

NETL RESEARCH



February 2025

NETL NATIONAL ENERGY TECHNOLOGY LABORATORY

NETL is the nation's only government-owned, government-operated (GOGO) national laboratory in DOE's system of 17 laboratories and technology centers, providing unique capabilities to efficiently and reliably meet the United States' evolving energy demands. NETL is in a unique position to bridge the gap between early-stage research and practical solutions for the energy sector. The Laboratory undertakes robust inhouse research and development (R&D) and manages an extensive external research, development, demonstration, and deployment (RDD&D) portfolio across various DOE offices.

NETL aligns organizationally under the auspices of the Office of Fossil Energy and Carbon Management (FECM), but NETL's capabilities support multiple DOE programs. These include the Office of Energy Efficiency and Renewable Energy; the Office of Cybersecurity, Energy Security, and Emergency Response; the Office of Electricity; the Grid Deployment Office; the Office of Manufacturing and Energy Supply Chains; and the Joint Office of Energy and Transportation. NETL's external R&D includes more than 1,500 RDD&D activities in 50 states with a total award value of more than \$30 billion. That work is complemented by private sector cost-sharing of \$14 billion with partners from small and large businesses, national and international research organizations, colleges and universities, and other government laboratories, including NETL's sister DOE national laboratories. Through these partnerships, the Laboratory fosters the growth of groundbreaking technologies that propel economic progress while diminishing risks.

Albany, OR • Morgantown, WV • Pittsburgh, PA • Houston, TX

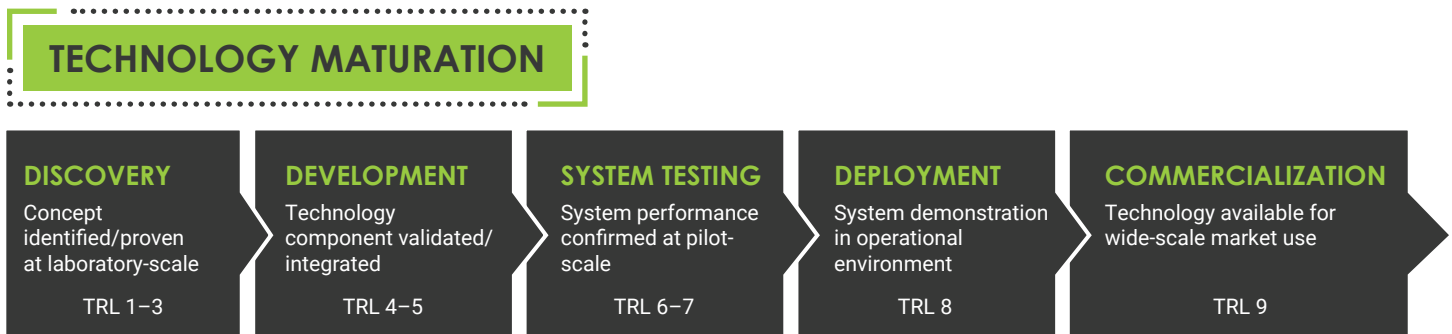


U.S. DEPARTMENT
of ENERGY

ACCELERATING DEVELOPMENT OF EMERGING TECHNOLOGIES

NETL is at the forefront of accelerating emerging technologies. With its expertise in science, engineering and technology, the Laboratory tackles national priorities by implementing the direction provided by the president of the United States and U.S. Congress, as well as spearheading targeted R&D initiatives to solve challenges identified by industrial partners. The Laboratory offers independent, unbiased, science-based analyses of technologies, energy policies, legislation and regulations.

NETL supports the entire spectrum of energy technology development, from initial concept ideas to deployment and commercialization. The project portfolio that NETL sponsors is measured along a nine-point technology maturation scale known as technology readiness level (TRL) to consistently identify technology development progression. NETL typically supports projects with the goal of transferring technologies to industry for commercialization and job creation within the U.S.



