



ACCOMPLISHMENTS

Q1 FY23



U.S. DEPARTMENT OF
ENERGY

NETL ACCOMPLISHMENTS

Quarter 1 – Fiscal Year 2023

[Backpack-Size Laser System to Find Rare Earth Elements May Breathe New Life into Coal Communities](#)

As demand for rare earth elements (REEs) and critical minerals (CMs) increases, research completed with NETL support and oversight has advanced the development of a lightweight tool that can be carried into the field to measure concentrations of these valuable materials in coal wastes and byproducts. This new technology, which is housed in a backpack and integrated with a handheld sensor, was developed by researchers at Los Alamos National Laboratory. A recently completed prototype, the culmination of a multiyear, \$1 million project funded and administered by NETL, provides an easy-to-use method to determine concentrations of REEs and CMs in coal wastes and byproducts.



[NETL Team Helped Bring Energy-Efficient Transportation Lessons to National Clean Cities Training Workshop](#)

An award-winning NETL team that assists and guides a nationwide network of Clean Cities Coalitions played key roles in the National Clean Cities Training Workshop in Denver, Colorado, that attracted more than 180 participants from around the nation who fine-tuned their expertise in new, alternative, and energy-efficient transportation fuels and technologies. The Clean Cities network of coalitions assist DOE's Office of Energy Efficiency and Renewable Energy, Vehicle Technologies Office to improve the nation's economic, environmental, and energy security by working locally to advance affordable, domestic transportation fuels, energy efficient mobility systems, and other fuel-saving technologies and practices. The seven-member NETL project manager team joined forces with three additional DOE National Laboratories and DOE program staff to execute the three-day training workshop that fostered teambuilding and motivation in addition to presenting critical alternative fuel transportation information.

[Senior NETL Researcher Preps Tomorrow's Engineers, Scientists to Make Impact](#)

NETL's Thomas Sarkus demonstrated the importance of giving back to ensure the next generation of engineers and scientists is prepared to advance crucial energy technologies when he addressed students at Southern Illinois University Carbondale. At a seminar held at the university's College of Engineering, Computing, Technology & Mathematics, Sarkus summarized lessons learned from technology demonstration projects, as well as future directions in fossil energy and carbon management technologies, including those that have been funded by the Biden Administration's Bipartisan Infrastructure Law.

[Publication Detailed "Inner Workings" of DOE's Produced Water Optimization Framework PARETO](#)

Two DOE national laboratories that teamed to provide an award-winning open-source software tool that can identify the best ways to manage, treat and — when possible — reuse produced water from oil and gas operations, published a framework manuscript providing insights about how the project can offer environmentally sustainable, lower-cost approaches for handling oil and gas wastewater. NETL and Lawrence Berkeley National Laboratory reached a development milestone with the publication of a framework manuscript describing PARETO, a cutting-edge program designed to help organizations recognize opportunities for minimizing fresh and brackish water consumption in active oil and gas development areas.





[NETL Baseline Study Updated to Include the Performance and Cost of High Carbon Capture Rates for Power Generation Systems](#)

NETL recently updated its widely used study on the performance and cost of fossil-fueled commercial power generation systems. The report titled “Cost and Performance Baseline for Fossil Energy Plants, Volume 1: Bituminous Coal and Natural Gas to Electricity” is used by industry, researchers and policy makers as a key reference for contemporary carbon dioxide capture systems applied to pulverized coal (PC) and natural gas combined cycle (NGCC) electricity generating units. Compared to Revision 4 of the report published in 2019, the revised study (Revision 4a) includes new cases for H-class NGCCs and incorporates updated quotes for the Shell CANSOLV post-combustion capture system. The revision also extends carbon capture rates for PC and NGCC cases to greater than 90%, which will support the administration’s goal for a decarbonized power sector by 2035.

