PROJECT facts

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

Sequestration

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CO_2 CAPTURE PROJECT: COLLABORATIVE TECHNOLOGY DEVELOPMENT PROJECT FOR NEXT GENERATION CO_2 SEPARATION, CAPTURE AND GEOLOGIC STORAGE

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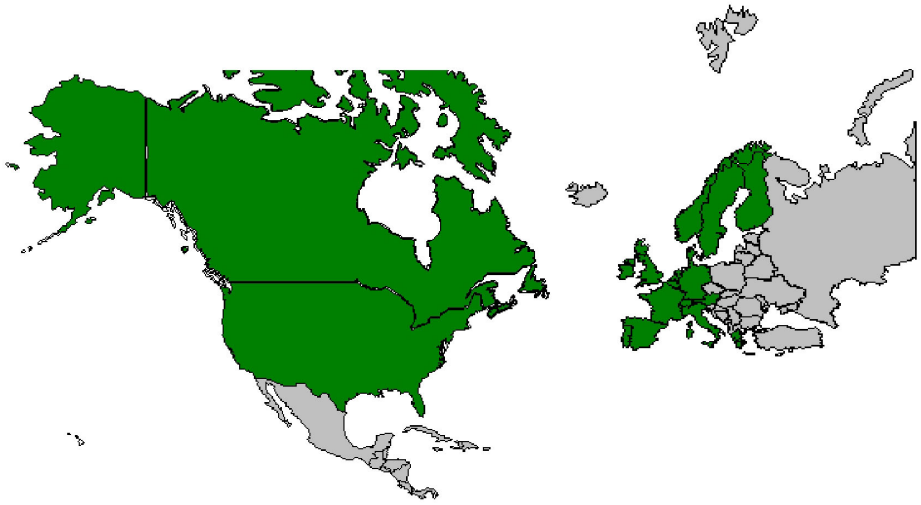
Background

DOE has joined with eight major international energy companies to sponsor the CO_2 Capture Project (CCP) with the goal of developing breakthrough technologies aimed at substantially reducing the cost of CO_2 capture and geologic storage. The CCP consortium is operated by BP and its members include ChevronTexaco, ENI, Norsk Hydro, PanCanadian, Shell, Statoil, and Suncor. In addition to the U.S. program, the CCP is comprised of separate, but complimentary projects which are also being sponsored by the European Union, and Norway. The total value of the CO_2 Capture Project, including international components, is $25 million.



Global participation of International Leading Energy Companies

Participating Phase I Technology Providers

Air Products & Chemicals, Inc.

Colorado School of Mines

Eltron Research Corporation

Energy Resource Centre of the Netherlands (ECN)

Fluor Daniel, Inc.

Idaho National Engineering & Environmental Laboratory

Lawrence Berkeley National Laboratory

Lawrence Livermore National Laboratory

McDermott Technology, Inc.

Netherlands Institute of Applied Geosciences

Oakridge National Laboratory

Scientific Monitor

SINTEF

Stanford University

Stanford Research Institute

TDA Research, Inc.

Texas Tech University

Tie-Line Technology

University of Cincinnati

Utah State University

The project schedule spans a 3-year period and is divided into two phases. Phase 1 represents the initial technology development period in which various promising avenues of R&D are pursued. Phase 2 will involve reprioritizing the R&D activities based on Phase 1 findings and then continuing with development of the most promising technologies.

Objectives

The strategic objective of the proposed project is to work with selected technology providers to develop new, breakthrough technologies, to the proof-of-feasibility stage, to reduce the cost of CO_2 separation, capture, transportation and sequestration from flue gases by one-half over today's best available technology for existing facilities, and by three-quarters for new facilities, by the end of 2003. The tactical objectives of the project are to:

