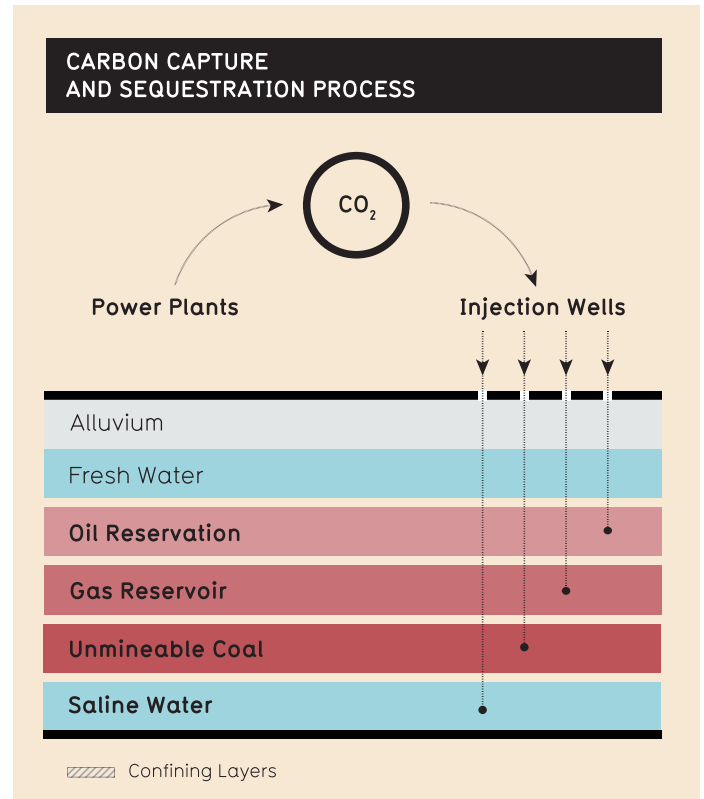


CARBON CAPTURE AND STORAGE

The International Energy Agency (IEA) estimates that by the year 2035, global demand for electricity will grow by 70% and global energy demand will increase by 33%, with fossil fuels being the principle source of energy worldwide.

As a result, carbon dioxide (CO₂) emissions are expected to rise 43% by 2035, according to the U.S. Energy Information Administration. One solution for limiting the rapid increase of CO₂ is through carbon capture and storage. The three-step process of carbon capture and storage (CCS), also called carbon capture and sequestration, captures CO₂ from large industrial sources and fossil fuel power plants that burn natural gas, coal or petroleum and emit large amounts of CO₂. After the CO₂ is captured, it is transported and deposited into deep underground rock formations.



CARBON CAPTURE AND STORAGE (CCS)

Stage 1 - CAPTURE

There are three different methods for traditional carbon capture, also called “scrubbing.”

1. POST-COMBUSTION CAPTURE

This involves use of a solvent to chemically absorb the CO₂ from the fuel gases after the combustion process.

2. PRE-COMBUSTION CAPTURE

The coal or gas is pre-treated and converted into a mix of hydrogen and CO₂.

3. “OXY-FUEL” COMBUSTION SYSTEMS

The coal or gas is burned in oxygen instead of air.

Stage 2 - TRANSPORT

Generally, CO₂ is transported as a gas or in its liquid state via pipeline, truck or ship.

Stage 3 - STORAGE/SEQUESTRATION

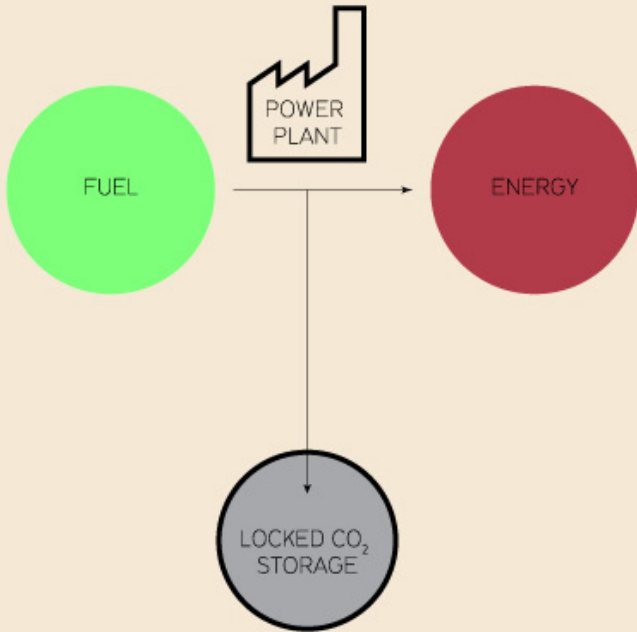
Current CCS programs utilize underground injection and geologic sequestration of the CO₂ into deep underground rock formations.

While this is the most commonly used CO₂ storage method, concerns about leakage and storage costs have prevented large-scale adoption of this technology to date.

