



NETL Coal Center of Excellence Visit
National Energy Technology Laboratory (NETL), Morgantown, WV
3610 Collins Ferry Road, Morgantown, WV 26505

Hosted by
Kyle Haustveit, Assistant Secretary
Hydrocarbons and Geothermal Energy Office, U.S. Department of Energy

Thursday, February 5, 2026 | 9:00 AM - 2:30 PM
Building 26, Room G51

8:00 AM	Guest Check-in and Registration	
9:00 AM	Welcome by Assistant Secretary HGEO	Kyle Haustveit
9:10 AM	Opening Remarks	Kyle Haustveit
9:30 AM	NETL Overview	Sean Plasynski
9:50 AM	NETL Coal Briefing <ul style="list-style-type: none"> Coal Center of Excellence Coal Research and Capabilities 	Bryan Morreale Nate Weiland
10:15 AM	R&D Laboratory Tour Safety Briefing	Bryan Morreale
10:20 AM	Break	
10:30 AM	R&D Laboratory Tour (Detailed tour agenda attached)	Bryan Morreale
12:30 PM	Lunch (Building 26, Cafeteria and Adjoining Areas)	
1:30 PM	Roundtable Discussions – Coal Center of Excellence Note: No NCC business will be conducted during today’s meetings.	All
2:30 PM	Adjourn	



Hydrocarbons and Geothermal Energy Office (HGEO) National Coal Council (NCC) and Industry Associates

Thursday, February 5, 2026, 10:30 AM – 12:30 PM
Morgantown, WV

NETL LABORATORY TOUR AGENDA

Time	Tour Stop	Speaker	Location
10:25 am	Research & Innovation Center Safety Briefing	Bryan Morreale Nate Weiland Cliff Whyte	Building 26, Room G51
10:30 am	Critical Minerals and Materials Research and Extraction By-Products from Fossil Energy Wastes	Aimee Curtright Christina Lopano Mengling Stuckman	Nondestructive CT Imaging Laboratory, B17 – Main Entrance
10:45 am	CT Scanning Lab	Dustin Crandall	Nondestructive CT Imaging Laboratory, B17
11:00 am	Coal and Carbonaceous Feedstock Conversion (ReACT Facility)	Christina Wildfire	ReACT Facility, B14
11:15 am	Chemical Looping Combustion and Gasification for Power, Fuels & Chemicals	Jarrett Riley	B13, Fluidized Bed Combustion Gasification Lab
11:30 am	Gasification Systems for Coal-Derived High-Value Carbon Products, Chemicals and Fuels / Accelerating Pulverized Coal Combustor Design and Development (MFix)	Steve Rowan Mehrdad Shahnam	Advanced Scale Up Reactor Experiment (Hot & Cold Units), B4
11:45 am	Advanced Integrated Energy Systems / Strategic Systems Engineering and Market Analysis	David Tucker Tony Burgard	Hybrid Performance Project, B4, Control Room
12:00 pm	High-Value Products from Coal	Christopher Matranga	Building 26, Room G46A
12:15 pm	Carbon Capture	Dave Hopkinson Dave Luebke	Building 26, Room G46B

TOUR STOP DESCRIPTIONS

Critical Minerals and Materials Research and Extraction By-Products from Fossil Energy Wastes

The Minerals to Materials Supply Chain Research Facility (METALLIC) builds upon existing DOE efforts to accelerate the establishment of new, domestic critical minerals and materials (CMM) supply chains. This NETL-led effort brings together the resources of nine national labs to establish METALLIC as the destination to validate, improve, and help commercialize technologies developed by domestic entities, amplifying the impact of the DOE and other U.S. government investments. This innovative approach fosters an ecosystem of expertise and capabilities for accelerating and de-risking CMM technology development and commercialization. ProMMiS, or Process Optimization and Modeling for Minerals Sustainability, is an NETL-led, multi-institutional collaboration building a framework and modeling platform to enable design choices with costing, to perform process optimization, and to accelerate development and deployment of extraction and purification processes for critical minerals and rare earth elements at reduced risk.

In response to China's monopoly on rare earth element (REE) supply, NETL has been investigating the feasibility of recovering rare earth elements (REEs) from domestic coal and coal by-products along with commercialization of novel materials developed from residual wastes. We are researching novel, cost-effective, and environmentally friendly REE recovery processes from coal by-products that is based on knowledge gained through advanced solid characterization (e.g., sequential extraction and synchrotron technologies) to tailor extraction processes for several types of coal byproducts (e.g., coal fly-ashes, bottom-ashes, to acid mine drainage solids) using mild acids at ambient conditions via a patented separation technology. We have also developed novel sorbents and materials to purify REEs from solutions to reduce the processing steps towards high purity critical mineral products.

CT Scanning Lab

The lab's four CT scanners enable researchers to examine geomaterials such as coal across a range of scales, probe different subsurface phenomena, and generate detailed characterizations of rock cores. The lab is built to look at real rocks under real subsurface conditions. Most research is focused on understanding the fundamental physics of fluid/rock interactions that control flow in the subsurface for our nation's energy production. Specifically with coal our efforts focus on:

- Nondestructive characterization to understand the variation, constituents, and potential of coal from a variety of settings,
- Evaluation of coal alteration under in-situ conditions coupled with flow to develop engineering equations to leverage our nation's resources, and
- Mechanical deformation coupled with high resolution and rapid CT scanning analyses to enhance coal preparation processes.

