

AUGUST 2022

CARBON CAPTURE NEWSLETTER



HIGHLIGHTS

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

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NETL Carbon Management Project Review Meeting to be Held in August

NETL's 2022 Carbon Management Project Review Meeting will be held Aug. 15–19, 2022 at the Westin Pittsburgh Hotel, in Pittsburgh, Pennsylvania. The [draft agenda](#) has been posted. The five-day meeting will feature many of the Lab's collaborative efforts with external partners around the nation that are helping to achieve the Biden Administration's net-zero carbon emission goals in the power sector by 2035 and the broader economy by 2050. A wide array of stakeholders will participate in panel discussions and presentations on a variety of topics in carbon management in the areas of Point Source Carbon Capture, Carbon Dioxide Removal, Carbon Conversion, and Carbon Storage. Talks from NETL presenters include the following, among others: "Carbon Utilization Program Overview" "DAC Test Center Overview," "Overview of Carbon Utilization Life Cycle Analysis at NETL," "Processible Porous Polymeric Fiber Adsorbents for Low-Concentrated Carbon Dioxide Capture," "Integrating CO₂-Selective Polymer Layers and Electrocatalytic Conversion," and "Updating NATCARB and Carbon Storage Geospatial Resource via EDX Cloud." There are invited poster sessions in the areas of Point Source Carbon Capture and Carbon Dioxide Removal, as well. Detailed [information](#) regarding registration, travel and hotel accommodations is available online.

Interagency News and Updates

Administration Launches Funding for Programs to Cut Carbon Emissions

DOE issued Notices of Intent (NOIs) for two programs that will advance six carbon capture demonstration projects and expand regional pipeline networks to transport CO₂ for permanent geologic storage or for conversion into valued end uses, such as construction materials. The two programs—the Carbon Capture Demonstration Projects Program and the Carbon Dioxide Transport/FEED (front-end engineering design) Program—are funded by a more than \$2.6 billion investment from the BIL. The \$2.54 billion [Carbon Capture Demonstration Projects Program](#) will focus on integrated carbon capture, transport, and storage technologies and infrastructure that can be readily replicated and deployed at fossil energy power plants and major industrial sources of CO₂. The \$100 million [Carbon Dioxide Transport/FEED Program](#) will design regional CO₂ pipeline systems to safely transport CO₂ from key sources to centralized locations.

NETL Assists Preparations for Global Clean Energy Action Forum

The U.S. Department of Energy (DOE) has partnered with Carnegie Mellon University (CMU) to launch and host the 2022 Global Clean Energy Action Forum in Pittsburgh, Pennsylvania, Sept. 21–23, 2022. The forum brings together energy leaders from around the world to turn clean energy ambition into action and accelerate the transition toward a more secure energy future. The Global Energy Forum will combine the regular convening of the 31 countries of the Clean Energy Ministerial (CEM) for CEM13, Mission Innovation (MI) for MI-7, and a broad presence of clean energy businesses, innovators, and civil society. DOE welcomed interested stakeholders in the clean energy action community to showcase their clean energy technologies. The technology showcase is a key component of the forum and offers opportunities to showcase solutions that are accelerating and demonstrating progress toward shared clean energy goals.

DOE-NETL Incubates R&D for Carbon Conversion: Growing Algae for Better Chicken Feed

Working as part of a three-year cooperative agreement with DOE's National Energy Technology Laboratory (NETL), researchers have demonstrated that algae grown using carbon dioxide (CO₂) emitted by a fossil energy power plant can be processed into a nutrient-rich supplement for chicken feed to produce quality eggs and poultry products. Supported with federal funding, the project, Beneficial Reuse of CO₂ from Coal-Fired Power Plants for Production of Animal Feeds, was launched at the Stanton Energy Center in Orlando, Florida. With NETL project oversight and support, the research and development (R&D) shows that growing algae using flue gas was more productive and resulted in greater amounts of algae compared to using a pure CO₂ stream or ambient air. After it was dried and milled, the algae supplement was blended with chicken feed. The algae-supplemented feed had 30% greater energy content than conventional feed and contained omega-3 fatty acids and other nutrients.



