might need to step in beyond an owner-and-operator liability limit, as has been the case in many other areas in which the government has sought to encourage public good through private action. The private sector's capacity to manage risks may be substantial, but has limits. Government might need to accept responsibility beyond what

the private market can manage. At a minimum, this likely would include the time after which operations cease and the project no longer produces revenues that would enable a private entity to cover liabilities. Because the goal in most cases is likely to be long-term storage of CO₂, long beyond the typical lifespan of private entities, government could be prepared to assume liability after injection operations cease and a 30-year closure period, or shorter if site conditions warrant, has elapsed. A backstop can and should be put in place without discouraging risk-minimizing behavior.

Notwithstanding that CCS will require some level of government risk management, particularly for long-term liability, financial-assurance regimes could encourage the role of private-market risk management to be as large as possible.

Financial-assurance mechanisms can be designed to be cost effective. Factors in cost will include the risk estimate, the type of instrument and the duration of the instrument. Each cost in the CCS chain will have an effect on whether CCS is deployed. Policymakers should carefully consider the potential cost of financial-assurance mechanisms when designing a financial-assurance regime.

During the debate on the Lieberman-Warner bill in the Senate last year to establish a carbon emission cap-and-trade scheme, Senator Joe Lieberman, I-Conn., said that Congress needed to address CCS liability and risk issues, but that he was not prepared to say how to do so. This must be done if policymakers expect CCS to be widely deployed.

CCS has great potential both to address climate change and to enhance energy security. Part of meeting these policy challenges is use of domestic fossil fuel resources. A positive risk-management regime for CCS could enable the country to serve both priorities. ■

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