



# 2010 Annual Meeting

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## 2264 Science and Technology Gaps for Large-Scale Implementation of Carbon Dioxide Geological Storage

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*Saturday, February 20, 2010: 9:30 AM*  
*Room 4 (San Diego Convention Center)*

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Carbon dioxide capture and geological storage is a climate change mitigation strategy that will deliver a significant reduction in carbon dioxide atmospheric emissions. There is political consensus around the urgent need to prove this technology on a large scale and to address concerns the public may have about safety. At the same time, the science of carbon dioxide storage has reached a plateau. Following years of successful laboratory experiments and numerical simulations, now there is a need to leverage this science base to enable large-scale demonstration projects. The primary science and technology gaps that these demonstrations intend to address involve: (1) the amount and distribution of storage space; storage efficiency; injectivity and storage capacity, particularly in the presence of multiple storage sites (interference and superposition effects); (2) the long-term fate and effects of the injected carbon dioxide physical and geochemical integrity of storage site; effects on and of existing and future wells; (3) monitoring technologies and monitorability in various geological environments; (4) effects of impurities in the injected carbon dioxide stream; and (5) the fate and effects of the brines displaced by the large volumes of carbon dioxide that must be injected to achieve emission reduction targets. In respect to carbon dioxide injection, Canada has gained significant experience as a result of 20 years of acid gas disposal at close to 50 sites in western Canada at a current cumulative rate of approximately one million tonnes per year. Acid gas, a mixture of carbon dioxide and hydrogen sulfide separated from sour natural gas, has been injected safely in proportions varying from 98% carbon dioxide and 2% hydrogen sulfide to 14% carbon dioxide and 85% hydrogen sulfide, in various sandstone and carbonate depleted hydrocarbon reservoirs and deep saline aquifers. However, the carbon dioxide storage demonstration projects need to be at least one order of magnitude larger than these acid gas disposal operations. Consequently, the Canadian federal government has allocated close to one billion CAD for the implementation of several projects in western Canada, while the Alberta provincial government has allocated two billion CAD to support three projects to demonstrate carbon dioxide capture and storage from coal-fired power plants, oil sands upgraders and fertilizer plants. Similar efforts are ongoing in neighbouring provinces, such that by 2015 there will be between six and nine projects in western Canada that will each inject at least 1 Mt carbon dioxide per year. These and similar projects in the U.S. will likely demonstrate carbon dioxide storage onshore, while European and Australian efforts will likely demonstrate carbon dioxide storage offshore.

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