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

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

CTSN CARBON TRANSPORT and STORAGE NEWSLETTER

VOL. 23, NO. 5

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This newsletter was compiled by the National Energy Technology Laboratory to provide information on recent activities and publications related to carbon transport and storage. It covers domestic, international, and public and private sector news in the following areas:

DOE/FECM/NETL HIGHLIGHTS

NETL to Expand BIL-Funded Carbon Storage Validation and Testing Program.

The U.S. Department of Energy's (DOE) Office of Fossil Energy and Carbon Management (FECM) is implementing the Bipartisan Infrastructure Law (BIL) Section 40305 (Carbon Storage Validation and Testing) through its Carbon Storage Assurance Facility Enterprise (CarbonSAFE) Initiative. Previously, the ***Funding Opportunity Announcement (FOA) DE-FOA-00002711*** accepted applications for later phases only (Phases III, III.5, and IV). In advance of the second deadline for full applications, the National Energy Technology Laboratory (NETL) may modify the FOA to add a new Area of Interest (AOI) to accept applications for projects that meet the objectives of CarbonSAFE Phase II (Storage Complex Feasibility). If the FOA is amended, applicants will be able to apply to four AOIs: AOI 1: Phase III – Site Characterization and Permitting; AOI 2: Phase III.5 – National Environmental Policy Act (NEPA), Front-End Engineering Design (FEED) Studies, and Storage Field Development Plan; AOI 3: Phase IV – Construction; and AOI 4: Phase II – Storage Complex Feasibility.

From *NETL*. March 2023.

CONTINUE

DOE/FECM/NETL HIGHLIGHTS *(cont.)*

NETL, ORNL Collaborate to Accelerate Decarbonization.

NETL is teaming with Oak Ridge National Laboratory (ORNL) to explore a range of technology innovations for carbon capture and utilization and strategies for economic development and sustainable energy transitions in the Appalachian region. Representatives of NETL and UT-Battelle, operator of ORNL, signed an official Memorandum of Understanding (MOU) during a ceremony held at NETL's Morgantown, West Virginia, site in March 2023. Under the MOU, NETL and ORNL intend to jointly explore the development and demonstration of materials and technologies for carbon capture and utilization; develop best practices for carbon dioxide (CO_2) removal; conduct research, development, demonstration, and commercialization of sustainable technologies for production, extraction, separation, and use of critical minerals; create alternative uses for coal; develop technologies; and develop and implement strategies to enable economic development and sustainable energy transitions in the Appalachian region.

From *energy.gov*. March 2023.

DOE Using BIL Funding to Decarbonize the Economy.

Using BIL funds, DOE's FECM, NETL, and Office of Clean Energy Demonstrations (OCED) are helping to establish four new regional direct air capture (DAC) hubs throughout the United States to help achieve a net-zero greenhouse gas (GHG) economy by 2050 in a cost-effective, reliable, and efficient manner. DAC technology uses chemical reactions to remove CO_2 from the air independent of point sources. After being separated from ambient air and extracted in a pure, compressed form, the CO_2 is then delivered for storage or conversion to valuable products.

From *NETL*. March 2023.

ANNOUNCEMENTS

FECM's Role in Call to Action on Carbon Management.

President Biden ***invited countries*** to join the United States in participating in the Carbon Management Challenge, a global initiative to accelerate the deployment of carbon management technologies. For the U.S. government, DOE's FECM is investing more than $12 billion allocated by the BIL toward the research, development, and commercial demonstration of carbon capture, DAC, and carbon conversion technologies, as well as the buildout of carbon transport and storage infrastructure around the country. Governments participating in the Carbon Management Challenge will announce contributing measures and specific goals at the ***United Nations Conference of the Parties (COP 28) meeting*** later this year in Dubai, United Arab Emirates.

From *energy.gov*. April 2023.

Updated DOE Carbon Transport Website.