PHOTO CREDIT:
MICROBIO ENGINEERING

Director's Corner: Sharing Ideas is a Responsibility

From NETL Director Brian Anderson, Ph.D.: "At NETL, we have a lot of good ideas for innovations that can help decarbonize our planet, create good-paying jobs, and work toward a net-zero carbon nation. And, we have the knowledge to help back up those ideas. Over the last three months alone, we have gone the extra mile to share them with the organizations, institutions, individuals, and conferences that can help move good ideas into action."

Interagency News and Updates (continued)

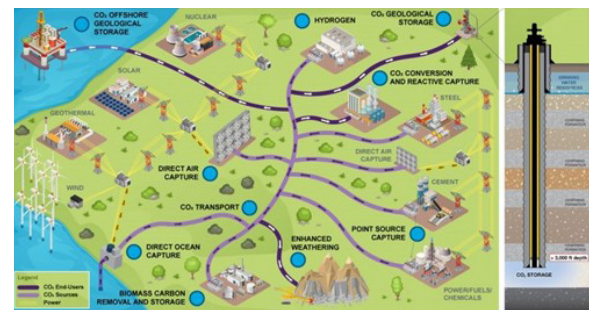
NETL CDR Removal Program Fact Sheet Released

NETL's Carbon Dioxide Removal (CDR) Program is advancing a diverse portfolio of CDR approaches that will aid in gigatonne-scale CO₂ removal from the atmosphere by mid-century. This diverse suite of technologies and solutions are integral to the U.S. goal of achieving a fully decarbonized power sector by 2035 and a net-zero carbon economy by 2050. Furthermore, these efforts directly support DOE's Carbon Negative Shot goal to remove CO₂ from the atmosphere and durably store it for less than \$100/net metric tons of CO₂-equivalent.



FECM Launches Carbon Management Tools

The U.S. Department of Energy's Office of Fossil Energy and Carbon Management (FECM) launched two new interactive tools to assist with advancing carbon management technologies and infrastructure in the United States: the 1) [Carbon Matchmaker Tool](#) – an online information resource designed to increase awareness of carbon management funding opportunities; support private sector development of carbon capture, storage, and transportation infrastructure and CO₂ removal pathways; and facilitate regional business development opportunities and education; and the 2) [Carbon Management Interactive Diagram](#) – an online tool that highlights carbon management programs in the BIL and through other DOE funding opportunities and educates users about resources that fall under each program.



NETL's Carbon Storage Newsletter Available for Subscription

Published monthly, NETL's Carbon Storage Newsletter provides information on recent activities and publications related to carbon storage. It covers domestic, international, public sector, and private sector news. Subscription information is [available online](#).



Promoting Decarbonization, Carbon Management, and Sustainability in the Chemical Sector by Leveraging NETL's Deep Expertise

NETL is leading the Center for Sustainable Fuels and Chemicals (CSFC) to help the U.S. chemicals industry retool products and operations for a sustainable future that strengthens domestic manufacturing as the nation transitions to clean energy. The center's work to develop technologies to produce chemicals without emitting CO₂ and other greenhouse gases (GHGs) supports priorities set by the Biden-Harris Administration. The CSFC also will bolster the efforts of the White House's Interagency Working Group (IWG) on Coal and Power Plant Communities and Economic Revitalization. The IWG was established to bring green manufacturing opportunities and good-paying union jobs to areas experiencing economic difficulties as the United States undergoes a historic evolution to clean energy.



Interagency News and Updates (continued)

Bipartisan Infrastructure Law Hub

The Bipartisan Infrastructure Law (BIL) represents the most dramatic changes to DOE since its founding in 1977. For the next five 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 (RDD&D) 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.



