

PROJECT facts

U.S. DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY

Carbon Sequestration

04/2008



DEVELOPMENT OF A CARBON MANAGEMENT GEOGRAPHIC INFORMATION SYSTEM (GIS) FOR THE UNITED STATES

Background

This project is developing tools to provide U.S. Department of Energy (DOE) research and development programs and project managers with the capability for real-time display and analysis of carbon dioxide (CO₂) sources, potential sequestration sinks, and other data, such as transportation corridors, within a spatial database. This type of program can assist decision makers by providing visual access to high quality, current, consistent data obtained from distributed datasets. The main tool being used is a geographic information system (GIS) to model and analyze the data and to display their spatial relationships. The Massachusetts Institute of Technology's (MIT) Carbon Management (CM) system is employing GIS tools to support decision making within the CM system. MIT is using GIS software to prepare a user-friendly model. Various social, economic, regulatory, and political aspects of sequestration are also being considered as part of the project.

MIT is taking a top-down approach to analyzing the potential for CO₂ capture and storage in the United States. To avoid duplication of effort while conducting this project, MIT is working closely with the ongoing National Carbon Sequestration Database and Geographic Information System (NATCARB) project. The primary use of the Carbon Management GIS will be as a systems analysis tool that can be used on a local, regional, or national scale.

Primary Project Goal

The overall objective of this project is to develop an analysis tool to aid in the development and deployment of carbon capture and sequestration technologies within the United States.

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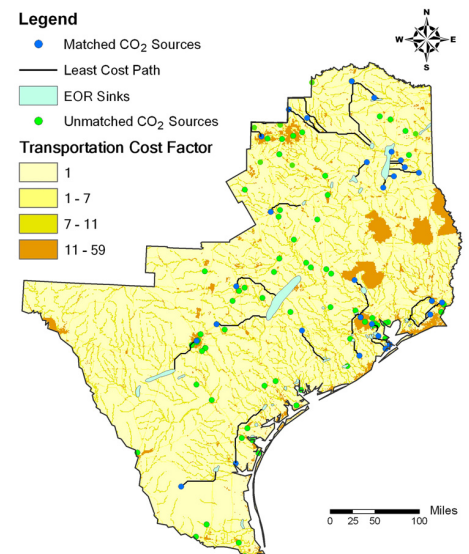
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CO₂ Sources and EOR Sinks Matching (Eastern Texas)



PARTNERS

Massachusetts Institute of
Technology

NATCARB Consortium

PERIOD OF PERFORMANCE

09/30/2002 to 12/31/2008

COST

Total Project Value

\$1,587,503

DOE/Non-DOE Share

\$1,270,002 / \$317,501

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Objectives

- To define in detail the GIS data requirements, the types of analyses that can be conducted, and the forms of output that will be produced.
- To identify data sources and convert this data into a form accessible by the GIS.
- To incorporate social, economic, regulatory, and political data.
- To develop a series of scripts (i.e., computer code) to allow easy manipulation and data analysis.
- To add “help” files so that most of the documentation will be incorporated right into the GIS. The system will be put into a user-friendly form.
- To work with NATCARB to provide Internet access to the developed software in a manner similar to that already done by NATCARB.
- To generate carbon sequestration abatement curves for various technology and policy scenarios.
- To maintain the Carbon Management GIS system.

Benefits

One of the options for mitigating CO₂ emissions from power plants and other point sources is sequestration in geologic formations, whether solely for containment purposes, for enhanced oil recovery (EOR), or for enhanced gas recovery (EGR). However, to minimize transportation and other costs, sources and sinks should be in close proximity to each other. The software being developed in this project will permit rapid visualization of the relationship between CO₂ sources and potential sequestration sites. It will ultimately aid DOE in the development of meaningful and economically feasible sequestration demonstration projects. Such projects are essential if sequestration is to become a technically, economically, environmentally, and socially acceptable option that supports the continued use of our abundant domestic coal resources to help meet the near- and long-term energy needs of the United States.

Accomplishments

- Produced working analysis tools that include a storage capacity calculator, an injectivity and injection cost calculator, a transportation cost calculator, and a source-sink matching tool.
- Incorporated data into the system for major CO₂ sources and sinks as well as factors that affect sequestration costs.
- Used the system to perform preliminary but detailed carbon sequestration marginal abatement cost curves for California and eastern Texas.
- Used the system to perform additional analyses for the West Coast Regional Carbon Sequestration Partnership (WESTCARB) and South East Regional Carbon Sequestration Partnership (SECARB) regional partnerships.

Planned Activities

- Maintain user access to the Carbon Management GIS.
- Incorporate new data as it becomes available.
- Improve existing capabilities of the user interface and analysis tools.
- Continue collaboration with the Regional Carbon Sequestration Partnerships.
- Maintain and improve system documentation.