DOE's Carbon Transport website has been updated. The Carbon Transport program area is designed to identify technical gaps, prioritize research needs, and develop tools to facilitate and optimize a robust, national-scale CO_2 transport infrastructure. The near-term goal is to expand the nation's capability to transport 65 million metric tons of CO_2 per year. The long-term goal, aligned with a net-zero carbon emissions strategy by the midcentury, is to ensure the capability to transport 1 gigatonne of CO_2 per year.

DOE/FECM Releases FY 2023 TCF to Support Partnerships Between Industry and National Labs.

Technology Commercialization Fund | U.S. DEPARTMENT OF ENERGY | OFFICE OF Technology Transitions

DOE's FECM announced funding under its Fiscal Year (FY) 2023 ***Technology Commercialization Fund (TCF)*** Base Annual Appropriations National Laboratory Call for FECM Program-Led Topics. The solicitation offers an opportunity for private industry to partner with DOE's national labs to advance lab-developed intellectual property toward commercialization in technology areas covered by FECM's strategic vision.

From *energy.gov*. March 2023.

NETL Report on Offshore GOM CO_2 Storage Pilot Study.

An NETL report, "***Exploratory Analysis of Offshore CO_2 Storage Pilot Project in the Gulf of Mexico: Geologic, Infrastructure, and Cost Considerations***," evaluates several design, infrastructure, and cost considerations for conceptual pilot-scale CO_2 saline storage in offshore Gulf of Mexico (GOM). The study (N. Wijaya et al., NETL, Pittsburgh, December 9, 2022) includes site selection and geologic storage screening for offshore storage sites and aims to assess the cost magnitude associated with developing green or brownfield storage options. The analysis presents the evaluation under two scenarios: a focus on the GOM Outer Continental Shelf federal waters and another on Texas state waters. The analysis intends to offer insight into the convergence of design, cost, and site-selection considerations, which can be used to support the planning of future carbon capture and storage (CCS) development in the offshore GOM.

From *NETL*. December 2022.

ANNOUNCEMENTS *(cont.)*

CCUS and Canada's Energy Strategy.

A Canadian international corporate law firm released a video analyzing carbon capture, utilization, and storage (CCUS) as a key element in the country's industrial and governmental energy transition strategy. Part of a larger series of videos and webinars, Torys LLP's video takes a cross-jurisdictional look at the strategies being employed in Alberta and Ontario, highlighting the key regulatory hurdles of CCUS, how potential liabilities are being handled, and how governments are supporting adoption with subsidies and tax credits.

From *Lexology*. March 2023.

IEA CCUS Projects Explorer.

The International Energy Agency's (IEA) CCUS Projects Database tracks CO_2 capture, transport, storage, and utilization projects worldwide that have been commissioned since the 1970s. The ***data set*** includes projects with a clear emissions reduction scope and excludes CO_2 capture for utilization pathways that bring low climate benefits (e.g., food and beverages) or that are part of a conventional industrial process (e.g., internal use for urea production).

From *International Energy Agency*. March 2023.

Humber Industrial Cluster Plan Launched.

After detailed analysis, modeling, and interviews, the Humber Industrial Cluster Plan has been launched by a consortium of companies and organizations in the United Kingdom (UK). First proposed in 2019 to drive sustainable growth and reduce carbon emissions in the Humber region, the plan highlights several key decarbonization projects, some of which feature the development of CCS technology.

From *Carbon Capture Journal*. March 2023.

PROJECT AND BUSINESS DEVELOPMENTS

Norway Receives Five Applications for Carbon Storage Permits.

Five companies applied for carbon storage permits in the Norwegian Continental Shelf. The location of the storage sites is in the North Sea's Trudvang area and will be the final destination of CO_2 released by large European and UK industry companies. To date, Norway has awarded licenses for four storage locations; it will review this set of applications (from Equinor, Neptune Energy Norge, Storegga Norge, Sval Energi, and Wintershall Dea Norge) with the goal of providing a verdict by July 2023.

From *Carbon Herald*. March 2023.

Denmark Inaugurates Cross-Border CO_2 Storage Site.

Project Greensand achieved cross-border CCS by shipping CO_2 from Belgium and injecting it into a depleted oil field under the Danish North Sea. The project aims to store up to 8 million metric tons of CO_2 every year by 2030 (the equivalent of 40% of Denmark's emissions reduction target and more than 10% of the country's annual emissions).

