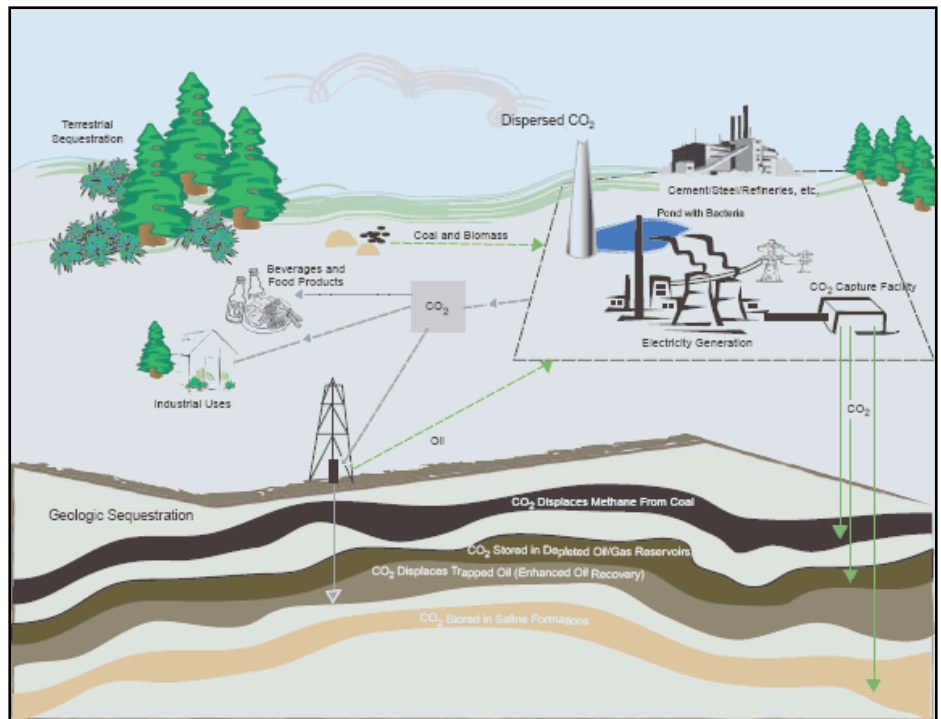


Frequently Asked Questions about Carbon Sequestration

What is carbon sequestration? Carbon sequestration is the capture and long-term storage of carbon dioxide (CO_2). *Geologic carbon sequestration* captures CO_2 from power plants, oil refineries, and other industrial facilities (point sources) and stores it in underground geologic formations such as deep saline formations, depleted oil and natural gas reservoirs, and unmineable coal seams. *Terrestrial carbon sequestration* is the absorption of CO_2 from the atmosphere by vegetation and soil. People can influence and even enhance this process by protecting and maintaining ecosystems that store carbon as well as improving land management practices and technologies that increase carbon uptake.

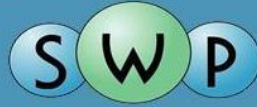
What is the nature of CO_2 ?

Carbon is the fourth most abundant element in the universe. It is a building block for all living things, and is present in the air, soil, and water. CO_2 is a naturally occurring gas that makes up almost 0.04% of our atmosphere. As part of the Earth's carbon cycle, CO_2 is released by animals during respiration, and absorbed by plants during photosynthesis. CO_2 is also what is called a greenhouse gas. Greenhouse gases are responsible for keeping the planet within hospitable temperatures, known as the greenhouse effect. Most scientists agree that an excess of greenhouse gases, primarily resulting from human activities, is contributing to global climate change.



What are the benefits of carbon sequestration? Carbon sequestration is a promising method for storing enormous quantities of CO_2 . By reducing the amount of CO_2 emitted into the atmosphere, we hope to minimize human contributions to global climate change.

What are the major contributors of man-made CO_2 ? According to climate scientists, deforestation and burning fossil fuels are the major contributors to the rise in atmospheric CO_2 . This has been demonstrated by studies examining changes of carbon content in ocean and land systems over time.



