

# NETL RESEARCH

## OUR MISSION

NETL is a U.S. Department of Energy national laboratory that drives innovation and delivers technological solutions for an environmentally sustainable and prosperous energy future. By leveraging its world-class talent and research facilities, NETL is ensuring affordable, abundant and reliable energy that drives a robust economy and national security, while developing technologies to manage carbon across the full life cycle, enabling environmental sustainability for all Americans.

## OUR VISION

NETL's vision is to be actively engaged in national and regional innovation ecosystems, serving as a driver of innovation-based partnerships. Realizing this vision requires NETL to continue to design and implement strategies that demonstrate its ability to develop new technologies that successfully become the leading solutions in their respective commercial markets. DOE and NETL's formal plans serve as an overarching framework for the design of NETL's partnership strategies, which ensure mission readiness by maintaining infrastructure, retaining intellectual capital, and pursuing strategic alliances.

# NETL

## NATIONAL ENERGY TECHNOLOGY LABORATORY

### WHO WE ARE

The National Energy Technology Laboratory (NETL) facilitates the responsible and effective use of our nation's extensive fossil resources. NETL is one of 17 partner organizations in the U.S. Department of Energy's National Laboratory System and the only national lab organization dedicated to fossil energy optimization research. For more than a century, NETL and its predecessor labs have been at the forefront of technology development, consistently creating safe and environmentally sound technical solutions that satisfy the world's demand for affordable, abundant energy.

## ACCELERATING DEVELOPMENT OF EMERGING TECHNOLOGIES

NETL is committed to utilizing and creating the most current and efficient technology to implement practices and policies that address the energy industry’s most demanding and complex challenges. To this end, NETL is working with our partners to achieve a carbon pollution-free power sector by 2035. We will accomplish this through integration of critical clean energy technologies, to include: battery storage; negative emissions technologies; carbon capture and storage; renewable hydrogen; safe nuclear energy; rare earth element extraction from waste products; and extraction of highly efficient methane gas.

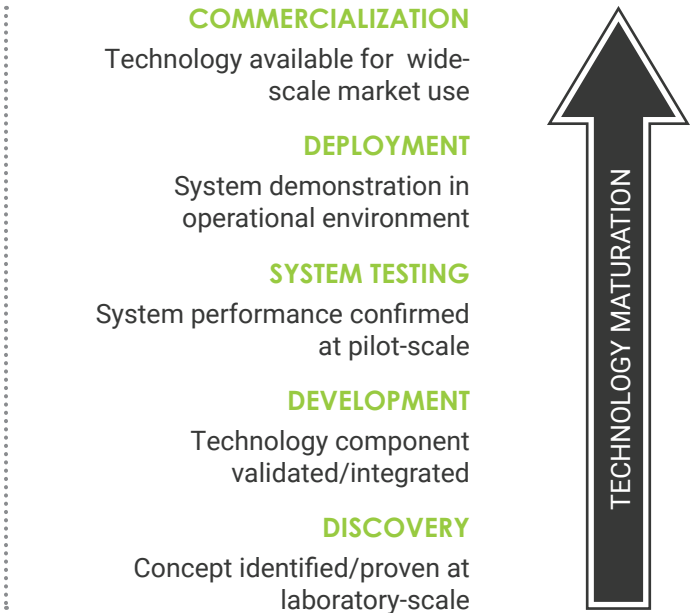
NETL’s research and development (R&D) projects provide program management support to DOE’s Office of Energy Efficiency and Renewable Energy; Office of Cybersecurity, Energy Security, and Emergency Response; and Office of Electricity (OE). The laboratory’s research portfolio includes more than 1,100 projects—totaling an award value of over \$9 billion, with more than 400 partners from small and large American businesses, national research organizations, colleges and universities, and other government laboratories, including nine of NETL’s sister DOE national laboratories.

## CLEAN TECHNOLOGY R&D

NETL has been at the center of technology development for more than a century, consistently leading and partnering to create safe, affordable, and environmentally sound technical solutions that increase efficiency, reduce emissions, and diminish energy costs. Advanced technologies will: synthesize the clean, reliable, and affordable energy needed to increase domestic manufacturing and associated workforce; invest in improving our nation’s energy infrastructure; improve electrical grid reliability and resilience; expand domestic energy production; educate America’s future scientists and engineers; and support U.S. energy and national security goals.

## DISCOVERY-COMMERCIALIZATION

NETL’s integrated science, engineering and technology competencies address today’s energy challenges while aggressively planning and seeking solutions for the challenges of tomorrow. NETL pursues its technology development mission by engaging partners in federal agencies and laboratories, in the private sector, and at some of the nation’s most prestigious research universities. NETL is committed to a strong science and technology enterprise enabling a fully integrated energy research portfolio that spans the discovery-development-deployment continuum to meet the Nation’s economic, environmental and energy security challenges of the 21st century.