From *Euractiv*. March 2023.

MOU to Explore CCS Projects in US and Australia.

Chevron and Japanese power generation company JERA Co., Inc. signed an MOU that provides a framework for their collaboration on CCS projects located in the United States and Australia. The MOU has the potential to expand the companies' current liquified natural gas relationship and further their collaboration in the lower carbon space.

From *Chevron Newsroom*. March 2023.

CCS Project Expands CO_2 Storage Footprint.

A CCS project located along the Texas Gulf Coast expanded its CO_2 storage footprint by acquiring nearly 100,000 acres onshore in Chambers and Jefferson Counties, Texas. The Bayou Bend CCS project—a joint venture between Chevron and Talos Energy—now encompasses nearly 140,000 acres of pore space for CO_2 storage. Bayou Bend CCS was the ***winning bidder*** in August 2021 for the Texas General Land Office's Jefferson County, Texas, carbon storage lease, located in state waters offshore Beaumont and Port Arthur, Texas.

From *Offshore Energy*. March 2023.

Feasibility Study to Begin in Stockholm.

Ports of Stockholm will begin a feasibility study to establish a node for CO_2 at Stockholm Norvik Port, the goal of which is to increase the possibilities for emission reduction and negative emissions by establishing a regional, sustainable, and cost-efficient CO_2 infrastructure in eastern Sweden. The feasibility study will provide support for future decision-making by Ports of Stockholm and other stakeholders about the possibilities to further the planning for a regional CO_2 hub at Stockholm Norvik.

From *Carbon Capture Journal*. March 2023.

LEGISLATION AND POLICY

CCS Legislation Advances in Illinois.

Legislation that would create a clearer regulatory framework to establish CCS in Illinois was passed out of a House committee. House Bill 2202 reflects on a recent study by the University of Illinois Urbana-Champaign's Prairie Research Center that noted deploying CCUS at a larger scale in Illinois to combat climate change and decarbonize the global economy will require "robust governance." The bill also further develops drilling regulations, injection permit procedures, and application processes with the Illinois Department of Natural Resources.

From *The Telegraph*. March 2023.

PA Looks to Regulate CO_2 Injection Wells.

The Pennsylvania Department of Environmental Protection (DEP) gave notice to the U.S. Environmental Protection Agency (EPA) that the state plans to apply for primacy as it looks to regulate CO_2 injection wells within its boundaries. If the application process succeeds, it would put Pennsylvania's DEP in charge of permitting and overseeing the geologic CO_2 storage industry.

From *The Bradford Era*. March 2023.

EU Lawmakers Approve Climate Legislation.

The European Parliament gave final approval to ***updated national targets*** to reduce CO_2 emissions and to ***expand carbon sinks*** in natural ecosystems. The two laws are part of a package of climate change legislation passing through the European Union's (EU) policymaking process, designed to help the 27-country bloc reduce its GHG emissions by 55% by 2030 (from 1990 levels).

From *Reuters*. March 2023.

UK Provides Springboard to CCUS Industry.

The UK government confirmed Spring Budget 2023 funding for the UK's CCUS program, kick-starting early investment in the industry. According to the ***Carbon Capture and Storage Association (CCSA)***—the trade body for the CCUS industry in Europe—the budget will unlock "private investment and job creation across the UK…".

From *CCSA*. March 2023.

Indonesia Passes New Legislation to Boost CCS in Oil and Gas Sector.

The government of Indonesia announced new legislation that aims to boost the use of CCS in the oil and gas sector. The guidance will help encourage fossil fuel companies to equip their operations with CCUS facilities to curb emissions. Under the regulation, companies in the oil and gas sector will be incentivized to install the technology through carbon credits. Indonesia has set a target of achieving ***net-zero emissions by 2060***.

From *Carbon Herald*. March 2023.

EMISSIONS TRADING

RGGI CO_2 Auction Results Announced.