[NETL Researchers Among the Top 2% of Scientists Worldwide According to Stanford University List](#)

Many of the world’s most talented energy technology experts call NETL home, and a recent analysis published by Stanford University underlined this fact, listing 25 current and former NETL researchers as being in the top 2% of global scientists. The Stanford analysis looked at the impact researchers have within their scientific communities. In the last year alone, NETL research was cited thousands of times in scientific publications

[NETL Leader Received Distinguished Alumni Achievement Award](#)

NETL’s Charles Damianides, Ph.D., received a 2022 Distinguished Alumni Achievement Award from the Chemical and Biomolecular Engineering Department at the University of Illinois Urbana-Champaign. Damianides serves as executive director of the Center for Sustainable Fuels and Chemicals (CSFC), a technology incubation center that develops technical solutions for the U.S. chemicals industry to retool its products and operations to reach net-zero emissions. Damianides was one of eight Alumni Award winners recognized at this year’s Graduate and Alumni Awards Ceremony.



[NETL Developing Materials to Plug Abandoned Wells in Keystone State and Beyond](#)

For NETL engineer Eilis Rosenbaum and her colleagues, Pennsylvania serves as ground zero to develop reliable, cost-effective technologies needed to permanently plug abandoned or orphaned oil and gas wells that emit methane, a potent greenhouse gas. The NETL team started in Pennsylvania to address this source of greenhouse gas, which also pollutes streams and water supplies, and what they accomplish has implications that can benefit the entire country. The Pennsylvania Department of Environmental Protection issued a letter in support of ongoing research by Rosenbaum and her colleagues to identify and test affordable materials to permanently plug these hazards. Their work could provide a blueprint and processes to plug the more than 2.1 million abandoned wells across the nation.

[NETL Case Study Explored Solvent-Based Direct Air Capture Systems for the Removal of Atmospheric CO₂](#)

A case study conducted by NETL examined the performance and cost of solvent-based direct air capture (DAC) system configurations that remove carbon dioxide (CO₂) from the atmosphere. DAC is an emerging carbon dioxide removal (CRD) technology that concentrates CO₂ found in the ambient air rather than a power plant or industrial facility flue gas, thereby addressing both current and legacy emissions. Atmospheric concentrations of CO₂ (~415 parts per million) are much lower than those found in effluent streams from power plants or industrial facilities, presenting a greater technical and cost challenge for technologies to concentrate the CO₂ to the degree necessary for storage or utilization. NETL is examining a variety of DAC technology options to prioritize research and development with the ultimate goal of facilitating commercialization by the private sector. Continuing research, development and demonstration is expected to result in more advanced DAC solvents, process equipment, and system configurations, leading to lower costs that will make widespread application practical.

[NETL Released 2022 Compendium of Carbon Capture Technology](#)

NETL published its 2022 Compendium of Carbon Capture Technology, which provides a technical summary of the Lab's Carbon Capture program, for viewing online. The compendium is compiled biannually to provide a technical summary of carbon dioxide capture technology research and development sponsored by DOE/NETL's Point Source Capture and Carbon Dioxide Removal programs. The current compendium presents 124 projects in a single document, all of which were active between Oct. 1, 2019, and Oct. 1, 2021.



[NETL Researchers Developed Technology to Detect Cobalt in Coal Byproducts](#)

NETL researchers created a compact, portable device that can be used to detect cobalt at low concentrations in liquids, such as process streams from U.S. coal byproducts like fly ash and to prospect for cobalt in acid mine drainage – an innovation with financial, environmental and geopolitical implications for recovering the element that is used in making alloys for aircraft engines and in lithium batteries for many electric vehicles and consumer products like cell phones, laptop computers and tablets.

[Electric Vehicle Ecosystem in Appalachia Advanced with NETL Support](#)

NETL project partners Tennessee Technological University, the West Virginia Clean Cities Program and the National Alternative Fuels Training Consortium of West Virginia University Energy Institute, are reimagining transportation in rural America by working to build an electric vehicle ecosystem in Appalachia. The efforts took a crucial step forward in Marion County, West Virginia, where NETL and its industry and academic project partners celebrated the launch of the new Ford E-Transit Van, powered solely by electric batteries, for the Fairmont-Marion County Transit Authority. Project leaders joined city and state officials to launch the first electric transit van added to a public transit authority's fleet in West Virginia. The ribbon cutting ceremony included a vehicle demonstration and ride along. NETL's Trev Hall, who manages the project, represented the Lab at the event.



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