Coal and Carbonaceous Feedstock Conversion

NETL's Reaction Analysis & Chemical Transformation (ReACT) facility is transforming the paradigm of converting domestic resources into high-value, U.S. manufactured products. The ReACT facility's unique capabilities include the use of microwaves and plasma to enhance conversion like coal gasification. These sources of energy drive all aspects of reaction engineering research, from catalyst design through reactor development, to allow unprecedented efficiencies, yields, and flexibility to chemicals that are the backbone of the economy.

Chemical Looping Combustion and Gasification for Power, Fuels & Chemicals

The production of syngas, fuels, and H₂ from solid fuels can be improved through Chemical Looping approaches. Looping technologies do not require energy intensive air separation units to supply oxygen to the fuel feedstocks for gasification. Oxygen is supplied through solid carrier materials in which oxygen carriers can also improve the conversion of pyrolysis and tar species generated from fuels of various sources. Tar management is a major challenge for non-traditional gasification feedstocks such as MSW and waste plastics. Various feed stocks such as coal, woody biomass, plastics, and municipal waste are being tested for production of syngas and H₂ using NETL's novel carrier technology. Semi-batch technology demonstrations (TRL4) are being carried out in NETL's SFFBR (Solid Fuel Fluidized Bed Reactor) that enables isothermal injection of solid fuel into a batch loading of oxygen carrier.

Gasification Systems for Coal-Derived High-Value Carbon Products, Chemicals and Fuels

NETL's Advanced Scale-Up Reactor Experiment (ASURE Reactor) is a flexible, modular platform for conversion of coal and other carbon rich feedstocks into value added products such as syngas, chemical precursors, hydrogen, structured carbon, and other hydrocarbon products. The ASURE reactor will also serve as a pilot-scale user facility focused on advancing the Technology Readiness Level (TRL) of new and innovative thermally driven reactor technology concepts and increasing the pace at which they are developed.

Accelerating Pulverized Coal Combustor Design and Development

The Computational Multiphase Flow Science Team at NETL develops advanced multiphase computational fluid dynamics (CFD) models to predict and optimize the performance of fossil energy systems, including next-generation pulverized coal combustors and gasifiers. These CFD simulations accelerate reactor scale-up for commercialization, reduce development costs and risks, and enable innovative technologies to reach the market faster.

CFD provides reactor designers and operators with deeper insight into reactor behavior during startups, shutdowns, and operational transitions caused by rapid changes in operating conditions.

Advanced Integrated Energy Systems

The Integrated Energy Systems Facility incorporates intelligent hardware or cyber-physical systems to develop new technologies and accelerate commercialization through implementation in an integrated power environment. This provides opportunities to improve energy system resiliency by increasing flexibility of both new and existing coal-fueled power plants by augmenting power generation with thermal and chemical storage. Using high-temperature thermal storage to minimize fuel modulation during load transients can improve ramp rates by as much as tenfold. Additionally, the Integrated Energy Systems Facility can be used to evaluate the coupling of chemical production from coal with power generation to achieve optimal economic viability. Critical to the success of these transformational systems is achieving optimal control strategies that balance the variable load while minimizing potential generation asset degradation — a research space where NETL provides leadership worldwide.

Strategic Systems Engineering and Market Analysis

NETL delivers advanced analytical and engineering capabilities that help energy industries—particularly the coal, natural gas, oil, and geothermal sectors—navigate a rapidly evolving market and regulatory environment. NETL's systems team combines techno-economic modeling, infrastructure and market analysis, and environmental assessments to identify cost-effective strategies for resource utilization and integration of emerging technologies. NETL's expertise spans process and cost engineering, dynamic optimization, and risk reduction, enabling companies to improve operational efficiency, reduce uncertainty, and uncover new revenue opportunities. With deep knowledge of energy systems—from subsurface resource development to grid and pipeline infrastructure—NETL provides actionable intelligence that supports strategic investments and positions traditional and emerging energy resources as reliable, resilient, and economically viable components of America's energy future.

High-Value Products from Coal

NETL's research in this area uses coal to manufacture high-tech products that cannot easily be produced using conventional approaches. Examples include carbon materials used in computer microelectronics, graphite, carbon electrodes used in batteries and supercapacitors, and carbon additives that improve the strength and durability of metal alloys, cement, and other structural materials. NETL's research efforts are among the first in the world to demonstrate how coal can be used for manufacturing advanced materials and products. This research also provides scientific and techno-economic information on how these products can be made at commercial scale.

Carbon Capture

Pulverized coal power generation still has an important contribution to make in expanding the grid to accommodate the AI revolution and securing the availability of inexpensive electricity to the American people. One way of ensuring the continued viability of these critical assets is modernizing them with new features including capture of carbon dioxide for enhanced hydrocarbon recovery. NETL's research on gas separations focuses on high performance materials and systems development for next generation membranes, solvents, and sorbents for applications including carbon dioxide capture from pulverized coal plants, from coal gasification, and for natural gas sweetening. NETL conducts synthesis and testing of gas separation materials from laboratory scale to small pilot scale. These efforts are closely aligned with industry and include a recent demonstration at a major U.S. Steel facility in the Pittsburgh area.