U.S. DEPARTMENT of ENERGY

Carbon Capture, Use, Transport, and Storage Fact Sheet

The U.S. Department of Energy (DOE) is driving the rapid deployment of technologies and infrastructure to expand domestic energy production, lower costs for American families and businesses, and bolster the reliability and security of the nation's energy system. As a part of this effort, DOE's Office of Fossil Energy and Carbon Management (FECM) invests in research, development, demonstration, and deployment projects to strengthen U.S. energy and critical minerals security.

A key focus of this strategy is advancing carbon capture, use, transport, and storage—a process that captures carbon dioxide (CO_2) from a source (e.g., fossil-fueled power plant, industrial process, or biomass combustion and conversion); compresses the CO_2 to a liquid-like state; transports the CO_2 via pipeline, ship, truck, or other means; and injects the CO_2 underground, either in deep reservoirs at a site suitable for secure geologic storage, sometimes in conjunction with CO_2-enhanced oil/gas recovery or conversion into a product such as fuels, chemicals, construction materials or other products.

Since 1997, DOE has laid the foundation for commercial-scale carbon capture, use, transport, and storage through programs like the Regional Carbon Sequestration Partnerships and Carbon Storage Assurance Facility Enterprise (CarbonSAFE) programs—providing the industry with critical data and best practices. Building on this progress, DOE is investing in technology innovation to drive down costs and optimize processes to pave the way for the widespread commercialization of these technologies.

Point-Source Carbon Capture Program

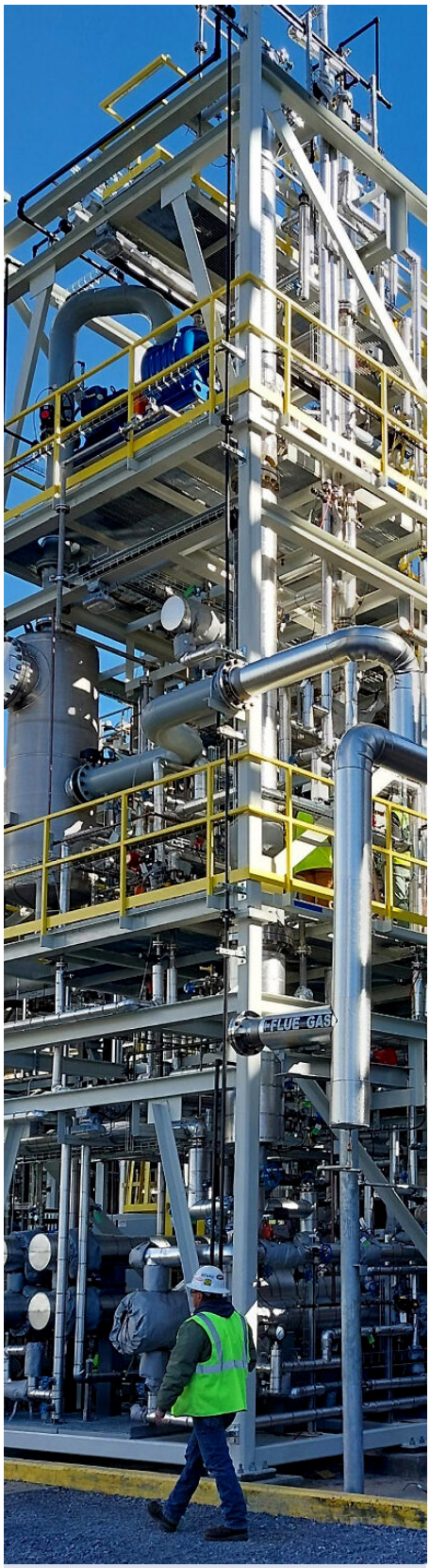
FECM's Point-Source Carbon Capture Program conducts research, development, and demonstration (RD&D) of carbon capture technologies for power generation and industrial operations. The program aims to reduce the cost and increase the efficiency of carbon capture by investing in technologies to improve the performance of different approaches to carbon capture (e.g., membrane, solvent, sorbent, chemical looping, etc.). Supported efforts range from lab/bench-scale innovations and scale-up testing to front-end engineering design (FEED) studies and pilot-scale demonstrations.

The program has a strong track record of driving carbon capture innovation, which includes establishing the National Carbon Capture Center (NCCC) in 2009. Today, the NCCC is a globally recognized testbed for technologies, accelerating their development toward commercial deployment. Over the years, FECM's Point-Source Carbon Capture Program has supported over 100 lab/bench-scale technologies (Technology Readiness Level, or TRL, 3 or 4), 46 technologies validated at TRL 6 and five validated at TRL 7, and 40 completed or in-progress FEED studies.

