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CLIMATE CHANGE

Federal Actions Will Greatly Affect the Viability of Carbon Capture and Storage As a Key Mitigation Option

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Highlights

Highlights of GAO-08-1080, a report to the Chairman of the Select Committee on Energy Independence and Global Warming, House of Representatives

Why GAO Did This Study

Key scientific assessments have underscored the urgency of reducing emissions of carbon dioxide (CO_2) to address climate change. Many have cited carbon capture and storage (CCS) as an essential technology because it has the potential to greatly reduce CO_2 emissions from power plants while allowing for projected increases in electricity demand. CCS involves capturing CO_2 from a power plant's emissions, transporting it to an underground storage location, and then injecting it into a geologic formation for long-term storage.

As requested, GAO examined (1) key economic, legal, regulatory, and technological barriers impeding commercial-scale deployment of CCS technology and (2) actions the Department of Energy (DOE), Environmental Protection Agency (EPA), and other agencies are taking to overcome barriers to commercial-scale deployment of CCS technology. Among other things, GAO examined key studies and contacted officials from pertinent agencies, companies, and environmental groups, as well as research and other organizations.

What GAO Recommends

Among GAO's recommendations are that (1) DOE continue to place greater emphasis on CO_2 capture at existing power plants and (2) EPA examine how its statutory authorities can be used to address potential CCS barriers. DOE neither explicitly agreed nor disagreed with the first recommendation. EPA expressed general agreement with the second recommendation.

To view the full product, including the scope and methodology, click on GAO-08-1080. For more information, contact John Stephenson at (202) 512-3841 or stephensonj@gao.gov.

What GAO Found

Nationally-recognized studies and GAO's contacts with a diverse group of industry representatives, nongovernmental organizations, and academic researchers show that key barriers to CCS deployment include (1) underdeveloped and costly CO_2 capture technology and (2) regulatory and legal uncertainties over CO_2 capture, injection, and storage. Key technological barriers include a lack of experience in capturing significant amounts of CO_2 from commercial-scale power plants and the significant cost of retrofitting existing plants that are the single largest source of CO_2 emissions in the United States. Regulatory and legal uncertainties include questions about liability concerning CO_2 leakage and ownership of CO_2 once injected. According to the National Academy of Sciences and other knowledgeable authorities, another barrier is the absence of a national strategy to control CO_2 emissions (emissions trading plan, CO_2 emissions tax, or other mandatory control of CO_2 emissions), without which the electric utility industry has little incentive to capture and store its CO_2 emissions. Moreover, according to key agency officials, the absence of a national strategy to control CO_2 emissions has also deterred their agencies from resolving other important practical issues, such as how sequestered CO_2 will be transported from power plants to appropriate storage locations and how stored CO_2 would be treated in a future CO_2 emissions trading plan.

Federal agencies have begun to address some CCS barriers but have yet to comprehensively address the full range of issues that would require resolution for large-scale CCS deployment:

- *DOE's* research strategy has, until recently, devoted relatively few resources to lowering the cost of CO_2 capture from existing coal-fired power plants, focusing instead on innovative technologies applicable to new plants. In recent years, however, the agency has begun to place greater emphasis on CCS technologies applicable to existing facilities.

- *EPA* issued in July 2008 a proposed rule to guide the permitting of large volume, or commercial-scale, CO_2 injections. It addressed at least some of the key issues under the Safe Drinking Water Act but left other issues related to EPA's implementation of its air, hazardous waste and substance statutes unresolved.

- *Other agencies*, such as Interior and Transportation, have jurisdiction over a number of interdisciplinary issues that could delay CCS deployment if unaddressed, but which have thus far received little attention. These include, among others, a legal and regulatory regime for a national CO_2 pipeline infrastructure and a plan for addressing CO_2 emissions reductions from CCS in a future emissions trading plan. In addition, unless the effects of CCS deployment are clearly explained, public opposition could delay future CCS projects.