Biden-Harris Administration Launches Program to Transform Mines into New Clean Energy Hubs

DOE issued a Request for Information (RFI) to announce a \$500 million BIL-funded program to place clean energy demonstration projects on current or former mine lands across the United States. Operated through DOE's Office of Clean Energy Demonstrations, the program will fund clean energy projects on mine land to benefit communities and their economies, create good-paying jobs, and reduce CO₂ emissions.



DOE FOA to Expand Biofuels Production and Decarbonize Transportation Sector

DOE announced \$59 million to accelerate the production of biofuels and bioproducts to reduce emissions in hard-to-decarbonize sectors and create good-paying jobs in rural America. DOE is focused on applied RDD&D to improve the performance and reduce the cost of biofuel production technologies and scale-up production systems in partnership with industry. By reducing costs and technical risks, these efforts can help pave the way for the biofuels industry to deploy commercial-scale integrated biorefineries. The funding opportunity announcement (FOA) "Scale-Up of Integrated Biorefineries" (FOA DE-FOA-0002638) will advance biorefinery development and feedstocks improvement projects in alignment with a broader DOE strategy to support biorefinery projects that can produce sustainable renewable diesel and aviation, marine, and rail fuel at every stage of development.



DOE to Fund Applied R&D to Accelerate Decarbonization of American Industry

DOE announced its intent to issue a FOA that will support DOE's efforts to decarbonize the American industrial sector and move the United States toward net-zero carbon emissions. The "Industrial Efficiency and Decarbonization FOA" is expected to include the following topics, applying the industrial decarbonization pathways to energy-intensive American industries where decarbonization technologies could have the greatest impact: chemicals, iron and steel, food and beverage products, cement and concrete, paper and forest products, and cross-sector.



Interagency News and Updates (continued)

DOE to Assist Communities with Locally Tailored Pathways to Clean Energy

DOE announced the inaugural communities selected as part of the Communities Local Energy Action Program (Communities LEAP), a first-of-its-kind initiative designed to help energy-overburdened communities take direct control of their clean energy future. The 24 communities will receive support from DOE to create community-wide action plans that reduce local air pollution, increase energy resilience, lower utility costs and energy burdens, and provide long-term jobs and economic opportunities. Learn more about the [selected communities](#) announced. Watch DOE Secretary Jennifer Granholm [sit down](#) with three mayors leading the charge on climate action in states grappling with climate impacts and the energy transition.



New DOT CO₂ Pipeline Safety Measures

DOE welcomes the [new CO₂ pipeline safety measures](#) announced by the U.S. Department of Transportation (DOT) Pipeline and Hazardous Materials Safety Administration (PHMSA). DOE will incorporate PHMSA's guidance into its RDD&D portfolio to ensure the continued safe operations of commercial CO₂ pipelines in the United States. The advancement of essential CO₂ transport infrastructure and carbon management technologies will be required, collectively, to help the nation achieve deep decarbonization and reduce CO₂ emissions that would otherwise be released into the atmosphere. To move toward these goals, the BIL provides DOE with nearly \$100 million to advance front-end engineering design (FEED) of CO₂ transport infrastructure. This will support broader efforts to develop technologies for carbon capture and removal across a diverse range of industries and regions.

A Message from Principal Deputy Assistant Secretary, Dr. Jennifer Wilcox

This month, the Office of Fossil Energy and Carbon Management (FECM) said farewell to Dr. Emily Grubert. Dr. Grubert served as the Deputy Assistant Secretary of the Office of Carbon Management for the past year, leading FECM's efforts to minimize the climate and environmental impacts of fossil energy through technology pathways, including carbon capture, CO₂ removal, carbon transport and storage, and hydrogen production with carbon management. Dr. Grubert will be succeeded by Noah Deich, who joined FECM as the Acting Director of Carbon Dioxide Removal and Conversion. Mr. Deich came to FECM from Carbon180, the U.S.-based non-governmental organization he co-founded to catalyze the development of a portfolio of carbon-removal solutions.