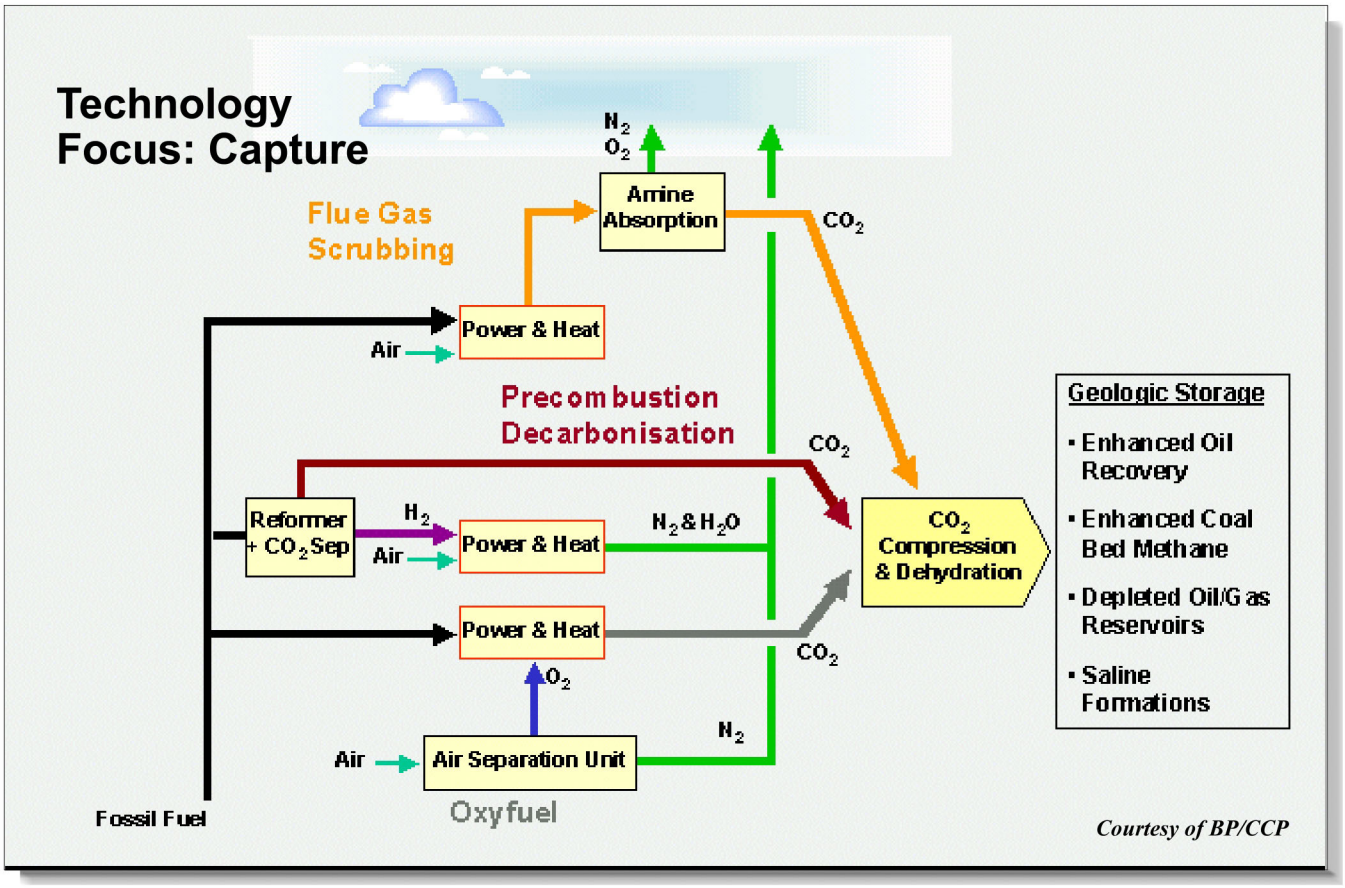
- Perform "benchtop" R&D (engineering studies, computer modeling, laboratory experiments) to prove the feasibility of advanced CO_2 separation and capture technologies, specifically targeting post-combustion methods, pre-combustion decarbonization, and oxyfuel.
- Develop guidelines for maximizing safe geologic sequestration, for measuring/verifying sequestration volumes, and for assessing and mitigating sequestration risks.
- Demonstrate to external stakeholder that CO_2 storage is safe, measurable, and verifiable.
- Develop technologies to the "proof of concept" stage by 2003/2004 and achieve at least one large-scale application by 2010

Benefits

The CCP team collectively accounts for approximately 32% of all oil and 17% of all gas production in the U.S., and 28% and 17% of oil and gas production respectively from OECD countries,. This team not only represents a significant market for the technologies to be developed, it is in the unique position of also operating and utilizing many of the geologic sinks needed to sequester the CO_2. These existing commercialization pathways will facilitate rapid industrial deployment of the new technologies developed under this project. Using conservative assumptions, the technology developed in the project could reduce the emissions of the CCP participants by 10 million tonnes of carbon per year (11 million tons per year). When applied more broadly in industry, the technology could reduce emissions by up to 140 million tonnes of carbon per year.

The potential scientific breakthroughs that could result from this project include:

- New solvents to reduce CO_2 separation costs.
- Improved CO_2 /H_2 absorption membranes.
- Integrated H_2 generation processes.
- Advanced oxyfuel boiler designs.
- An enhanced understanding of controls and requirements for geologically sequestering CO_2.



Flow diagram of various CO_2 capture and storage technologies

CO_2 Capture Project: Collaborative Technology Development Project for Next Generation CO_2 Separation, Capture and Geologic Storage

PARTNERS

National Energy Technology Laboratory

BP Corporation

ChevronTexaco

Norsk Hydro

Shell

Statoil

Suncor Energy

Pan Canadian

ENI

COST

Total Project Value	$9,994,165
DOE	$4,995,000
Non-DOE Share	$4,999,165

CUSTOMER SERVICE

800-553-7681

WEBSITE

www.netl.doe.gov

In addition to reducing technology costs, domestic energy security will also benefit. The proposed project develops lower cost separation and capture technology, which when combined with value-added geologic sequestration opportunities (EOR and ECBM) provides industry with a market-driven mid-term option for reducing CO_2 emissions while continuing to use fossil fuels. Additional benefits include a significant increase in the production of domestic oil and natural gas which improves U.S. energy security. It is estimated that 12 billion barrels (1.9 billion m 3) of incremental oil and 31 Tcf (0.9 Tm 3) of incremental gas is technically recoverable via these processes. Although the technology will enhance viability of CO_2 EOR, the focus of the R&D will be on new technologies to maximize the amount of CO_2 stored and the assurance and verification of sequestered volumes.