CSN CARBON STORAGE NEWSLETTER

DECEMBER 2016

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

CARBON STORAGE PROGRAM DOCUMENTS and REFERENCE MATERIALS

NATIONAL ENERGY TECHNOLOGY LABORATORY

DOE/NETL HIGHLIGHTS

Energy Department Announces More Than $44 Million for CO_2 Storage Projects.

The U.S. Department of Energy's (DOE) Office of Fossil Energy (FE) announced the selection of 16 carbon storage projects to receive funding for cost-shared research and development (R&D) as part of DOE's Carbon Storage Assurance Facility Enterprise (CarbonSAFE) initiative, which seeks to help mitigate carbon dioxide (CO_2) emissions from the burning of fossil fuels. The selected projects will address key research gaps in the deployment of carbon capture and storage (CCS) technologies, as well as look to develop integrated CCS complexes that are constructed and permitted for operation in the 2025 timeframe over a series of sequential phases of development: Integrated CCS Pre-Feasibility, Storage Complex Feasibility, Site Characterization, Permitting, and Construction. The 16 selected projects, which apply to the first two of those phases, will build on lessons learned from the *Regional Carbon Sequestration Partnerships' (RCSPs)* large-scale field projects. From *energy.gov* on November 30, 2016.

ANNOUNCEMENTS

DOE, Natural Resources Canada Announce Pilot Plant.

DOE and Canada's Natural Resources Canada (NRCan) will open a new facility to test oxy-fired pressurized fluidized bed combustion (oxy-PFBC) to capture CO_2 emissions from a coal-fired power plant. The *1-megawatt thermal (MWth) facility*, located in Canoga Park, California, USA, will test oxy-PFBC as a means to more efficiently and economically capture CO_2 and help advance the commercialization of carbon capture, utilization, and storage (CCUS).

2016 Carbon Storage Newsletter Annual Index Available.

This document is a compilation of the National Energy Technology Laboratory's (NETL) Carbon Storage Newsletters published over the September 2015 to September 2016 timeframe. Outdated information (e.g., conference dates and paper submittals) has been removed.

ANNOUNCEMENTS *(cont.)*

ADM Carbon Storage Plan Under EPA Review.

The U.S. Environmental Protection Agency (EPA) accepted comments to modify a permit for an Archers Daniels Midland (ADM) injection well to store CO_2 underground. The existing permit is for a well that ADM plans to use for the injection and storage of CO_2 from its ethanol plant in Decatur, Illinois, USA, as part of the five-year Industrial Carbon Capture and Storage (ICCS) Project. The *proposed modifications* would update the permit with new information obtained during well construction and pre-injection testing.

CCS Study Aims to Boost Industry.

A new study will explore CCS and the refinement and development of a financing option for the industrial CCS network in Teesside, England, known as the Teesside Collective. The study will also recommend a regulatory regime to manage the system, known as the Hybrid Incentive Model.

CO_2 Capture Project Releases CO_2 Storage Report.

The CO_2 Capture Project (CCP) published a report looking at international best practices for transitioning from CO_2-enhanced oil recovery (EOR) to CO_2 storage sites. The report studied the legal frameworks for CCS and CO_2-EOR sites within the United States, Canada, Europe, Australia, and Brazil.

RGGI Releases Report.

The states participating in the Regional Greenhouse Gas Initiative (RGGI) released the "Report on the Secondary Market for RGGI CO_2 Allowances: Third Quarter 2016." The report, prepared by independent market monitor Potomac Economics, provides a summary of activity in the secondary market in the third quarter of 2016 and discusses the results.

Research Report Explores Global CO_2 Market.

This report examines the sales of CO_2 in the global market, providing a basic overview of the current state of the CO_2 industry. The report, titled *"2016 Market Research Report on Global Carbon Dioxide Market,"* also discusses development policies and plans, manufacturing processes, and cost structures.

PROJECT and BUSINESS DEVELOPMENTS

Washington Carbon Capture Project Says it has Permanently Stored CO_2.

The Wallula Basalt Pilot Project in Washington state completed the injection of nearly 1,000 tons of CO_2 into the Grande Ronde basalt formation. According to *post-injection findings*, the injected CO_2 remains within the targeted formation and at a depth in the range of 2,720 to 2,786 feet. As part of the project, the CO_2 was injected into underground lava flows where it solidified into a mineral called ankerite. The project is being conducted by the *Big Sky Carbon Sequestration Partnership*, one of *DOE's RCSPs*. From *Utility Dive* on November 22, 2016.

