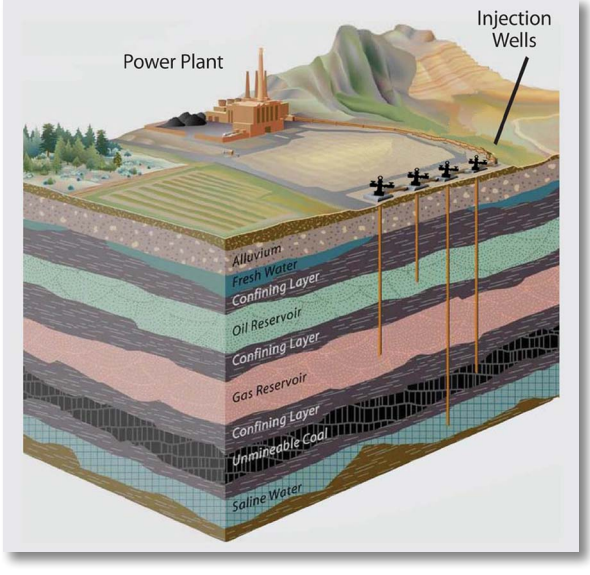
Fossil Energy Research Benefits

Carbon Capture and Storage

Through **Office of Fossil Energy (FE)** research and development (R&D), the United States has become a world leader in **carbon capture and storage (CCS)** science and technology.

FE and its research facility, the National Energy Technology Laboratory (NETL), began the carbon sequestration R&D program — the predecessor to current-day CCS research — in 1997. The program's initial budget of $1 million would grow 150 percent by 2010, funding activities that put DOE and the United States in the forefront of global CCS R&D efforts.

CCS is a group of technologies for effectively **capturing, compressing** and **transporting**, and permanently **injecting** and **storing** in geologic formations carbon dioxide (CO_2) from industrial or power plants. It is one part of a wider **portfolio strategy** (including greater use of renewable and nuclear energy, and higher efficiencies) that many scientists and nations favor for achieving significant cuts in atmospheric CO_2 emissions.



Carbon capture and storage includes a group of technologies for capturing CO_2 from power and industrial plants, compressing and transporting it (usually via pipeline), and injecting it for permanent geologic storage in safe underground reservoirs. (Illustration adapted from Energy and Geoscience Institute, University of Utah).

CCS is among the most promising solutions aimed at reducing the threat of climate change many experts link to higher atmospheric emissions of CO_2, a major "greenhouse gas." Fossil fuels — coal, oil and natural gas — provide the vast majority (**83 percent**) of our daily energy needs; but these resources, especially coal, are also among the **most carbon-intensive** energy options.

Coal generates the largest single portion, about 45 percent, of **U.S. daily electricity needs**, and is expected to continue to play an important role for years to come. **FE's Clean Coal Research Program (CCRP)** is directed toward developing technologies that dramatically increase the efficiency and lower the cost of capturing CO_2 emissions from existing and future power plants.

Focus of FE's Carbon Capture & Storage Program

Developing technologies for globally **competitive CO_2 capture** for power plants and industrial sources.

Establishing the basis for **long-term CO_2 geologic storage**.

Improving the **efficiency** of existing and new coal-fired generation units.

Implementing computer modeling and simulation to **accelerate technology commercialization** and **reduce costs**.

DOE's Carbon Capture and Storage RD&D Overview