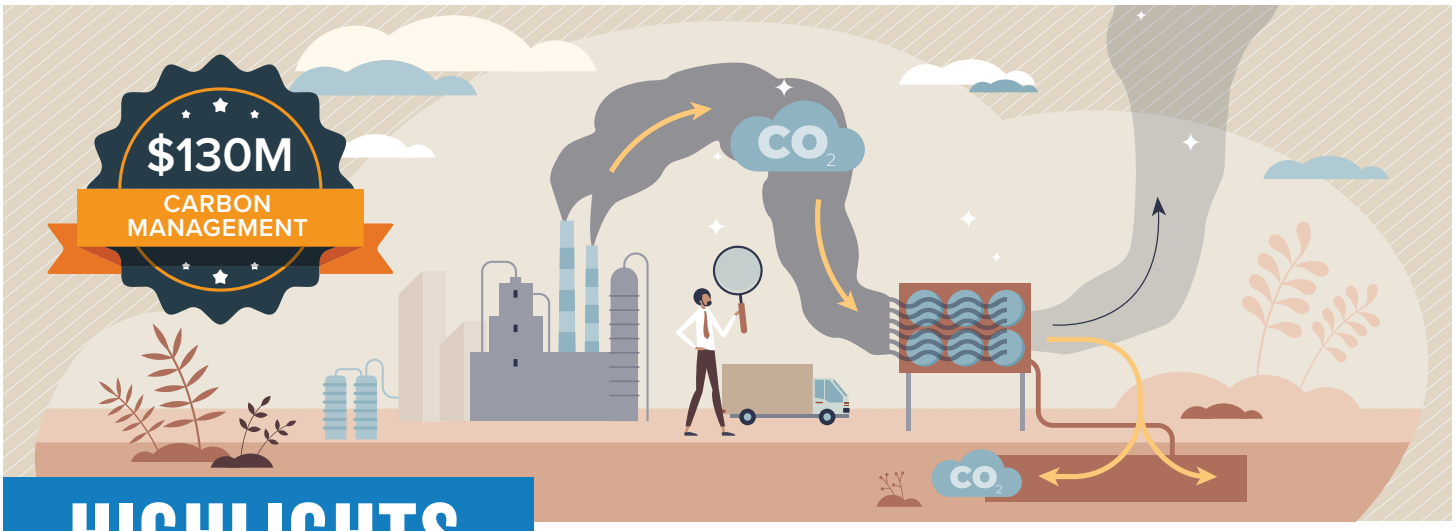
NATIONAL ENERGY TECHNOLOGY LABORATORY

MARCH 2023

CARBON CAPTURE NEWSLETTER

U.S. DEPARTMENT OF ENERGY | OFFICE OF FOSSIL ENERGY AND CARBON MANAGEMENT | NATIONAL ENERGY TECHNOLOGY LABORATORY



HIGHLIGHTS

The newsletter is compiled by the National Energy Technology Laboratory to provide information on recent activities and publications related to carbon capture.

To subscribe, click here.

DOE Invests Funding to Lower Nation's Carbon Pollution

The U.S. Department of Energy (DOE) announced $131 million for 33 research and development projects to advance the wide-scale deployment of carbon management technologies to reduce carbon dioxide (CO_2) pollution. The projects will address technical challenges of capturing CO_2 from power plants and industrial facilities or directly from the atmosphere and assess potential CO_2 storage sites, increasing the number of sites progressing toward commercial operations. DOE is investing $38 million in 22 projects awarded under the "Carbon Management" funding opportunity that will develop technologies to capture CO_2 from utility and industrial sources or directly from the atmosphere and transport it either for geologic storage or for conversion into valuable products such as fuels and chemicals. DOE is investing $93 million in 11 projects awarded under the "CarbonSAFE: Phase II - Storage Complex Feasibility" funding opportunity that will improve procedures to safely, efficiently, and affordably assess onshore and offshore CO_2 project sites within a storage complex at a commercial scale. Projects were selected under DOE's Carbon Storage Assurance Facility Enterprise (CarbonSAFE) initiative, which focuses on developing commercial-scale geologic storage sites each with the potential to store 50 million metric tons or more of CO_2 over a 30-year period.