Results Released from CO_2 Monitoring Project.

New data has been released from three subsurface release experiments at the Ginninderra Controlled Release Facility in Canberra, Australia. The datasets, released by Geoscience Australia and CO2CRC Limited, will inform monitoring strategies. The research enabled scientists to simulate the release of atmospheric CO_2 under controlled experiment conditions and assess the performance of different monitoring technologies. The results of the controlled release experiment – which involved releasing a known amount of CO_2 into soil and monitoring how it moves into the atmosphere – found horizontal movement in the near surface. More than 20 monitoring techniques were trialed. The datasets are available for download via *Geoscience Australia's website*. From *Geoscience Australia News Release* on November 16, 2016.

LEGISLATION and POLICY

EU Aims to Reduce CO_2 Emissions by 2030.

The European Union (EU) announced its commitment to reduce CO_2 emissions by at least 40 percent by 2020, and presented a package of legislative proposals to accelerate clean energy innovation and provide measures to encourage public and private investment. The proposals, titled "Clean Energy for All Europeans," cover energy efficiency, renewable energy, electricity market design, electricity supply security, and governance rules for the EU. From *Global Times* on December 1, 2016.

Saskatchewan, Ottawa Strike Accord on Coal-Fired Power Generation.

The government of Saskatchewan reached a deal on reducing greenhouse gas (GHG) emissions in Saskatchewan's coal-fired power sector. According to the Saskatchewan Environment Minister, Saskatchewan could keep coal-fired power plants operating past 2030 if the province makes GHG reductions elsewhere in the electricity sector. The agreement follows a federal plan released in November 2016 that called for the phase-out of coal-fired electricity as part of Canada's commitment to reduce GHG emissions by 30 percent from 2005 levels by 2030. From *The Globe and Mail* on November 28, 2016.

Legislator Proposes Carbon Tax Bill for 2017 General Session.

A Utah State Representative will propose a carbon tax during the 2017 legislative session. The bill would be revenue neutral and funding from the proposed tax could be used for education or infrastructure initiatives, according to the press release. From *UtahPolicy.com* on December 1, 2016.

Japan's CO_2 Emissions Drop to Five-Year Low in FY 2015.

According to data released by the Japanese Ministry of Environment, Japan's GHG emissions were reduced three percent to 1.321 billion metric tons of CO_2 equivalent in FY 2015, a five-year low. Japan set a goal to reduce its GHG emissions by 26 percent from 2013 levels by 2030. From *Japan Today* on December 7, 2016.

EMISSIONS TRADING

Results of 34th RGGI Auction Released.

The RGGI-participating states announced the results of their 34th auction, the fourth and final of 2016, in which 14,791,315 CO_2 allowances were sold at the auction clearing price of $3.55. Bids for the CO_2 allowances ranged from $2.10 to $13.75 per allowance, and the auction generated $52.5 million for reinvestment in strategic programs, such as energy efficiency, renewable energy, and GHG abatement. To date, total proceeds from all RGGI CO_2 allowance auctions exceed $2.6 billion. In addition, none of the 10 million cost containment reserve (CCR) allowances available were sold; the CCR is a fixed additional supply of allowances offered only if CO_2 allowance prices exceed certain levels ($8.00 in 2016; $10.00 in 2017). Additional details are available in the *"Market Monitor Report for Auction 34."* From *RGGI Press Release* on December 9, 2016.

Meadow Restoration Studied for Potential to Build Carbon Credits in California.

Scientists from the Soil Science Laboratory at the University of Nevada, Reno, are studying the Sierra Nevada mountain meadows with a goal of developing a model that can predict the amount of CO_2 stored in a meadow. The data gathered has the potential to be used by the California Air Resources Board (CARB) to sell carbon credits through California's cap-and-trade program, which sets to reduce the state's GHG emissions to 1990 levels by 2020. If the research shows meadow restoration has the potential to store CO_2, the cap-and-trade program could permit landowners who restore a meadow area to sell carbon credits, thus offsetting the costs of restoration. From *University of Nevada, Reno*, on December 8, 2016.

CLIMATE and SCIENCE NEWS

Research Published on Soil's Potential Impact on Atmospheric CO_2.

