Carbon Capture and Storage

Legislation and Regulation

Arthur Lee

Overcoming Barriers to CCS Deployment
Carbon Sequestration Leadership Forum Workshop
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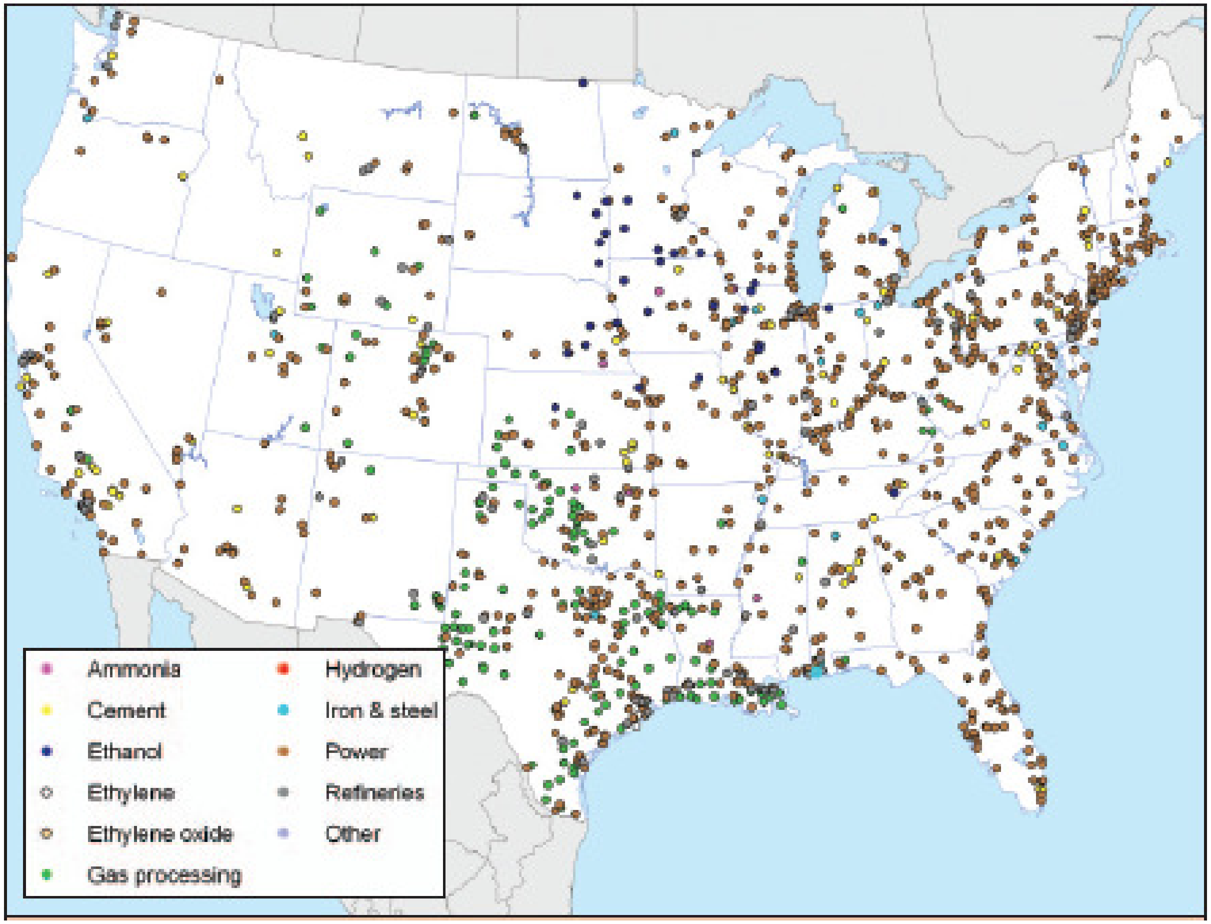
Scale of CO2 Infrastructure for Potential Capture and Storage of Large Emission Sources

This map indicates the scale of the issue. This map indicates the point sources from various industries, emitting more than 100,000 metric tons CO2 per year. To give a sense of scale, the CO2 pipeline infrastructure will likely be comparable to the current scale of petroleum pipeline infrastructure in the US in order to match sources to sinks. To capture and store all power generators emissions would require moving over 50 million barrels/day of CO2 around the US. The role of technology policies to enable the beginning of this infrastructure development will be critical to the deployment of carbon capture and storage.