Interagency News and Updates

Large Pilot Carbon Capture Project Supported by NETL Breaks Ground in Illinois

DOE's National Energy Technology Laboratory (NETL) representatives recently attended a groundbreaking ceremony at the City Water, Light and Power (CWLP) plant in Springfield, Illinois, to celebrate the advancement of a large pilot CO_2 capture project made possible with funding and project management support from the laboratory. The project is led by the University of Illinois, in partnership with the Linde Group, BASF Corporation, Affiliated Engineers, Inc., Affiliated Construction Services, Inc., and Visage Energy. The large pilot testing will evaluate a 10-megawatt-electric (MWe) capture system, based on the Linde-BASF advanced amine-based post-combustion capture technology, designed to capture 200 tonnes of CO_2 per day.

Groundbreaking ceremony at City Water, Light and Power (CWLP) plant in Springfield, Illinois. Image: NETL

NETL Project Partner Demonstrates CO_2 Capture from Ethanol Production and Its Deep Geologic Storage

Archer Daniels Midland (ADM), with support from NETL, demonstrated an integrated system of processing CO_2 and transporting it from an ethanol plant to the Mt. Simon Sandstone saline reservoir for geologic storage. This is the largest demonstration of its kind in the United States. The system demonstrated by ADM at the company's Agricultural Processing and Biofuels Plant, located in Decatur, Illinois, collected CO_2 produced as a byproduct of processing corn into fuel-grade ethanol. ADM carbon capture and storage (CCS) is the first geologic storage project to operate with the U.S. Environmental Protection Agency's Class VI injection well permit. Under this Class VI permit, the cumulative amount of CO_2 injection into the Mt. Simon Sandstone saline reservoir was over 2.8 million metric tons.

NETL/DOE Review Progress on Next-Generation Carbon Capture Projects During California Visit

NETL and other DOE representatives toured six sites during four days in California where projects are being developed with the laboratory's oversight and support to capture CO_2 and lower atmospheric levels of CO_2. The tour stops focused on technologies supported by both the Point Source Carbon Capture and the Carbon Dioxide Removal (CDR) programs.

DOE and NETL representatives, from left, Andrew Hlasko, Zachary Roberts, Dan Hancu, Krista Hill, Andrew Jones, José Figueroa and Nicole Shamitko-Klingensmith visited Electricore in Fountain Valley, California, to discuss a project to capture CO_2 from the air using a novel solid sorbent laminate filter technology. The group received a tour of the test plant and a project status update. Photo: NETL

Interagency News and Updates (continued)

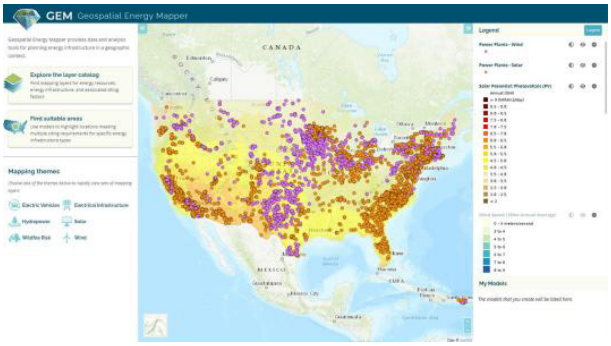
Funding Opportunities Issued for Carbon Capture Large-Scale Pilot Projects and Carbon Capture Demonstration Projects Program

DOE's Office of Clean Energy Demonstrations (OCED), in collaboration with the Office of Fossil Energy and Carbon Management (FECM) and the National Energy Technology Laboratory (NETL), will provide up to $2.52 billion to fund two carbon capture programs needed to reduce carbon emissions from the electricity generation and industrial sectors. Funded by President Biden's Bipartisan Infrastructure Law (BIL), the two programs—Carbon Capture Large-Scale Pilots and Carbon Capture Demonstration Projects—aim to significantly reduce CO_2 emissions from electricity generation and hard-to-abate industrial operations, an effort critical to addressing the climate crisis and meeting the President's goal of a net-zero emissions economy by 2050. Read the full Funding Opportunity Announcements here and here.