DOE Announces Funding for R&D to Turn Buildings into Carbon Storage Structures

DOE announced funding awards for 18 projects seeking to develop technologies that can transform buildings into net carbon storage structures. Led by DOE's Advanced Research Projects Agency-Energy (ARPA-E), selectees for the [Harnessing Emissions into Structures Taking Inputs from the Atmosphere \(HESTIA\) Program](#) will prioritize overcoming barriers associated with carbon-storing buildings, including scarce, expensive, and geographically limited building materials. Decarbonization goals for the HESTIA Program mirror President Biden's plan to reach zero emissions by 2050 and aim to increase the total amount of carbon stored in buildings to create carbon sinks, which absorb more carbon from the atmosphere than released during the construction process.



U.S. and International Events

Overcoming Barriers to Deploying Direct Air Capture (DAC) Workshop

“Overcoming Barriers to Deploying Direct Air Capture” is a free virtual workshop—to be held August 11, 2022—organized and sponsored by the Electric Power Research Institute (EPRI) and United States Energy Association (USEA) under a cooperative agreement with DOE FECM. The workshop will focus on relevant issues for those advancing DAC as a climate solution. Keynote addresses will feature FECM Principal Deputy Assistant Secretary Dr. Wilcox and Prof. Klaus Lackner, an early DAC pioneer. Other speakers will include representatives from leading DAC organizations including Carbon Engineering, Climeworks, Oxy Low-Carbon Ventures, and Stripe. For more information and registration please see the [website](#).

NETL Carbon Management Project Review Meeting

The [draft agenda](#) is now available for NETL’s 2022 Carbon Management Project Review Meeting, to be held Aug. 15–19, 2022, at the Westin Pittsburgh Hotel, in Pittsburgh, Pennsylvania. Registration is [available online](#). Topics from NETL presenters include the following, among others: “Carbon Utilization Program Overview,” “DAC Test Center Overview,” “Overview of Carbon Utilization Life Cycle Analysis at NETL,” “Processible Porous Polymeric Fiber Adsorbents for Low-Concentrated Carbon Dioxide Capture,” “Integrating CO₂-Selective Polymer Layers and Electrocatalytic Conversion,” and “Updating NATCARB and Carbon Storage Geospatial Resource via EDX Cloud.”



Pittsburgh Coal Conference

The 2022 International Pittsburgh Coal Conference, to be held virtually Sept. 19–22, 2022, is an outgrowth of a series of conferences spanning more than three decades, dealing with coal utilization, both in the United States and internationally. The conference is dedicated to providing a unique opportunity for in-depth and focused exchange of technical information and policy issues among representatives from industry, government, and academia throughout the world.



**INTERNATIONAL PITTSBURGH
COAL CONFERENCE**
University of Pittsburgh · Swanson School of Engineering

CEM13/MI-7

The 13th CEM and the ministerial for MI—a collective effort by the public and private sector to rapidly create the net-zero economy that leaves no community behind—will be held Sept. 22–23, 2022, in Pittsburgh, Pennsylvania. CEM is a platform for members to help shape the global clean energy agenda and advance the deployment of specific clean energy technologies and solutions.



**GLOBAL
CLEAN ENERGY
ACTION FORUM**
CEM13/MI-7 USA 2022

U.S. and International Events (continued)

Carbon Capture Technology Conference and Expo

The Carbon Capture Technology Conference and Expo, to be held Oct. 19–20, 2022, in Messe Bremen, Germany, 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 non-governmental organizations, consultants, and government bodies to explore how to rapidly accelerate the deployment and commercialization of carbon-removal technologies as a key solution on the pathway to net-zero carbon emissions.