How much greenhouse gas are humans contributing to the atmosphere? According to the EPA in 2004, the United States produced 7.07 billion metric tons of greenhouse gas including CO₂, methane (CH₄), nitrous oxide (N₂O), and hydrofluorocarbons (HFCs). Looking at point sources alone, the total amount of CO₂ emitted into the atmosphere was 3.81 billion metric tons. Adding non-point sources such as vehicle emissions would drastically increase this number.

How safe is this technology? Carbon sequestration is a natural process. In geologic sequestration, CO₂ is stored in formations more than 1.5 km underground in depleted oil and gas reservoirs, unmineable coal seams, and deep saline formations. Many of these formations have naturally stored CO₂ and other gases and fluids for millions of years, and have the potential to store hundreds of years' worth of human-generated CO₂.

What safety measures are in place for CO₂ storage sites? When choosing a CO₂ storage site, risk assessments examining health, safety, and the environment are conducted prior to selection. Formations are tested for seismic activity and require an impermeable cap rock to prevent leakage. Monitoring equipment and techniques used to measure CO₂ movement as well as to detect any physical and chemical changes are also implemented to ensure CO₂ security in the formations.

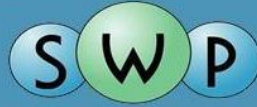
Are there any health effects to carbon sequestration? To date, there are no documented ill health effects from the deliberate storage, testing, or commercialization of CO₂ sequestration activities.

Does CO₂ contaminate water? When CO₂ dissolves into water, it causes the water to become more acidic. In order to prevent this problem, carbon sequestration operations will be prohibited from geologic formations in close proximity to underground sources of drinking water, or USDWs. Monitoring will also be in place to observe CO₂ containment in the formation.



What are the chances of a CO₂ leak? The chances of a CO₂ leak are very low. Although it is extremely unlikely that CO₂ injected into a formation will leak, we cannot say there is absolutely no chance of a leak. For this reason, we have a measuring, monitoring and verification (MMV) program to detect and respond if a leak should occur.

What might happen if the CO₂ leaks? If a leak occurs, the CO₂ has to go through numerous target reservoir chambers before exiting the formation it is stored in. Then it has to go through numerous other formations before reaching USDW or the surface. Since all storage formations are monitored, a leak would be detected long before it reached drinking water or the surface. If a leak is detected, operators decrease the pressure within the target formation, controlling the release of the CO₂ from the formation.



Who “owns” the CO₂ pumped into geologic formations? The company injecting the CO₂ into the underground geologic formation is the legal owner of the injected CO₂. They are also responsible for onsite safety and monitoring.

Who is liable if anything goes wrong? So far the question of liability is still unresolved. Liability will have to be established prior to commercial injection.

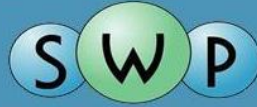
Do carbon sequestration operations influence surface owner rights? Similar to oil operations, companies injecting and monitoring the captive CO₂ require permission or pay a compensation fee for their operations.

What is the U.S. Department of Energy’s role in carbon sequestration? The U.S. Department of Energy’s (DOE) National Energy Technology Laboratory (NETL) is engaged in a research and development Carbon Sequestration Program focusing on technologies to reduce greenhouse gas emissions. Program elements include research, development, demonstration, and deployment of carbon sequestration technologies. DOE is also part of an international collaboration in carbon sequestration called the Carbon Sequestration Leadership Forum (CSLF). This is an international climate change initiative focused on the development of improved cost-effective technologies for the separation and capture of CO₂ for its transport and long-term safe storage.

Who are the carbon partnerships and what is their role? Created in 2003 by DOE, the 7 Regional Carbon Sequestration Partnerships (RCSPs) are a government/industry effort tasked with determining the most suitable technologies, regulations, and infrastructure needs for carbon sequestration. These partnerships are contracted with DOE and NETL, and are currently in the stage of piloting sequestration technologies throughout the United States and Canada.

What is the SWP? The SWP was one of the 7 regional partnerships developed by the U.S. Department of Energy in response to global climate change. The SWP has been challenged to evaluate available technologies that capture and store CO₂ in the Southwest region. The SWP primarily includes educational institutions, private industry, and state governments in: Arizona, Colorado, New Mexico, Utah, Kansas, Nevada, Texas, and Wyoming.





For further questions about carbon sequestration, the SWP, and how to get involved, please contact:

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U.S. Department of Energy:
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