DOE Awards Funding to Accelerate Domestic Biofuel Production

DOE awarded $118 million in funding for 17 projects to accelerate the production of sustainable biofuels for America's transportation and manufacturing needs. The selected projects, located at universities and private companies, will drive the domestic production of biofuels and bioproducts by advancing biorefinery development, from pre-pilot to demonstration, to create sustainable fuels that reduce emissions associated with fossil fuels. Projects selected as part of this funding opportunity will contribute to meeting DOE's goal to achieve cost-competitive biofuels and at least a 70% reduction in greenhouse gas (GHG) emissions by 2030. The selected projects include pre-pilot, pilot, and demonstration projects that will scale-up existing biomass to fuel technologies that will eventually create millions of gallons of low-carbon fuel annually.

A New Tool Helps Map Out Where to Develop Clean Energy Infrastructure



GEM interface showing wind and solar power plant locations with photovoltaic solar potential. (Image by Argonne National Laboratory.)

The Geospatial Energy Mapper (GEM) is a comprehensive, interactive online mapping tool that can help identify areas across the country that are suitable for wind, solar, and other clean energy. First publicly launched in 2013 as the Energy Zones Mapping Tool (EZMT), GEM has been redesigned, rebranded, and reengineered. GEM is hosted by DOE's Argonne National Laboratory with funding from DOE's Office of Electricity. GEM offers an extensive catalog of mapping data. This includes energy resources and infrastructure, and other information that might influence energy infrastructure siting decisions. With over 190 different mapping layers—including demographics, boundaries, and utilities—users can locate areas for clean power generation, electric vehicle charging stations, and more.

Interagency News and Updates (continued)

Scientists Unveil Carbon Capture System

Scientists at DOE's Pacific Northwest National Laboratory (PNNL) cleared a new milestone in their efforts to make carbon capture more affordable and widespread—creating a new system that captures CO_2 and converts it into one of the world's most widely used chemicals: methanol. As described in the journal *Advanced Energy Materials*, the new system is designed to fit into coal-, gas-, or biomass-fired power plants, as well as cement kilns and steel plants. Using a PNNL-developed capture solvent, the system captures CO_2 molecules before they're emitted, then converts them into useful, sellable substances.

Chemist Dave Heldebrant, a recently selected fellow of the American Chemical Society who holds a joint appointment with Washington State University, has helped design several solvents that can deftly capture carbon dioxide molecules before they reach Earth's atmosphere. (Photo by Andrea Starr | Pacific Northwest National Laboratory)

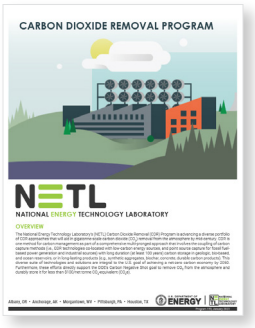
Granholm Delivers Speech at Consumer Electronics Show

Video is now available of Secretary of Energy Jennifer Granholm's Speech at the Consumer Electronics Show, highlighting DOE's Earthshots.

Apply to Review FECM Funding Opportunity Applications

The Office of Fossil Energy and Carbon Management (FECM is looking for a diverse pool of individuals to review the equity, justice, jobs, and community engagement sections of funding opportunity applications. To apply to review, send a resume to SCI_FECM@NETL.DOE.GOV. Reviewers should have academic, subject matter, and/or practitioner experience in at least one of following areas: diversity, equity, inclusion, and accessibility; community and stakeholder engagement; workforce development and quality jobs; and environmental justice.