The states participating in the Regional Greenhouse Gas Initiative (RGGI) announced the results of their 59th auction of CO_2 allowances. A total of 21,522,877 CO_2 allowances were sold at a clearing price of $12.50 (bids ranged from $2.50 to $17.57 per allowance). None of the 11.25 million cost containment reserve (CCR) allowances made available were sold (the CCR is a fixed additional supply of allowances that are made available for sale if an auction's interim clearing price exceeds $14.88). None of the 10.62 million emissions containment reserve (ECR) allowances made available were withheld (the ECR is a designated quantity of allowances to be withheld if an auction's interim clearing price is below $6.87). The auction generated $269 million for states to reinvest in strategic programs, including energy efficiency, renewable energy, direct bill assistance, and GHG abatement programs. Additional details are available in the ***Market Monitor Report for Auction 59***.

From *RGGI News Release*. March 2023.

RGGI Program Review: Public Meeting.

The RGGI-participating states conducted their third program review meeting on March 29, 2023, to review the successes, impacts, and design elements of their CO_2 budget trading programs. ***During the public meeting***, the RGGI member states provided an update on program review considerations to date and sought feedback on assumptions and a proposed framework for conducting electricity sector analyses.

From *RGGI News Release*. March 2023.

SCIENCE

Underwater Waves May Affect Ocean's Ability to Store CO_2.

According to new research, waves deep below the ocean's surface may affect how the ocean stores heat and CO_2. A team of researchers, led by the University of Cambridge, the University of Oxford, and the University of California – San Diego, quantified the effect of these waves and other forms of underwater turbulence in the Atlantic Ocean, finding that their importance is not being accurately reflected in climate models. The results, published in the journal ***AGU Advances*** (Laura Cimoli et al., Significance of Diapycnal Mixing Within the Atlantic Meridional Overturning Circulation, AGU Advances [2023]), show that turbulence in the interior of oceans is more important for the transport of carbon and heat than previously imagined.

From *Pyhs.Org*. March 2023.

Global Ecosystem at Risk of Losing Carbon Storage Ability: Study.

A recent study found that several regions of the world are at risk of losing their ability to store carbon. Published in the journal ***Nature***, the study (Fernández-Martínez, M., Peñuelas, J., Chevallier, F. et al. Diagnosing destabilization risk in global land carbon sinks. Nature [2023]) reviewed the productivity of carbon storage of global ecosystems between 1981 and 2018, finding that many fluctuated greatly from year to year; so much so, that some parts of the world are at risk of turning into scrubland that is unable to host forests and other ecosystems that act as carbon sinks.

From *Mongabay*. March 2023.

About DOE'S CARBON TRANSPORT and STORAGE PROGRAM

The **Carbon Transport and Storage Program** at the National Energy Technology Laboratory (NETL) is focused on developing and advancing technologies to enable safe, cost-effective, permanent geologic storage of CO_2, both onshore and offshore, in different geologic settings. The technologies being developed will benefit both industrial and power sector facilities that will need to mitigate future CO_2 emissions. The program also serves to increase the understanding of the effectiveness of advanced technologies in different geologic reservoirs appropriate for CO_2 storage—including saline formations, oil reservoirs, natural gas reservoirs, unmineable coal seams, basalt formations, and organic-rich shale formations—and to improve the understanding of how CO_2 behaves in the subsurface. These objectives are necessary to increasing public confidence in safe, effective, and permanent geologic CO_2 storage.

The ***Carbon Transport and Storage Program Overview*** webpage provides detailed information of the program's structure, as well as links to the webpages that summarize the program's key elements.

Carbon Transport and Storage Program Resources

Newsletters, program fact sheets, best practices manuals, roadmaps, educational resources, presentations, and more information related to the Carbon Transport and Storage Program is available on ***DOE's Energy Data eXchange (EDX) website***.

Get Social with Us

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

Disclaimer

About NETL'S CARBON TRANSPORT and STORAGE NEWSLETTER

Compiled by the National Energy Technology Laboratory, this newsletter is a monthly summary of public and private sector carbon transport and storage news from around the world. The article titles are links to the full text for those who would like to read more (note that all links were active at the time of publication).

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