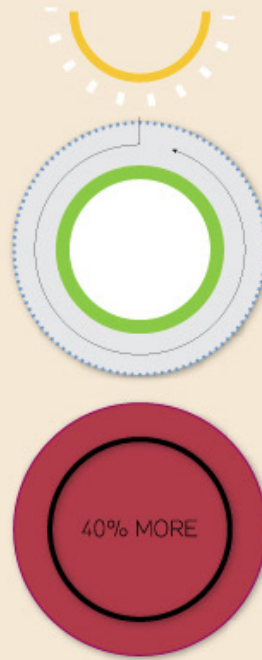
source: Frequently Asked Questions: CCS Capture, Carbon Capture & Storage Association
<http://www.ccsassociation.org/faqs/ccs-capture/>

THE GLOBAL STATUS OF CCS

CCS AT-A-GLANCE



CLIMATE CHANGE CHALLENGE



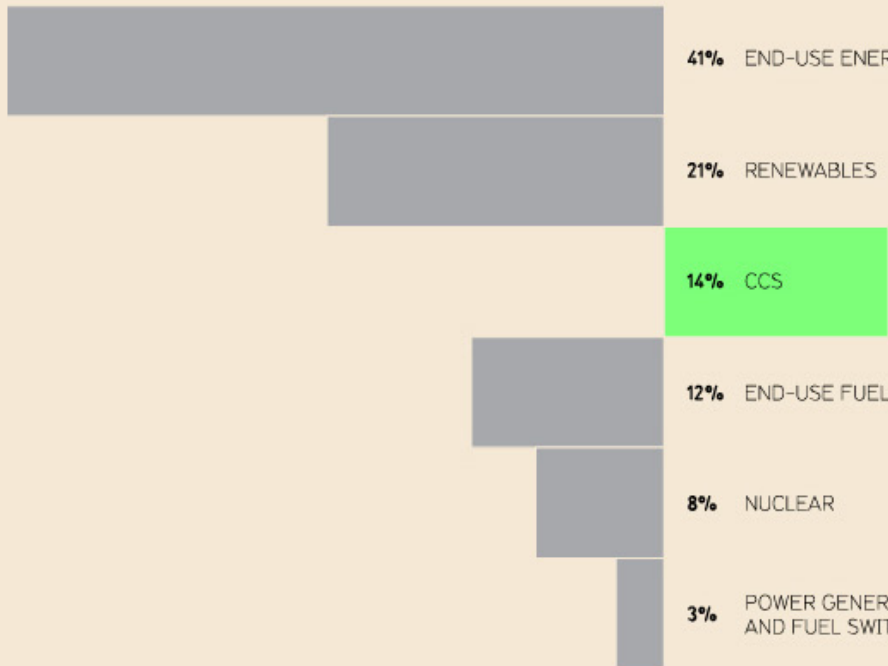
Unless the emission of man-made CO₂ and other greenhouse gases into the atmosphere can be reduced drastically, the greenhouse effect will intensify and the temperature of the Earth will continue to rise.

Meanwhile, world energy demand is projected to grow by more than 40% over the next two decades.

REQUIRED TECHNOLOGIES AND ACTIONS

Limiting the global average temperature increase to 2°C requires halving energy related emissions by 2050.

More effort is required to fully decarbonize energy by 2075 and CCS's role continues to grow in this task, post 2050.



As part of a portfolio of actions, CCS accounts for 14% of total energy related CO₂ reductions by 2050.

Looking toward 2050

According to the Carbon Capture and Storage Association, this process can capture up to 90% of the CO₂ emissions produced from the use of fossil fuels in electricity generation and industrial processes, preventing CO₂ from entering the atmosphere. The IEA reports that, in order to meet global targets of 50% reduction in CO₂ emissions by 2050, 20–40% of all industrial and power facilities need to be equipped with CCS technologies.

Turning Problems into SolutionsSM

By providing an innovative, alternative means of sequestering and utilizing CO₂, Solidia Technologies® plays a key role in Carbon Capture and Utilization/Sequestration solutions. The Solidia process sequesters CO₂ at a much lower cost than traditional CCS approaches for medium-size industrial emitters, at <200,000 tCO₂ emissions per year, and minimizes the need for expensive

compression and cleanup of flue gas prior to sequestration. Gas is injected into concrete during the manufacturing process and transformed into a usable element that gives large- and small-scale concrete producers a competitive edge. Now in the commercialization stage, Solidia's is a complex technology made simple and verified by leading independent industry laboratories.

The Solidia approach comes at a crucial time in the search for solutions to climate change. Cement is the supply chain sibling of concrete. Cement manufacturers represent approximately 5–7% of global greenhouse gas emissions and recognize the need to reduce emissions of CO₂ and other pollutants. By offering the concrete and cement industries market-driven solutions as they pivot to the low-carbon economy, Solidia Technologies offers a solution grounded in scientific innovation and fueled by the power of the marketplace.

Additional Resources:

CCS and Storage Video Animation. US Department of Energy, National Energy Technology Laboratory, 2008.
The Problem with Carbon Capture: CO₂ Doesn't Always Stay Captured. Fast Company, November 19, 2010.
Technology Roadmap: Carbon Capture and Storage in Industrial Applications. International Energy Agency and United Nations Industrial Development Organization, 2011.