CDR Program Tech Sheet Now Available



NETL's CDR Program is advancing a diverse portfolio of CDR approaches that will aid in gigatonne-scale CO_2 removal from the atmosphere by mid-century. These efforts directly support DOE's Carbon Negative Shot goal to remove CO_2 from the atmosphere and durably store it for less than $100/net tonne CO_2-equivalent (CO_2e).

Career Opportunities at NETL

At the core of NETL's success is its commitment to hiring the right people for the right positions. DOE's only government-owned and government-operated national laboratory offers exciting federal careers in research and engineering, technical project management, procurement, finance and budget, legal, and administrative support. Learn more at NETL Careers.

Interagency News and Updates (continued)

Website Now Available to Submit LCA Data for Planned Carbon Conversion Funding Opportunity

In support of the BIL, NETL intends to release a Funding Opportunity Announcement in support of a new Utilization Procurement Grants (UPGrants) initiative. Through the Carbon Conversion Program, this initiative will provide demonstration grants to eligible entities to procure and use commercial or industrial products derived from anthropogenic carbon oxides. The UPGrants opportunity will require that eligible entities procure products that demonstrate significant net reductions in GHG emissions as compared to incumbent products. In support of UPGrants, NETL has recently published a website that allows carbon conversion product manufacturers to submit life cycle analysis (LCA) data. NETL will critically review manufacturer-provided LCAs; if the review is satisfactory, the product manufacturer will warrant inclusion as an UPGrants vendor, enabling eligible entities to apply for demonstration grants to procure and use these products.

Bipartisan Infrastructure Law Hub

BIL HUB
Resources for the Bipartisan Infrastructure Law

The Bipartisan Infrastructure Law (BIL) represents the most dramatic changes to DOE since its founding in 1977. In the next few years, the BIL will stand up 60 new DOE programs, including 16 demonstration and 32 deployment programs, and expand funding for 12 existing research, development, demonstration, and deployment programs. NETL's BIL Hub provides information on the BIL, including links to the Guidebook, DOE's Clean Energy Corps, DOE's Applicant Portal, and DOE's Grid Resilience Program, as well as information on solicitations and funding opportunities.

NETL Energy 101 Webinar: Point Source Carbon Capture

Join NETL March 9, 10–11 a.m., for a discussion with a point source carbon capture expert and learn about the regional economic and workforce development opportunities this technology is expected to generate. The webinar will begin with comments from Anthony Armaly, coordinator of NETL's Regional Workforce Initiative, followed by a presentation by Ron Munson, technology manager, Point Source Carbon Capture, and an economic and workforce development roundtable discussion. Register here.

DOE STEM Portal

DISCOVER THE WORLD OF ENERGY
DOE STEM
U.S. DEPARTMENT OF ENERGY

DOE is building pathways for a diverse workforce to pursue science, technology, engineering, and mathematics (STEM) careers. DOE seeks to engage learners at all levels to promote STEM and energy literacy and to attract, inspire, and develop a STEM identity and a sense of belonging in STEM. DOE is committed to promoting and supporting people from all backgrounds and perspectives, including individuals and communities that have been historically underrepresented in STEM fields and activities at DOE.

U.S. and International Events

ICR23

The Innovations in Climate Resilience 2023 conference (ICR23), to be held Mar. 28–30, 2023, in Columbus, Ohio, continues the mission of leading innovations in climate resilience with the theme "Bold Leaps and Action." The focus areas of the conference include restoring ecosystems, enabling adaptation of built infrastructure and societies, improving human health, boosting national security, securing the food supply, and dramatically reducing the trajectory of causative factors.