16th Greenhouse Gas Control Technologies Conference

The 16th Greenhouse Gas Control Technologies (GHGT) Conference, to be held Oct. 23–27, 2022, in Lyon, France, has established itself as the principal international conference on GHG mitigation technologies, especially carbon capture and storage (CCS). The GHGT conferences are held every two years in member countries, rotating between North America, Europe, and Asia. Each conference is a forum for technical discussions related to the field of GHGT. Bios for GHGT keynote speakers are now [available](#).

Business and Industry News

DOE Awards Funding to Advance CCS Study at U.S. Steel's Gary Works

DOE/NETL selected the University of Illinois Urbana-Champaign's Prairie Research Institute (PRI) for a funding award for R&D to support a FEED study on CO₂-removal technologies. The study will focus on the advancement of a DAC and utilization system, which can remove 5,000 metric tons of CO₂ per year from ambient air and then permanently mineralize it in concrete products. The study will launch at U.S. Steel's Gary Works in Gary, Indiana, using a DAC technology developed by CarbonCapture Inc. The technology will use the plant's waste heat, energy, and location.

Research Project Seeks to Capture CO₂ and Produce Hydrogen

DOE/NETL awarded the University of Kentucky (U of K) funding to develop a cost-effective system that will capture CO₂ and produce hydrogen at natural gas combined cycle (NGCC) power plants. For the project—"Dual-loop Solution-based CO₂ Capture System for Net Negative CO₂ Emissions with Lower Costs" (DE-FE0032134)—U of K researchers will design, retrofit, and research a dual solvent CO₂ capture system on the university's Center for Applied Energy Research's (CAER) existing 0.1 MW-thermal bench-scale facility using natural gas-derived flue gas.

Publications

2022 Emissions Control Project Portfolio

EMISSIONS CONTROL PROGRAM STAFF, NATIONAL ENERGY TECHNOLOGY LABORATORY, MAY 2022.

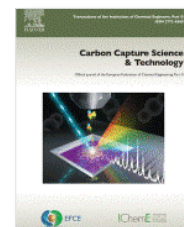


Direct Air Capture of CO₂ Using Solvents

RADU CUSTELCEAN, ANNUAL REVIEW OF CHEMICAL AND BIOMOLECULAR ENGINEERING, VOLUME 13, JUNE 1, 2022. (SUBSCRIPTION MAY BE REQUIRED.)

The interfacial compatibility between a potential CO₂ separation membrane and capture solvents

JUN GAO, YUCHEN ZHANG, JIYOUNG SON, JASON BARA, KATHRYN E. O'HARRA, MARK H. ENGELHARD, DAVID J. HELDEBRANT, ROGER J. ROUSSEAU, XIAO-YING YU, CARBON CAPTURE SCIENCE & TECHNOLOGY, VOLUME 2, FEB. 16, 2021. (SUBSCRIPTION MAY BE REQUIRED.)



Mitigated carrier saturation of facilitated transport membranes for decarbonizing dilute CO₂ sources: An experimental and techno-economic study

YANG HAN, W. S. WINSTON HO, JOURNAL OF MEMBRANE SCIENCE LETTERS, VOLUME 2, ISSUE 1, MAY 2022.

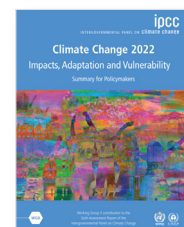


National Getting to Neutral Report - Preliminary Evaluation

J. PETT-RIDGE, SLESSAREV, B. SCHMIDT, G. PERIDAS, S. PANG, S. BAKER, NATIONAL NUCLEAR SECURITY ADMINISTRATION, MAR. 14, 2022.

IPCC Sixth Assessment Report

WORKING GROUP II, IPCC, FEBRUARY 2022.



About DOE Carbon Capture:

DOE/NETL is developing the next generation of advanced CO₂ 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
- CCSI²
- Systems Analysis
- Conference Proceedings
- Accomplishments Posters
- Fossil Energy Techlines

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