Source of Data: EIA's 2005 emissions data; "Carbon Dioxide Capture and Geologic Storage: A Core Element of a Global Energy Technology Strategy to Address Climate Change," a report of the Global Energy Technology Strategy Program, Pacific Northwest National Laboratory and the University of Maryland, April 2006

Enormous Scale
Importance of the Four P's

- Price / Cost
  - Technology development to continue to reduce costs
  - Share costs
- Policy
  - Government framework on legal and regulatory issues
  - Streamlining to encourage near term deployment
- Partnership
  - Between governments, industries, stakeholders, communities
- Public confidence and acceptance
  - Without this, no widespread deployment

CO2 Capture Project
To Develop a Site Certification Framework

CO₂ Capture Project

Goals

- Provide a framework to regulators that can certify safe geologic storage before the start of injection and at the time of site closure.
- Quantify CO2 seepage risks
- Gain public acceptance

Attributes

- Systematic and Consistent
- Simple, Transparent, and Accepted
- Inexpensive, Prompt

CO_2 Capture Project to Develop a Site Certification Framework

CO_2 Capture Project

Objectives

- Identify the important properties of a geological system in the context of CO_2 storage
  - Avoiding unnecessary details
- Characterize how they relate to the main leakage pathways
  - Faults, factures and wells
- Quantify the potential leakage rates
- Assess long- and short-term impact on
  - Health, safety, and environment
  - Subsurface resources
- Develop an easy-to-use interface
  - Explain and promote the approach to stakeholders.

IEA CSLF Workshop on Near Term Opportunities for Carbon Capture and Storage

Report to the Final Plenary Session

Legal and Regulatory Issues

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San Francisco, CA
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Critical Issues Identified (1)

Category	Issue	Priority
Ownership/liability issues	1) Need to account for liability along the CCS chain	Critical
	2) Retroactive liability	
	3) Insurance for earliest projects	
	4) State aid and its limitations	
Regulatory treatment of CO_2	1) Compliance with applicable, existing regulation (if it exists)	Critical
	2) Possibility of CCS regulation under existing regulations	
	3) Tolerance for contaminants	
	4) Definition of CO_2 as a waste or commodity (circumstantial)	
Monitoring/remediation issues	1) Need for system to be in place to monitor possible leakages/seepages over time	Critical
	2) Remediation	

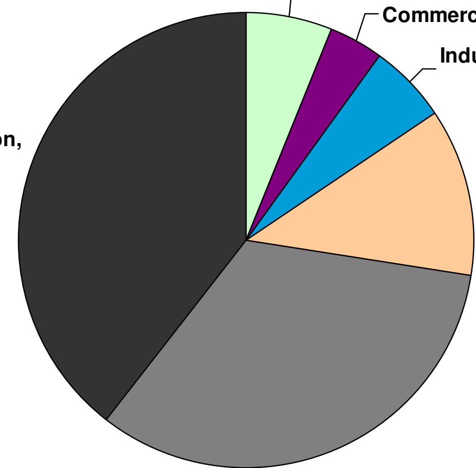
Critical Issues Identified (2)

Category	Issue	Priority
Property rights/IP issues	1) Need for other resources (e.g., mineral) to be protected	Critical
	2) Need for regulation of geophysical trespassing	
	3) How to deal with ownership of resources (e.g., mineral, surface, water)	
	4) Ownership of pore space	
	5) Unitization of CO2 storage to make clear who stakeholders are and what their roles are	
	6) Need to address regulatory status of use and siting of transportation infrastructure	
	7) Intellectual property	
Jurisdictional issues	1) How to deal with competing laws in the case of transboundary issues	Important for national jurisdiction/ critical for some offshore projects
	2) Need to distinguish between national and sub-national jurisdiction for onshore projects versus international law for offshore projects	

Appendix

Theoretical Geological Storage of CO2 Emissions from Large Emission Sources

In 2005, total US CO2 emissions due to energy consumption is approximately 5,945 million metric tons CO2 according to the EIA.