CCUS 2023

Carbon, Capture, Utilization, and Storage (CCUS) 2023, to be held Apr. 25–27, 2023, at the University of Houston in Houston, Texas, will highlight current CCUS work and address related challenges, including subsurface geologic storage and site selection; CO_2 enhanced hydrocarbon recovery and utilization; reservoir modeling monitoring and risk assessment; case studies; industry applications; economics, incentives, and policy; infrastructure; and non-technical considerations.

GRC on Carbon Capture, Utilization, and Storage

The fifth edition of the Gordon Research Conference (GRC) on Carbon Capture, Utilization, and Storage—"Transformative Science for the New Carbon Economy"—will be held May 28–June 2, 2023, in Les Diablerets, Switzerland. The conference will examine scientific advances covering all dimensions of the anthropogenic carbon cycle from capturing hard-to-abate CO_2 emissions to using CO_2 as feedstock and generating negative emissions by removing CO_2 from the atmosphere and oceans.

2023 IEW

The 41st edition of the International Energy Workshop (IEW), to be held in Golden, Colorado, June 13–15, 2023, will be co-hosted by the Colorado School of Mines and the National Renewable Energy Laboratory. Researchers and practitioners from countries around the world are invited to submit original papers with new and innovative results on scientific, technical, and practical experience on the economics of energy and climate systems.

Carbon Capture Summit 2023

The key focus for the Carbon Capture Summit 2023, to be held June 26–27, 2023, in Amsterdam, The Netherlands, will be "working in collaboration with industry" by sharing expertise, building capacity, and providing advice and support so CCUS can play an integral role in reducing carbon emissions. Government agencies, global corporations, research bodies, and non-government organizations (NGOs) committed to learning and adopting CCUS technologies will participate in the event.

Carbon Capture Technology Expo

The Carbon Capture Technology Expo, to be held June 28–29, 2023, in Houston, Texas, will bring together leading engineering firms, technology manufacturers and suppliers, energy firms, the oil and gas sector, heavy industry, chemical companies, various manufacturing organizations, research groups and NGOs, consultants, and government bodies to explore how to rapidly accelerate the deployment and commercialization of CDR technologies as a key solution on the pathway to net-zero carbon emissions.

U.S. and International Events

Hydrogen Technology Conference & Expo

The Hydrogen Technology Conference & Expo, to be held June 28–29, 2023, in Houston, Texas, is dedicated to discussing advanced technologies for the hydrogen and fuel cell industry. The event brings together the entire hydrogen value chain to focus on developing solutions and innovations for low-carbon hydrogen production, efficient storage and distribution, as well as applications, in a variety of stationary and mobile applications.

Clearwater Clean Energy Conference

The 47th Clearwater Clean Energy Conference, to be held July 23–28, 2023, in Clearwater, Florida, provides essential information to power generators who must meet the challenges of energy utilization in the 21st century. The conference will include more than 200 technical presentations in four days, all offered both in-person and virtually.

PCCC-7

The next Post-Combustion Capture Conference (PCCC-7) will be in-person, Sept. 25–27, 2023, in Pittsburgh, Pennsylvania. The call for abstracts will open in early-March 2023. The conference format will consist of a two-stream program for oral presentations, a poster session, and a small exhibition area.

Business and Industry News

The Scale-Up of CDR

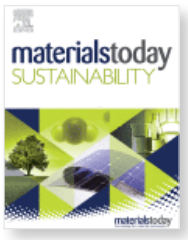
Central to achieving net-zero emissions by 2050 is a wide-scale deployment of carbon management technology and infrastructure in energy, industry, and manufacturing. According to CDR Technology Manager Andrew Jones, this needs to be done across the entire value chain of carbon capture, removal, conversion, CO_2 transport, and secure geologic storage. Jones points to a diverse set of CDR approaches, including direct air capture and direct ocean capture with secure geologic storage. There is also biomass carbon removal and storage, as well as mineralization of atmospheric CO_2.