According to a study conducted by researchers from Kansas State University and the Konza Prairie Biological Station, soils may have the potential to release large amounts of CO_2 in response to potential higher temperatures. Using data from 49 sites in different ecosystems around the world, the researchers claim that Arctic soils containing large amounts of soil carbon are the most sensitive to potential higher temperatures and will release the most CO_2 into the atmosphere. Published in the online journal Nature, the study, titled *"Quantifying global soil carbon losses in response to warming,"* also found that CO_2 stored in temperate grassland soils, such as Konza Prairie, is less sensitive to comparable temperatures. From *EurekAlert!* on December 7, 2016.

NASA Announces First Geostationary Vegetation, Atmospheric Carbon Mission.

The National Aeronautics and Space Administration (NASA) will measure GHGs from space to advance understanding of Earth's natural exchanges of carbon between the land, atmosphere, and ocean. Among the primary goals of the Geostationary Carbon Cycle Observatory (GeoCARB) is to probe the natural sources, sinks, and exchange processes that control GHGs, such as CO_2, in the atmosphere. GeoCARB will measure the daily total concentration of CO_2, among other GHGs, in the atmosphere over the Americas from an orbit of approximately 22,000 miles above the equator. From *NASA Press Release* on December 6, 2016.

Study Shows Grassland Environmental Contributions.

Researchers at the University of Alberta and Alberta Environment and Parks studied the effects of land use and grazing on soil carbon levels, finding that grasslands have the capability of storing large amounts of CO_2. The study, conducted at the Rangeland Research Institute at the University of Alberta, Canada, involved 144 grassland enclosures (both grazed and ungrazed sites) and ran from 2013 through 2016. The effects of livestock grazing on the carbon nutrient cycling in the grasslands of central and southern Alberta were measured, and the study found that grazing could provide the opportunity to enhance and maintain soil carbon pools. From *Manitoba Co-operator* on December 7, 2016.

JOURNAL ARTICLES

Optimization of a recompression supercritical carbon dioxide cycle for an innovative central receiver solar power plant.

The following is the Abstract of this article: "Peculiar thermodynamic properties of CO_2 when it is held at or above its critical condition (stated as supercritical CO_2 or sCO_2) have attracted the attention of many researchers. Its excellent thermophysical properties at medium-to-moderate temperature range have made it to be considered as the alternative working fluid for next power plant generation. Among those applications, future nuclear reactors, solar concentrated thermal energy or waste energy recovery have been shown as the most promising ones. In this paper, a recompression sCO_2 cycle for a solar central particles receiver application has been optimized, observing net cycle efficiency close to 50 [percent]. However, small changes on cycle parameters such as working temperatures, recuperators efficiencies or mass flow distribution between low and high temperature recuperators were found to drastically modify system overall efficiency. In order to mitigate these uncertainties, an optimization analysis based on recuperators effectiveness definition was performed observing that cycle efficiency could lie among 40 [percent]–50 [percent] for medium-to-moderate temperature range of the studied application (630°C–680°C). Due to the lack of maturity of current sCO_2 technologies and no power production scale demonstrators, cycle boundary conditions based on the solar application and a detailed literature review were chosen." **M.A. Reyes-Belmonte, A. Sebastián, M. Romero, and J. González-Aguilar**, *Energy*. (Subscription may be required.)

The Evolution and Control of Fluid Phase During Liquid CO_2 Fracturing.

The following is the Abstract of this article: "Liquid CO_2 fracturing is a novel stimulation technology, which helps realize multiple objectives such as conservation of water, [storage] of [GHGs] and enhancement of single-well productivity and ultimate recovery. During operations, CO_2 flows through storage tank, booster pump, blender, fracturing pump, and eventually into wellbore and production zone, generating a changing temperature and pressure distribution. CO_2's phase state, density and viscosity properties change consequently, which influence significantly the reliability and stimulation effect. In a liquid CO_2 fracturing field test for tight oil, temperature and pressure sensors are positioned at 12 critical nodes (including booster pump, blender, fracturing pump, wellhead and bottom hole) to monitor CO_2 fluid. To ensure the reliability, CO_2 is required to maintain in liquid state both on the surface and subsurface. Inlet, inside and outlet pressure of the blender should be concerned, because the blender utilizes non-mechanical pump, which requires sufficient motive flow to draw proppants into the main pipe, while the pressure difference directly impacts the flow rate of motive flow. The field test is successfully implemented with satisfactory result, 21 m^3 proppants are added into the formation. The main conclusions are as follow. (1) In low-pressure fluid feeding stage, partial CO_2 is gasified, which influences the stability of fluid feeding; In future a buffer vessel will be placed between storage tanks and booster pumps, which will provide adjustment for phase control; And a heat exchanger may help by further reduce the temperature of CO_2.(2) Pressure difference among inlet, inside and outlet pressure of blender fluctuates during the whole process, with the probable reason of two additional static mixers, which create system pressure drop. (3) The temperature of CO_2 is very low in low-pressure stage, and the pipes are frosted; When pumping pressure reaches 38MPa, the temperature gradually exceeds 0°C, and the pipes are defrosted. Phase evolution during liquid CO_2 fracturing has been identified, and phase control method has been determined. This helps improve the stability of fluid feeding and sand adding, and enhances the success ratio and stimulation result of fracturing." **Siwei Meng, He Liu, Jianguo Xu, Yongwei Duan, Qinghai Yang, and Zixiu Yao**, *Society of Petroleum Engineers*. (Subscription may be required.)

