Carbon Capture Demonstration Projects Program Front-End Engineering Design (FEED) Studies

The Carbon Capture Demonstration Projects Program, managed by the U.S. Department of Energy (DOE) Office of Clean Energy Demonstrations (OCED), aims to de-risk integrated carbon capture and storage (CCS) demonstrations and catalyze significant follow-on investments from the private sector for commercial-scale, integrated CCS demonstrations on carbon emissions sources across industries in the United States. To advance CCS demonstrations, OCED sought applications to execute and complete front-end engineering design (FEED) studies for prospective integrated carbon capture, transport (if required) and storage systems projects. OCED awarded this FEED study in September 2023.

Project At A Glance

- **Project Total:** $12,873,157
- **OCED Award Amount:** $4,992,811
- **Total Potential Carbon Savings:** 2 million tons of CO_2 per year
- **Project Synopsis:** Conduct an integrated FEED study for a carbon capture and storage project at the Mitchell Cement Plant
- **Awardee:** Heidelberg, operator of 13 fully integrated cement production plants in North America
- **Project Locations:** Mitchell Cement Plant; Lawrence County, Indiana
- **Project Start Date:** October 1, 2023

About This Project

OCED is working with Heidelberg to evaluate the cost and performance of retrofitting a cement plant with amine-based carbon capture technology, identify site-specific considerations for the full-scale integration at the specified facility, and evaluate the benefits to the community from the technology retrofit. The study will also examine storage aspects of the project, including nearby storage injection wells to be located on Heidelberg property in Lawrence County, Indiana that may help limit the length of the pipeline needed to connect the capture facility with the storage site.

A future project at this site could capture 95% of the carbon dioxide (CO_2) emissions from the plant, or roughly 2 million tons of CO_2 per year. The FEED study will include the development of a robust Community Benefits Plan (CBP), engineering designs, a preliminary engineering design plan, critical design review, final design engineering package, final FEED report, preliminary pipeline route, final pipeline FEED study, and Environmental Health & Safety Assessment Report.

The U.S. Department of Energy established OCED to help scale the emerging technologies needed to tackle our most pressing climate challenges and achieve net zero emissions by 2050. OCED's mission is to deliver clean energy demonstration projects at scale in partnership with the private sector to accelerate deployment, market adoption, and the equitable transition to a decarbonized system.

Heidelberg CCS FEED Study
Project Fact Sheet

Project Site

Mitchell is located in Lawrence County in southern Indiana. The Mitchell Cement Plant has been in operation producing Portland cement since the early 1900s and is currently in the final phase of a modernization effort that will more than triple the plant's current nominal capacity. The Mitchell Cement Plant is also located near geological formations that are suitable for storage.

Community Benefits Plan

The Mitchell Cement Plant Integrated CO_2 Capture Project FEED Study CBP will aim to create local benefits, such as a reduction in atmospheric pollution that will flow directly to nearby communities. To mitigate potential impacts of this project and maximize its benefits, the CBP will promote equity and inclusion through detailed plans to:

- Create and implement a diverse hiring strategy across the project.
- Increase diversity of business ownership within project subcontractors by engaging small, disadvantaged businesses.
- Increase awareness of community benefits and impacts through project-wide training and company-wide engagement.
- Improve equity of access to CCS-related education and information.

Replicability

Decarbonizing the cement sector is critical to help the U.S. to become a net-zero economy by 2050 and reach a 50% reduction in economy-wide net greenhouse gas pollution from 2005 levels by 2030. Cement production accounts for approximately 8% of global CO_2 emissions and roughly 70 million tons of CO_2 emissions per year. The chemical process behind cement production is highly carbon intensive and cannot be replaced with other methods, making carbon capture a key tool for decarbonizing this industry. The U.S. has 98 total cement plants, 96 in 34 states and two in Puerto Rico, that must be decarbonized over the next 20 years to achieve net-zero greenhouse gas goals in the sector.

The project evaluated in the awarded FEED study is a first-of-a-kind installation of amine-based technologies in the cement industry, meaning this study will help to advance the use of this technology in multiple industrial applications, as well as the deployment of carbon capture technologies in a critical sector. To learn more about Carbon Management you can access DOE's Pathways to Commercial Liftoff report., or visit the Carbon Management section on the OCED website.

Contact

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More Resources

Website: energy.gov/oced/CCFEEDs

Office of Clean Energy Demonstrations: energy.gov/oced

Carbon Management Interactive Graphic: edx.netl.doe.gov/carbonstorage/interactive-graphic/