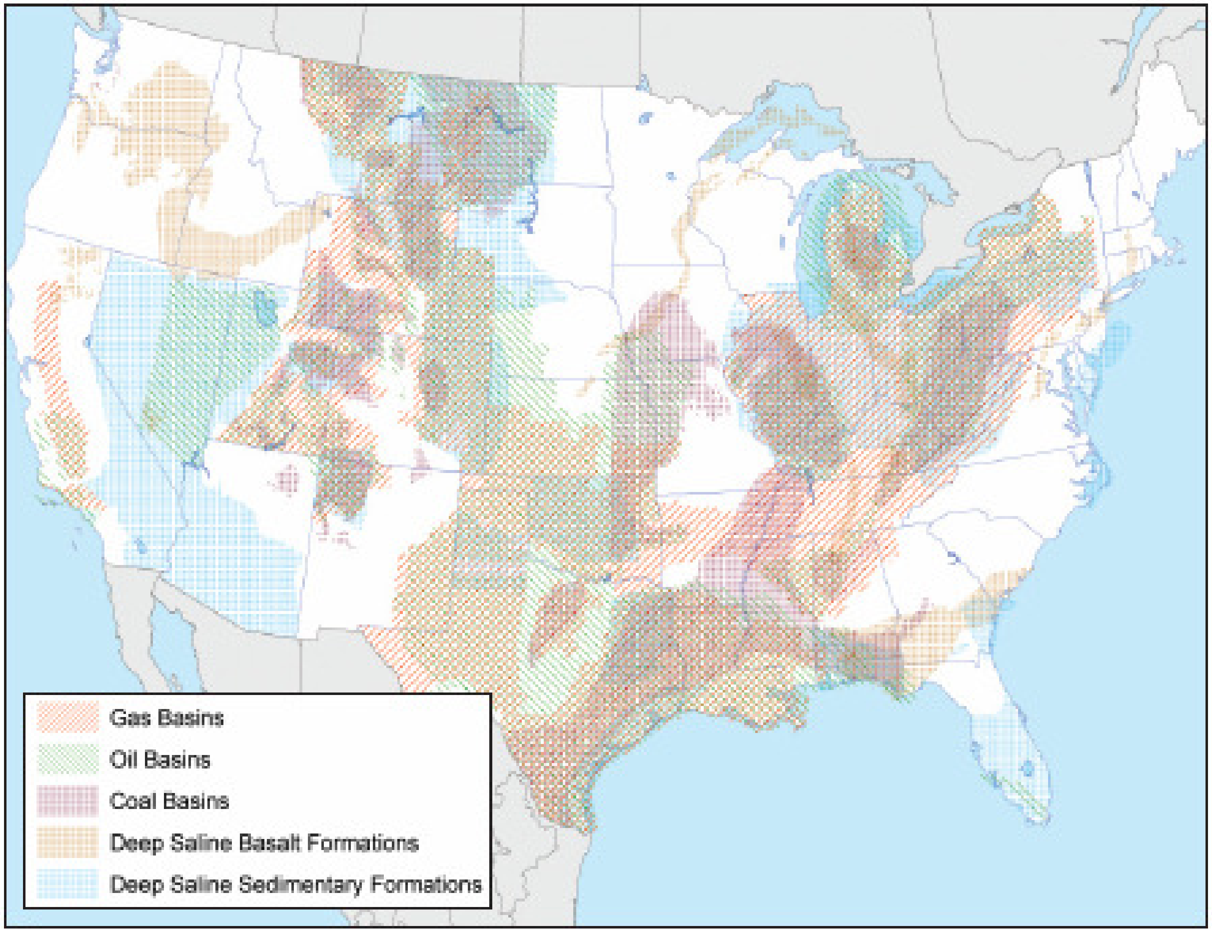
Preliminary estimates of US geologic capacity indicate roughly: 3,900 billion metric tons CO2 storage. Factors including detailed geological suitability, value of the carbon, source-sink matching, and infrastructure development, as well as the sheer scale of the infrastructure required, will influence the eventual "economic capacity," which will be smaller.

	Years of Storage (US)
Capture and Store All Electric Power CO2 Emissions	1,600 Years
Capture and Store All CO2 Emissions	600 years

Source: EIA 2005 data, Pacific Northwest National Laboratory & University of Maryland's Global Energy Technology Program data; ALee analysis

Scale of CO2 Infrastructure for Potential Capture and Storage of Large Emission Sources

The two maps, on the next two slides, indicate the challenging tasks ahead of matching industrial and power generating sources to sinks and the scale of the issue. This map gives a very rough, very preliminary set of geological data on potential sinks. The theoretical potential is roughly 3,900+ billion metric tons CO2.



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