JOURNAL ARTICLES *(cont.)*

Features of CO_2 fracturing deduced from acoustic emission and microscopy in laboratory experiments.

The following is the Abstract of this article: "[The authors] conducted hydraulic fracturing (HF) experiments on 170 mm cubic granite specimens with a 20 mm diameter central hole to investigate how fluid viscosity affects HF process and crack properties. In experiments using supercritical carbon dioxide [($scCO_2$)], liquid carbon dioxide (L-CO_2), water, and viscous oil with viscosity of 0.051–336.6 mPa · s, [the authors] compared the results for breakdown pressure, the distribution and fracturing mechanism of acoustic emission, and the microstructure of induced cracks revealed by using an acrylic resin containing a fluorescent compound. Fracturing with low-viscosity fluid induced three-dimensionally sinuous cracks with many secondary branches, which seem to be desirable pathways for enhanced geothermal system, shale gas recovery, and other processes." **Tsuyoshi Ishida, Youqing Chen, Ziad Bennour, Hiroto Yamashita, Shuhei Inui, Yuya Nagaya, Makoto Naoi, Qu Chen, Yoshiki Nakayama, and Yu Nagano**, *Journal of Geophysical Research*. (Subscription may be required.)

The syringe sampler: An inexpensive alternative borehole sampling technique for CO_2-rich fluids during mineral carbon storage.

The following is the Abstract of this article: "Mineral carbon storage involves the dissolution of injected gaseous or supercritical CO_2 followed by interaction of the carbonated solution with the host rock at depth resulting in the precipitation of carbonate minerals. Monitoring of elemental chemistry and tracers is required to evaluate the evolution of the fluid geochemistry and the degree of CO_2 mineralization during its injection into the subsurface. To avoid degassing during sampling, which is a common feature of commercial groundwater samplers, especially vacuum samplers, a syringe-like sampler was designed, constructed, and tested in the lab and field. This system was successfully deployed during the injection of 175 tons of pure gaseous CO_2 at the CarbFix injection site in Hellisheidi, SW Iceland. This study presents in detail this sampling tool and its application to the monitoring of the CO_2-rich fluid evolution during subsurface carbonation. The syringe sampler was developed as a flexible and mobile unit of low investment and operating costs making it an attractive option for deployment at small scale carbon storage demonstration sites that do not command the budgets to deploy commercial alternatives, e.g. from the oil and gas industry." **Helgi A. Alfredsson, Kiflom G. Mesfin, and Domenik Wolff-Boenisch**, *Greenhouse Gases: Science and Technology*. (Subscription may be required.)

Analysis of state and federal regulatory regimes potentially governing the extraction of water from carbon storage reservoirs in the United States.

The following is the Abstract of this article: "Extracted water—water brought to the surface of the ground during CCS projects to create additional room for [CO_2] injection—exists in a murky legal environment. As part of a broader attempt to identify the complex interactions between water resource policies and CCS, an analysis was undertaken at both the state and the federal level to scope the policy environments surrounding extracted water policies and laws. Six states (California, Illinois, Mississippi, Montana, North Dakota, and Texas) were chosen for this analysis because either active CCS work is currently underway, or the potential exists for future work. Although regulation of extracted waters could potentially occur at many points along the CCS life cycle, this paper focuses on regulation that may apply when the water is withdrawn—that is, accessed and removed from the saline [formation]—and when it is re-injected in a close but unconnected [formation]. It was found that no regulations exist for this source specifically. In addition, greater input is needed from regulators and policy makers in terms of defining this resource. In particular, regulation of extracted waters (and CCS activities broadly) often overlaps with the management of fluids produced during oil and gas development. Many regulations would apply to extracted waters if they were classified as such. Therefore, correct categorization is key as the industry in this space continues to grow." **Jenna N. Schroeder, Christopher B. Harto, and Corrie E. Clark**, *International Journal of Greenhouse Gas Control*. (Subscription may be required.)

