Carbon Capture FAQs

Reshaping the future of cement & concrete construction materials

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What is carbon dioxide (CO_2)?

- CO_2 is the fourth most abundant gas in the Earth's atmosphere. It is colorless, odorless, non-flammable and recognized as a significant greenhouse gas.
- CO_2 is generated by a variety of sources both natural and man-made. It is a byproduct of fuel combustion as well as of chemical reactions.
- CO_2 is released by all aerobic organisms when they metabolize organic compounds to produce energy by respiration (breathing).
- CO_2 is released from organic materials when they decay or combust.
- Managing the earth's CO_2 levels through reductions in man-made sources helps to lower CO_2 concentrations in the atmosphere.

What is Carbon Capture?

Carbon capture is the process of removing CO_2 from large emission sources. The purpose of carbon capture is to limit the release of CO_2 emissions into the atmosphere by capturing it and then storing it safely, for instance in underground geological formations. The whole process of capturing, transporting and storing CO_2 is referred to as carbon capture and storage, or CCS.

Why CCS is important for Cement Industry?

About 1/3 of CO_2 emissions from cement manufacturing comes from the fuel combustion required to achieve temperatures to produce cement. Reducing these CO_2 emissions can be accomplished by low-carbon fuels and renewable fuels such as biomass and other natural products. This work is ongoing today, and at the Mitchell facility we have shifted to 100% natural gas, which has resulted in a double-digit net reduction per ton of product. Approximately 2/3 of CO_2 emissions from cement manufacturing come from the chemical conversion of limestone into the final product. These emissions will be addressed through carbon capture and storage.

Can other technologies be leveraged to decarbonize cement manufacturing?

Other decarbonization technologies continue to be in the early development stages and have not achieved scale. Implementation of carbon capture technology over the near to intermediate term is critical to decarbonize our industry.

How will the Mitchell CCS project help decarbonize the cement industry?

Projects like the Mitchell CCS project will enable this technology to be broadly deployed. Heidelberg Materials has one of the the most developed CCS portfolios across the globe, including other full-scale carbon capture projects in Brevik, Norway, and Edmonton, Canada - this project will enable us to further develop and implement this technology at other locations.

Why is it important to have support from agencies such as the U.S. Department of Energy (DOE)?

Because of the nature and cost of first-mover large-scale projects such as Mitchell, support from agencies such as the U.S. DOE is critical to help to assess, implement and operate these projects so that further cost reductions and efficiencies can be developed to facilitate broad deployment across the industry.

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What is being proposed at the Mitchell plant?

- The Mitchell plant is currently undergoing a Engineering and Design (FEED) studies for CO_2 capture and storage within its property boundaries using an amine-based solvent capture technology. This technology has been installed at 18 commercial facilities worldwide with two commercial facilities in progress. Testing of this technology has confirmed a carbon capture rate of 95% or higher which is above the current industry standard, with significant energy-savings and low amine emissions.
- The Illinois State Geological Survey completed a feasibility study in 2021 which showed that the Mitchell plant has a range of sequestration options.

How will CO_2 be stored?

The geological study will evaluate the capacity of CO_2 storage that is available in the sedimentary rocks beneath the property. While southern Indiana is known for its karst topography including sinkholes, caves, sinking streams and springs, CO_2 would be stored thousands of feet below where these features are found to ensure safe storage.

Will it be safe?

- CO_2 capture technologies have been operating safely across the globe and the U.S. since the 1970s. The underground injection and permanent storage of CO_2 began in the late 1990s and those projects are still safely storing CO_2 underground today.
- Underground injection of CO_2 is regulated by the U.S. Environmental Protection Agency's Class VI Injection well permitting program which has stringent protocols for safe storage and ongoing monitoring. Additionally, the Indiana Department of Natural Resources issues a permit to store CO_2 with long-term monitoring and a liability trust fund paid for by permit holders.
- In Indiana, the average depth of a drinking water well is about 150 feet. Carbon storage occurs at significant depths, often more than a mile beneath the surface, where it is isolated from shallow groundwater and surface water sources.
- Monitoring processes and protocols will be in place to ensure the CO_2 is safely stored.

What type of impact will this project have on the local and regional community?

- A carbon capture system improves local air quality by reducing the amount of CO_2, SO_2, NO_x and particulate matter emissions from existing operations.
- The project will have a significant economic benefit to the local and regional community through the creation of 1,000 construction jobs and 20-25 full time jobs.
- Heidelberg Materials has a robust community outreach program and a Community Advisory Panel (CAP) that meets on a regular basis and engages with city and local leadership to discuss updates at the site, receive feedback from the community, identify issues and challenges, and develop plans to resolve any outstanding matters. The CAP will continue to meet during the CCS study to inform of the project status and next steps.
- The CCS projects have a Community Benefits Plan component which will continue to study and identify opportunities for this project and Heidelberg Materials to provide a positive and meaningful impact on the surrounding community.