TECHNOLOGY TRANSFER

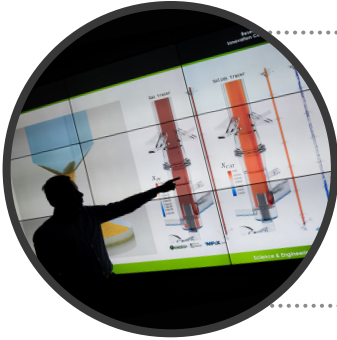
NETL leverages partnerships with entrepreneurs, companies and universities to efficiently commercialize laboratory-developed technologies, ensuring optimal utilization of federal R&D funds. By engaging in diverse partnerships, NETL mitigates technical and economic risks, advances technologies through development stages, and addresses manufacturing and supply-chain challenges. Through agreements and licenses, NETL offers a range of technologies for transfer, prioritizing partners with robust commercialization plans and a commitment to sharing intellectual property benefits with the public. Additionally, NETL uses various agreements — such as cooperative research and development agreements (CRADAs), memoranda of understanding (MOUs), and memoranda of agreement (MOAs) — to facilitate effective technology transfer and collaboration.

INHOUSE CORE COMPETENCIES

Highly skilled and experienced innovators at NETL's research laboratories — in Albany, Oregon; Morgantown, West Virginia; and Pittsburgh, Pennsylvania — collaborate on a broad range of research that supports DOE's mission to ensure America's security and prosperity by addressing its energy challenges through transformative science and technology solutions.

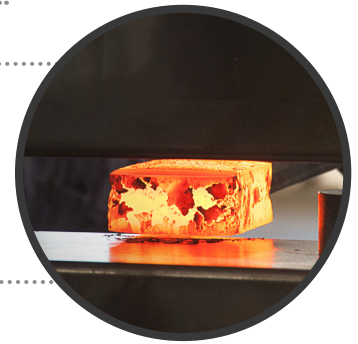
The Laboratory's multidisciplinary teams, armed with expertise and cutting-edge tool sets, are dedicated to pioneering transformative energy solutions. By advancing FECM's carbon management and resource sustainability technologies, NETL's R&D programs are actively shaping the energy future. The Laboratory's core competencies include computational science and engineering, energy conversion engineering, geological and environmental systems, materials engineering and manufacturing, program execution and integration, and strategic systems analysis and engineering.

NETL conducts research in five areas that build upon R&D competencies to enhance technical skill related to carbon management and resource sustainability technologies. The Laboratory's core competencies in integrated science, engineering and technology enable researchers to address the current energy challenges while planning and seeking solutions for the future. NETL conducts RDD&D guided by comprehensive system analysis and performs experiments at real conditions with real samples at the right scales, accelerating deployment via advanced modeling. Multidisciplinary teams work toward solution-driven research, discovering, maturing and deploying innovative technologies that are critical to ensuring that the Laboratory continues to provide technology options to meet the nation's energy needs.



COMPUTATIONAL SCIENCE AND ENGINEERING

High-Performance Computing
Data Analytics
Artificial Intelligence and Machine Learning
Multi-scale Modeling (Atomistic to Device)



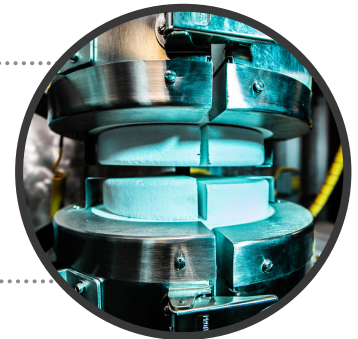
MATERIALS ENGINEERING AND MANUFACTURING

Structural and Functional Materials
Design, Synthesis, Characterization,
Manufacturing and Performance Assessment



GEOLOGICAL AND ENVIRONMENTAL SYSTEMS

Geo-analysis and Monitoring
Data Storage, Management and Analysis
Geochemistry



ENERGY CONVERSION ENGINEERING

Process and Systems
Multi-scale Modeling, Simulations and Optimization
Energy Market Analysis



STRATEGIC SYSTEMS ANALYSIS AND ENGINEERING

Reaction Engineering
Design and Validation
Innovative Energy and Water Processes



PROGRAM EXECUTION AND INTEGRATION

Technical Project Management
Finance and Acquisition
R&D Planning



NETL is a U.S. Department of Energy national laboratory that drives innovation to deliver solutions for a secure energy future. Through its expertise and research facilities, NETL is advancing technologies to unleash America's affordable, reliable and secure domestic energy and natural resources.

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