



U.S. DEPARTMENT of ENERGY

Hydrocarbons and
Geothermal Energy Office

OFFICE OF COAL

America's need for affordable, reliable, and secure energy is growing as Super Intelligence, advanced manufacturing, and other industries increase demand for electricity. The U.S. Energy Information Administration projects this demand could grow as much as 50 percent by 2050. The U.S. Department of Energy's (DOE) Hydrocarbons and Geothermal Energy Office (HGEO) is working to meet that demand by making more effective use of America's abundant domestic energy resources, strengthening existing infrastructure, and advancing new technologies.

As part of that mission, HGEO's Office of Coal works with the National Energy Technology Laboratory (NETL), other DOE national laboratories, industry, universities, and partners to **stabilize, optimize, and grow America's coal industry.**

Research & Development Priorities

The Office of Coal focuses on four objectives:

1. **Modernize and extend the life of existing coal mines and coal-based power plants** through advanced technologies and infrastructure improvements.
2. **Improve efficiency across the coal value chain**, including extraction, processing, conversion, and power generation.
3. **Grow coal-based power generation and product manufacturing** by advancing technologies for reliable electricity and high-value coal-derived products.
4. **Expand opportunities for U.S. coal exports** by addressing technical and infrastructure barriers and



strengthening access to global markets.

Innovation Across the Value Chain

The **Mining & Processing Division** develops technologies to modernize coal extraction and processing, improve safety and productivity, extend mine life, and access resources previously considered uneconomic or difficult to recover.

Super Intelligence, Robotics & Automation • Digital Twins • Advanced Coal Processing • Enhanced Coalbed Methane Recovery • Underground Gasification • Export-Enabling Technologies

The **Conversion & Products Division** advances new uses for coal and coal-derived feedstocks, expanding opportunities beyond traditional power generation and strengthening domestic manufacturing and supply chains.

High-Value Carbon Materials • Graphite & Carbon Fibers • Coal-Derived Fuels & Chemicals • Waste-to-Products • Gasification

The **Power & Capture Division** develops technologies to modernize America's existing coal power fleet, improve efficiency and operational flexibility, and create value from power plant waste streams.

Coal Plant Modernization • High-Efficiency Power Systems • Flexible Operations • Waste Stream Conversion • Carbon Dioxide-Enhanced Oil Recovery

From Research to Real-World Impact

More Than \$1 Billion Investment Announced

In FY26, HGEO announced more than \$1.1 billion in federal funding for coal plants and infrastructure, including projects to modernize existing generation, recommission viable facilities, add generating capacity, and strengthen export infrastructure.

More Value From American Coal

HGEO and NETL are advancing technologies that can create graphite, critical minerals, carbon materials, construction materials, fuels, and chemicals from coal and coal-related resources, opening new markets while strengthening domestic industrial supply chains.

Coal Center of Excellence

Based at NETL's Morgantown, West Virginia campus, the Coal Center of Excellence connects industry and other stakeholders with DOE expertise, facilities, and technical capabilities to solve real-world challenges and move technologies toward deployment. The Center has already supported more than 68 industry engagements.

Powering Wyoming

HGEO is supporting research and technology development in Wyoming to modernize existing coal-fired power plants, improve water management, advance capture technologies to provide low-cost carbon dioxide (CO₂) for enhanced

oil recovery, and create new opportunities to recover valuable resources from coal combustion byproducts.

University of Wyoming: Turning Coal Plant Waste Into a Resource

Phase 1 of the Thermal Bottom Ash Drying and Critical Mineral Recovery Project, led by the University of Wyoming, focuses on a preliminary front-end engineering design for the thermal bottom ash drying system, water and critical mineral recovery, site integration studies, and an evaluation of post-combustion carbon capture, utilization, and storage configurations to improve wastewater management at Basin Electric Power Cooperative's Laramie River Station. The technology uses thermal drying to separate wet bottom ash slurry into reusable water and dewatered solids. The approach could help coal plants reduce water consumption, improve operational efficiency, and recover materials with potential value to American industry.

Project at a Glance

\$400,000

Approximate DOE investment

\$500,000

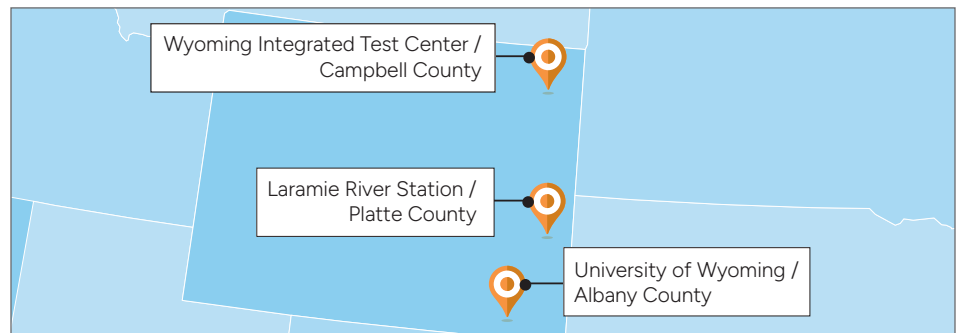
Approximate total project value

1,710 MW (gross)

Enough generating capacity to power approximately 700,000 homes

Improving Real-World Testing to Increase Enhanced Oil Recovery

The Wyoming Integrated Test Center, also led by The University of Wyoming, will enhance its capabilities by constructing a multi-use utility building, installing a cooling water system, and adding flue gas polishing and sampling systems to accommodate a wider range of capture technologies. The test center is attached to the Basin Electric Power Cooperative's 422-megawatt coal-fired Dry Fork Station power plant in Gillette,



Wyoming. Test center projects aim to process waste flue gases from coal-fired power plants for use in enhanced oil recovery to increase the availability of energy at the lowest costs possible.

Project at a Glance

\$15,000,000

Approximate DOE investment

\$21,000,000

Approximate total project value

Coal waste flue gas → enhanced oil recovery

Increasing available energy at lower cost

Enabling Low-Cost CO₂ Recovery

Membrane Technology and Research (MTR) is operating a large pilot system of the MTR membrane post-combustion capture technology at the Wyoming Integrated Test Center. The project aims to advance a membrane-based, post-combustion capture process to a large pilot stage to enable low-cost CO₂ recovery from coal flue gas for enhanced oil recovery.

Technology at a Glance

Capturing 70% of the CO₂

from a 10-MWe equivalent slipstream

Capture of ~150 metric tons of CO₂

per day at the station

\$62 Million

DOE investment

Strengthening Wyoming's Energy Future

Together, these investments demonstrate how innovation can help get more value from America's existing coal infrastructure. By exploring technologies that recover usable water and potentially valuable minerals from coal combustion byproducts and advance capture technologies to provide low-cost CO₂ for enhanced oil recovery, DOE and its partners are working to improve plant efficiency, increase energy availability, reduce waste-management challenges, and strengthen domestic resource supply chains. The research also highlights the role of universities and industry partnerships in developing technologies that can move from engineering design toward field demonstration and commercial application.

Work With Us

HGEO works directly with industry, universities, national laboratories, and other partners to identify barriers, apply DOE's technical capabilities, and move promising technologies from research through demonstration and toward commercial deployment.

Learn more: energy.gov/hgeo/office-coal

Contact: coal@hq.doe.gov ■



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For more information, visit:
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