Publications

Final Report, Phase I Conceptual Study, Hydrogen Storage for Load-Following and Clean Power: Duct-firing of Hydrogen to Improve the Capacity Factor of NGCC Plants

John Vega, Jeff Mays, FECM, May 27, 2022

Energy-efficient and water-saving sorbent regeneration at near room temperature for direct air capture



T. Ji, H. Zhai, C. Wang, C.M. Marin, W.C. Wilfong, Q. Wang, Y. Duan, R. Xia, F. Jiao, Y. Soong, F. Shi, M. Gray, Materials Today Sustainability, Volume 21, March 2023. (Subscription may be required.)

Two-stage membrane-based process utilizing highly CO_2-selective membranes for cost and energy efficient carbon capture from coal flue gas: A process simulation study

Huanghe Li, Fan Wang, Shiguang Li, Miao Yu, Journal of Membrane Science, Volume 669, March 2023. (Subscription may be required.)

Sorbent Based Post-Combustion CO_2 Slipstream Testing

Fei Yi, Jeannine Elliott, DOE, October 27, 2022.

Low Regeneration Temperature Sorbents for Direct Air Capture of CO_2

S. James Zhou, FECM, Dec. 21, 2022.

Initial Engineering and Design For CO_2 Capture From Ethanol Facilities

Kerryanne M. Leroux, John P. Kay, Christopher J. Beddoe, Jason D. Laumb, DOE, Nov. 28, 2022.

Development of Novel Materials for Direct Air Capture of CO_2: MIL-101(Cr)-Amine Sorbents Evaluation Under Realistic Direct Air Capture Conditions (Final Report)

Christopher W. Jones, Ryan P. Lively, Matthew J. Realff, FECM, Jan. 3, 2023.

Pilot Test of a Nanoporous, Super-hydrophobic Membrane Contactor Process for Post-combustion CO_2 Capture

Shiguang Li, Howard Meyer, Travis Pyrzynski, Ed Sanders, Uttam Shanbhag, Yong Ding, FECM, Sept. 30, 2023.

About DOE Carbon Capture:

DOE/NETL is developing the next generation of advanced CO_2 capture technologies through NETL's Point Source Carbon Capture Program and the Carbon Dioxide Removal Program.

The Compendium of Carbon Capture Technology provides a technical summary of the DOE/NETL's Carbon Capture Program, assembling carbon dioxide capture technology research and development (R&D) descriptions in a single document.

Carbon Capture Reference Materials

- Carbon Capture Program Factsheet
- Carbon Dioxide Removal Program Fact Sheet
- Carbon Capture Infographics
- Compendium of Carbon Capture Technology
- Carbon Dioxide Capture Handbook
- CCSI^2
- Systems Analysis
- Conference Proceedings
- Accomplishments Posters
- Fossil Energy Techlines

Contact Us

DOE Carbon Capture contacts:

Ron Munson, Point Source Capture Technology Manager, 412.386.9294

Andrew Jones, Carbon Dioxide Removal Technology Manager, 412.386.5531

Amishi Claros, Acting Director, CO_2 Removal and Conversion, 202.586.1888

Dan Hancu, DOE Senior Program Manager, Point Source Carbon Capture, 240.220.1186

1450 Queen Avenue SW
Albany, OR 97321-2198
541-967-5892

3610 Collins Ferry Road
Morgantown, WV 26507-0880
304-285-4764

626 Cochran Mill Road
Pittsburgh, PA 15236-0940
412-386-4687

Program staff are also located in **Houston, Texas** and **Anchorage, Alaska**

CUSTOMER SERVICE: 1-800-553-7681

www.netl.doe.gov

Click here to subscribe or unsubscribe to the CCN.

Click here to submit questions, feedback or SUGGESTIONS.

Get Social with Us

There are several ways to join the conversation and connect with NETL's Carbon Capture Program:

U.S. DEPARTMENT OF ENERGY | NETL NATIONAL ENERGY TECHNOLOGY LABORATORY