Quantifying the potential impacts of China's power-sector policies on coal input and CO_2 emissions through 2050: A bottom-up perspective.

The following is the Abstract of this article: "This study evaluates four recent policies for China's power sector—mandatory renewable targets, green dispatch, [CCS] development, and coal-fired generation efficiency improvements—and quantifies their energy and CO_2 emissions reduction potential through 2050 using bottom-up energy modeling and scenario analysis. [The authors] find renewable targets and green dispatch have crucial interlinked impacts on energy and CO_2 emissions that could change the shape and peak year of China's power-sector emissions outlook. Without either renewable targets or green dispatch, coal will likely continue dominating China's power mix and could delay the power-sector CO_2 emissions peak to the late 2030s." **Nina Zheng Khanna, Nan Zhou, David Fridley, and Jing Ke**, *Utilities Policy*. (Subscription may be required.)

Effectiveness of greenhouse-gas Emission Trading Schemes implementation: a review on legislations.

The following is the Abstract of this article: "Due to the severe problems caused by global warming, controlling [GHG] emissions has become an emerging topic around the world. This situation has led to the implementation of legislations, forcing companies to implement innovations and strategies to prevent and reduce carbon emissions. Nevertheless, the effectiveness of implementing these strategies and the estimation to fulfill Kyoto Protocol's 2020 target Emission Trading Schemes needs to be further [analyzed] and discussed. This paper reviews the existing [GHG]-emission legislations, as well as carbon offset programs worldwide. A detailed analysis on carbon emissions trends related to emissions penalties is shown for six major countries. The optimal penalty for emissions trading schemes is also analyzed and discussed in this paper. Future changes that could be made to the existing programs for enhancing their effectiveness are also suggested. It was found that carbon emissions decreased around 1.58 [percent] per year since Emission Trading Schemes implementation. Around 23.43 [percent] of CO_2 reduction can be reached after 10 years of Emission Trading Schemes implementation, compared to the trend when Emission Trading Schemes was not implemented. Despite Emission Trading Schemes implementation is extremely recent, based on the existing data a first estimation of the optimal penalty in achieving the maximum carbon reduction it was found around US$90.22 per [metric ton]. However, as the implementation period of Emission Trading Schemes is still limited for most countries, it is necessary to explore similar analysis as future work." **Paola Villoria-Sáez, Vivian W.Y. Tam, Mercedes del Río Merino, Carmen Viñas Arrebola, and Xiangyu Wang**, *Journal of Cleaner Production*. (Subscription may be required.)

REPORTS and OTHER PUBLICATIONS

United States Mid-Century Strategy for Deep Carbonization.

The following is from the Executive Summary of this document, released by The White House: "Human activities, particularly CO_2 emissions from fossil fuel combustion, have driven atmospheric GHG concentration levels higher than at any time in at least 800,000 years. As a result, the Earth has warmed at an alarming rate over the past century, with average temperatures increasing by more than 0.8°C (1.5°F). The consequences are already severe. Heat waves and droughts are more common, wildfire seasons are longer and fires larger and more costly, and extreme weather is becoming more intense and unpredictable. Left unchecked, from 2000 to 2100, global average temperature increases of 2 to 5°C (3.6 to 9°F) and sea level rise of two to four feet are likely, and much larger increases are possible. Climate change will reduce long-run economic growth and jeopardize national security. With the adoption of the Paris Agreement in December 2015, the world took a decisive step toward avoiding the most dangerous impacts of climate change. The Paris Agreement aims to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels. Consistent with this objective, Parties aim to balance GHG emissions sources and sinks in the second half of this century or, in effect, achieve net-zero global GHG emissions. Countries have submitted near-term targets to address GHG emissions, called 'nationally determined contributions' or NDCs, and will review and extend these targets every five years. The Paris Agreement further invited countries to develop by 2020 'mid-century, long-term low greenhouse gas emission development strategies.' This document answers that call, laying out a strategy to deeply decarbonize the U.S. economy by 2050."

The Global Status of CCS 2016: Summary Report.

