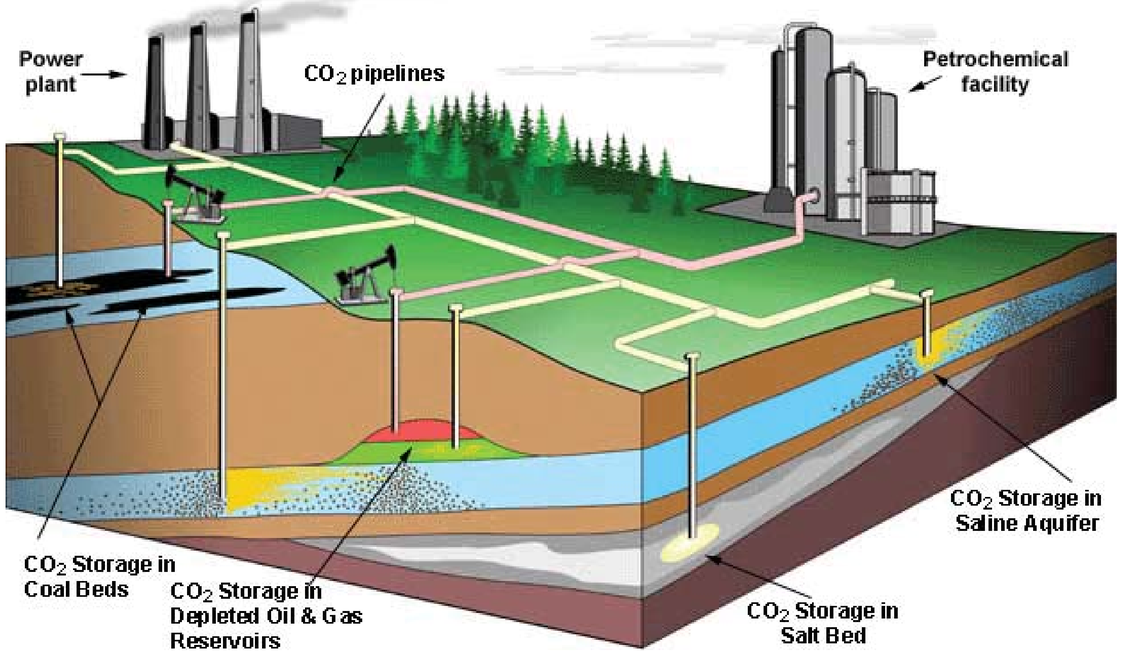
ENHANCE
ENERGY INC.

www.enhanceenergy.com

CCS: Carbon Capture and Storage

Carbon Capture and Storage (CCS), also known as Carbon Capture and Sequestration, is the separation and capture of carbon dioxide (CO_2) from the atmospheric emissions of industrial processes and its subsequent transport and permanent storage in deep underground rock formations. By preventing the CO_2 emissions from large-scale industrial facilities to enter the atmosphere, CCS is a powerful tool for combating climate change. Geologic storage is the sequestration component of CCS by which the CO_2 is permanently stored underground.



In geologic storage, CO_2 is injected under high pressure into deep, **stable porous rocks in which there are countless, tiny pores that trap natural fluids.** Some types of rock formations have securely trapped fluids including CO_2, for millions of years. The CO_2 will be injected into these types of formations.

Several types of rock formations are suitable for CO_2 storage. These include depleted oil and gas reservoirs, deep saline formations and unmineable coal seams. Deep, porous rock formations with trapped natural fluids such as oil, natural gas or highly salty and unusable water are common throughout the world. Geologists have found that these formations have the capacity to securely hold vast amounts of CO_2, potentially equivalent to hundreds of years of man-made emissions.

The same geologic forces that kept the original fluids in place will also secure the CO_2. Once injected, the CO_2 will be trapped initially in tiny pores within the storage rocks. Over time, the CO_2 will dissolve in water already in the rock formation and then may combine chemically with the rocks to trap it even more securely. The CO_2 will be far below the surface, separated from unusable ground water by thick, impermeable barriers of dense rock.

In depleted oil and gas fields, CO_2 occupies the pores in the rock that were once filled with oil or natural gas. Depleted oil and gas fields are more likely to be used early for CO_2 storage because, in some cases, the injected CO_2 could lead to additional production of oil or natural gas. This practice is also known as Enhanced Oil Recovery (EOR) or Enhanced Gas Recovery (EGR). EOR with injected CO_2 is a common practice today in some oil fields, having been used for over 30 years. Increased production of oil or gas could offset a portion of the costs of capture and storage. In other cases, the CO_2 may be injected into the pores of rocks where the oil or gas has already been produced for storage purposes only, resulting in no further oil or gas production.

ENHANCE
ENERGY INC.

www.enhanceenergy.com

CO_2 Compression SIEMENS PRESS PICTURE

Safe, long-term underground geologic storage (sequestration) of CO_2 must be conducted properly. This means thorough planning and geologic analysis of the storage site, safe operating practices, careful monitoring of the underground CO_2 during injection, and continued monitoring for some time afterward. Reliable geological surveys can prove the presence of impermeable rock barriers and the capability of deep rock formations to hold fluids. Geologic storage uses well established techniques and equipment used over many years by industry. Storage sites are continuously monitored for CO_2 containment.

Geologic storage projects have already successfully stored millions of tons of CO_2, some for many years, without detectable leakage. For example, the IEA GHG Weyburn-Midale CO_2 Storage and Monitoring project in Canada has injected over 5 million tonnes of CO_2 into a depleted oil field. Extensive monitoring by an international team of scientists has detected no leakage. Similarly, the Sleipner Project off the coast of Norway has injected over 10 million tonnes of CO_2 in a deep saline formation with no leakage. Other projects are now underway and many new projects are planned throughout the world in the years to come.

Storage projects are carefully tracked through Measurement, Monitoring and Verification (MM&V) procedures both during and after the period when CO_2 is being injected. These procedures address the effectiveness and safety of storage activities and the behavior of the injected CO_2 underground.

MM&V is used to measure the amount of CO_2 stored at a specific geological storage site, to monitor the site for leaks or other deterioration of storage integrity over time, and to verify for accounting purposes that the CO_2 is stored and that it poses no harm to the host ecosystem. MM&V ensures safe permanent storage and can help satisfy regulators and government officials who must permit geologic storage projects. MM&V will also provide valuable feedback for continual refinement of injection and management practices.