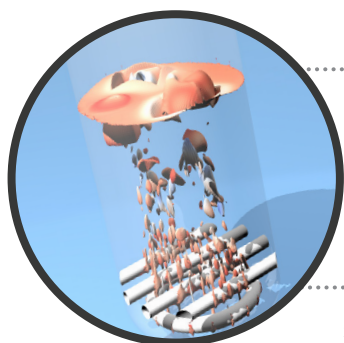
## SCIENCE AND TECHNOLOGY STRATEGY FOR THE FUTURE, MAJOR INITIATIVES

DOE’s and NETL’s long history of R&D focused on diminishing environmental impacts and the corresponding solution technologies are focused on the continuing challenge from four perspectives: Decarbonization and Carbon Management; Environmentally Sustainable Supply Chains; Integrated Energy and Industrial Systems to Enable Deep Decarbonization; and Advanced Data and Computing Solutions for Applied Energy Challenges. Each of these initiatives represents the intersection of NETL’s core capabilities with unique investments in facilities which are brought to bear on challenges relevant to the U.S. energy sector. Holistically considered, the initiatives will make significant contributions to a decarbonized economy and will address the broader technology development ambitions of the department.

## CORE COMPETENCIES

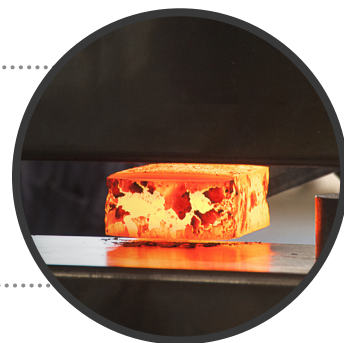
Executing an energy research portfolio of national importance that discovers, matures, and deploys innovative technologies requires NETL to maintain cutting edge and enduring core competencies. NETL's integrated science, engineering and technology competencies address today's energy challenges while aggressively planning and seeking solutions for tomorrow. Furthermore, maintaining these core competencies is critical to ensuring the Laboratory can continue to provide technology options to meet the Nation's needs in times of crisis.

NETL continues to place critical value upon the people that ultimately own the success. Consequently, significant effort is devoted to cultivating a well-trained, dynamic workforce capable of accelerating the technology advancements that attain the energy, economic and environmental goals pursued by the laboratory.



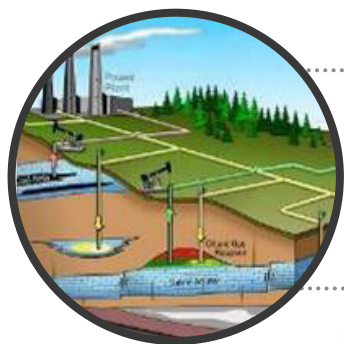
### COMPUTATIONAL SCIENCE & ENGINEERING

High Performance  
Computing  
Data Analytics



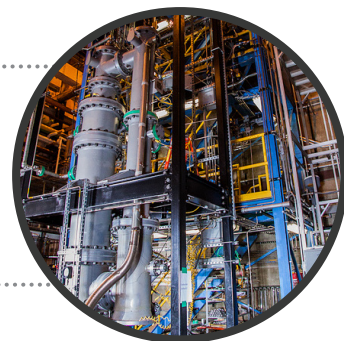
### MATERIALS ENGINEERING & MANUFACTURING

Structural & Functional Materials  
Design, Synthesis, Manufacturing & Performance



### GEOLOGICAL & ENVIRONMENTAL SYSTEMS

Air, Water & Geology  
Understanding & Mitigation



### ENERGY CONVERSION ENGINEERING

Component & Device  
Design & Validation



### STRATEGIC SYSTEMS ANALYSIS & ENGINEERING

Process & System  
Optimization, Validation & Economics

## KEY LABORATORY INITIATIVES

In 2020, NETL executed an extensive competency assessment to identify paths for growth of the Lab's capabilities, which culminated in the establishment of four Key Lab Initiatives (KLIs). The KLIs were crafted to align with the strategic goals of DOE, the Office of Fossil Energy and Carbon Management (FECM) and NETL. They are intended to meet these strategic goals while exercising and enhancing NETL's technical capabilities.



### ADVANCED ALLOYS SIGNATURE CENTER

Create a Signature Center for U.S. industry, DOE labs, other government agencies, and academia to prototype alloy solutions, bridging the "valley of death" between laboratory demonstration and large-scale production, thus accelerating domestic commercialization.



### SCIENCE-BASED ARTIFICIAL INTELLIGENCE/ MACHINE LEARNING INSTITUTE (SAMI)

Enabling AI-driven solutions and support to applied energy science, addressing the nation's environmental, economic and social challenges.



### MICROWAVE (MWAVE) TECHNOLOGY

Our signature microwave technology research center provides foundational research in microwave applications for industrial processes that significantly improve energy efficiency and effectiveness, reduce or eliminate greenhouse gas emissions, and enable scalable and distributed low-carbon applications.



### CENTER FOR SUSTAINABLE CHEMICALS AND FUELS

An NETL-led technology incubation center seeking to develop [partnerships](#) with industry to assist the chemicals sector in their decarbonization, carbon management and sustainability efforts. In addition, the center will work to scale technologies to maturation that are too risky or far-term for solely private-sector investment.

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#### Contacts

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