The following is from this Global CCS Institute document: "The Paris Agreement, which focuses on climate mitigation actions after 2020, represents a clear and indisputable commitment from the world's political leaders to transition to a low-carbon economy. It provides a benchmark by which to gauge society's collective efforts and progress. If the ambitions of the Paris Agreement are to be achieved, CCS must enter into the mainstream of climate mitigation actions to be undertaken by governments and by business. The approach adopted for the post-2020 climate agreement is fundamentally different to that of the pre-2020 agreement under the Kyoto Protocol. A more 'bottom-up' approach, allowing for greater national level determination of future climate actions, was developed and agreed by the Parties at COP 21 in Paris in December 2015. This new approach is expected to secure a greater level of climate action than previous arrangements. It took just ten months for the Paris Agreement to legally commence or 'enter into force'. In contrast, its sister agreement, the Kyoto Protocol, took eight years to reach that milestone. The Paris Agreement provides cause for optimism that the future investment environment required to accelerate the widespread deployment of CCS will eventuate – but much needs to be done in the next five years."

The Evidence for Deploying Bioenergy with CCS (BECCS) in the [United Kingdom (UK)].

The following is from the Executive Summary of this Energy Technologies Institute (ETI) document: "Bioenergy with CCS (BECCS) is a credible, scalable and efficient technology, and is critical to deploy in order for the UK to meet its 2050 GHG emission reduction targets cost-effectively. Major advances in the fundamental science and technology development have been made by the ETI and others over the last ten years – significantly de-risking this value chain, and evidencing that there are no 'showstopping' technical barriers to BECCS. Specifically, advances have been made in understanding: [1] The costs, efficiencies and challenges of biomass-fed combustion systems with carbon capture. [2] The evidence that numerous bioenergy value chains can deliver significant carbon savings, and sizeable negative emissions when including BECCS, based on certain feedstocks. [3] The potential availability and sustainability of feedstocks relevant to the UK. [4] The identification and assessment of high capacity, low cost, low-risk stores for CO_2 around the UK and the infrastructure required to connect to them."

Putting the Puzzle Together: State & Federal Policy Drivers for Growing America's Carbon Capture & CO_2-EOR Industry.

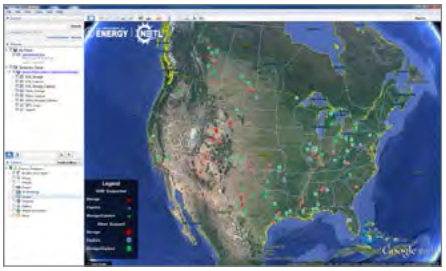
The following is a summary of this document: "This report offers readers both an in-depth look at [CO_2-EOR], while explaining the current policy landscape and recommendations for future action. The report first provides background information on the formation of the Work Group and the process utilized to develop this report. The next section of the report provides the rationale for the capture of [CO_2] from power plants and industrial facilities and its use and storage through [EOR] as a key component of a U.S. and global energy strategy with the potential to provide economic, environmental, and national security benefits. The subsequent sections take a detailed look at the current policy landscape and several core state and federal policy options. The report concludes with a glossary and detailed appendices that provide state-level information on existing laws and policies related to CO_2-EOR."

ABOUT DOE'S CARBON STORAGE PROGRAM

The **Carbon Storage Program** advances the development and validation of technologies that enable safe, cost-effective, permanent geologic storage of CO_2. The Carbon Storage Program also supports the development of best practices for CCS that will benefit projects implementing CCS at a commercial scale, such as those being performed under NETL's Clean Coal Power Initiative and Industrial Carbon Capture and Storage Programs. The technologies being developed and the small- and large-scale injection projects conducted through this program will be used to benefit the existing and future fleet of fossil fuel power-generating facilities by developing tools to increase our understanding of the behavior of CO_2 in the subsurface and identifying the geologic reservoirs appropriate for CO_2 storage.

The *Carbon 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 Storage Program Resources



The *National Energy Technology Laboratory's CCS Database* includes active, proposed, and terminated CCS projects worldwide. The information is taken from publically available sources to provide convenient access to information regarding efforts by various industries, public groups, and governments towards development and eventual deployment of CCS technology. NETL's CCS Database is available as a Microsoft Excel spreadsheet and also as a customizable layer in Google Earth.

Newsletters, program fact sheets, best practices manuals, roadmaps, educational resources, presentations, and more are available via the *Carbon Storage Program Publications webpage*.

Get answers to your carbon capture and storage questions at NETL's *Frequently Asked Questions webpage*.

ABOUT NETL'S CARBON STORAGE NEWSLETTER

Compiled by the National Energy Technology Laboratory, this newsletter is a monthly summary of public and private sector carbon storage news from around the world. The article titles are links to the full text for those who would like to read more.

National Energy Technology Laboratory

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