# Introduction to CO$_2$ Storage

Fossil fuels currently dominate commercially supplied energy worldwide, and most estimates of energy use over the next 30 years suggest that use of fossil fuels will grow as the developing economies make greater use of energy. If that prediction is correct, then reduction of the amount of CO$_2$ emitted to the atmosphere will require that the CO$_2$ that results from combustion reactions be captured and stored. This report deals with the possibility of storage in three geologic settings: oil and gas reservoirs, deep saline aquifers, and coalbeds. In each of these settings, sites will have to be selected that have appropriate geologic seals, efficient methods for flow predictions will be needed for process design and for permitting, and monitoring systems appropriate to various stages of a project will have to be designed.

GCEP currently has two projects underway to enable the technology of CO$_2$ sequestration in the subsurface. The first is a collaboration among 4 principal investigators (Harris, Kovscek, Orr and Zoback) which ties together flow-modeling during the injection period, assessment of the seal capacity of sequestration sites, and cost-effective long-term monitoring of sequestered CO$_2$. This project has been ongoing since the inception of GCEP and its results are reported in the following pages.

The second project (Tchelepi, Durlofsky and Aziz) is aimed at the development of mathematical models capable of predicting subsurface flow of CO$_2$ over the very long timescales required to ensure that sequestration has the desired climate impact. This project was funded in January, 2005. Because it is brand new, no results are reported, however, a technical summary of the methodology is included.