Carbon Conversion Program

FECM's Carbon Conversion Program invests in the research and development of technologies that convert captured carbon oxides, primarily CO_2, into a product such as fuels, chemicals, construction materials or other products. This program began in 2012 and has since grown in the support capabilities it offers to both researchers and industry. This includes creating publicly available techno-economic analysis and life cycle analysis tools and enabling the development of CO_2-derived fuels, chemicals, and products.

Technologies supported by the program fall into three broad categories—mineralization, biological, and catalytic pathways—based on the conversion mechanism. Research on these technologies span a variety of disciplines, including catalyst development,

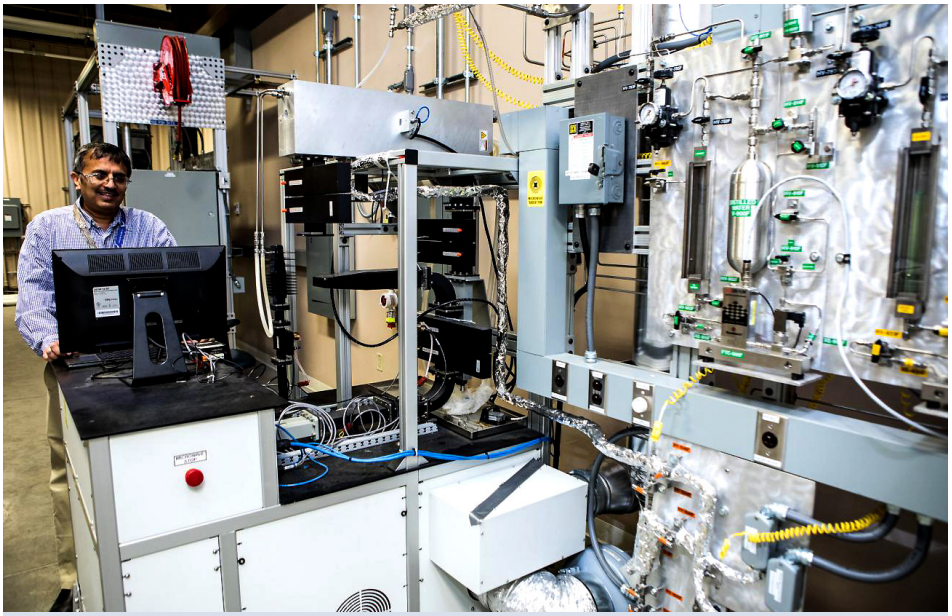


Funded by DOE, the National Carbon Capture Test Center serves as a leading research and development center for carbon capture and CO_2 conversion.

reactor design, microbial engineering, and point-source CO_2 integration. The Carbon Conversion program is committed to overcoming the technology barriers to using CO_2 as a feedstock for the fuels and chemicals in the U.S. economy.

Carbon Transport and Storage Program

FECM's Carbon Transport and Storage Program focuses on the RD&D needs to support the growth of the carbon transport and carbon storage industry. The program's investments are advancing networks that connect CO_2 sources—such as industrial facilities and power plants, as well as CO_2 emissions captured directly from the atmosphere—to geologic formations where large quantities of captured CO_2 emissions can be securely and permanently stored deep underground or transported to locations where it can be used as a feedstock to manufacture fuels, chemicals, building materials, and other long-lived products. CO_2 can be transported by any single or a multimodal combination of freight transportation, such as pipelines, rail, trucks, barges, or ships.



A DOE CO_2 conversion research and development test laboratory at the National Energy Technology Laboratory.

The program leads and supports multiple initiatives, including the Regional Carbon Sequestration Partnerships and CarbonSAFE Initiative; Regional Initiative for Technical Assistance Partnerships; the Carbon Basin Assessment and Storage Evaluation Initiative; and the Carbon Storage Operational Readiness and Efficiency Initiative. These efforts aim to ensure the safe and efficient deployment of CO_2 transport and storage solutions.

As a part of its broader research, development, and demonstration portfolio, FECM engages with industry, academia, stakeholders, and offices across government (Federal and State) to facilitate the widespread deployment of carbon capture, use, transport, and storage technologies.

To keep up to date with future project updates and funding announcements, visit FECM's website and sign up for news alerts. ■

A pipeline transporting CO_2 for secure geologic storage.

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For more information, visit:
energy.gov/fecm

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