

# NETL RESEARCH



## OUR MISSION

*Discover, integrate, and mature technology solutions to enhance the nation's energy foundation and protect the environment for future generations*

## ENDURING MISSION ELEMENTS

### EFFECTIVE RESOURCE DEVELOPMENT

Developing technologies that improve the effectiveness and economics of producing our fossil energy resources

### EFFICIENT ENERGY CONVERSION

Discovering cleaner, cheaper, and more efficient energy conversion technologies for the production of high-value energy commodities

### ENVIRONMENTAL SUSTAINABILITY

Accelerating the development of transformative and enabling solutions to protect our air, land, and water for future generations

# NETL

## NATIONAL ENERGY TECHNOLOGY LABORATORY

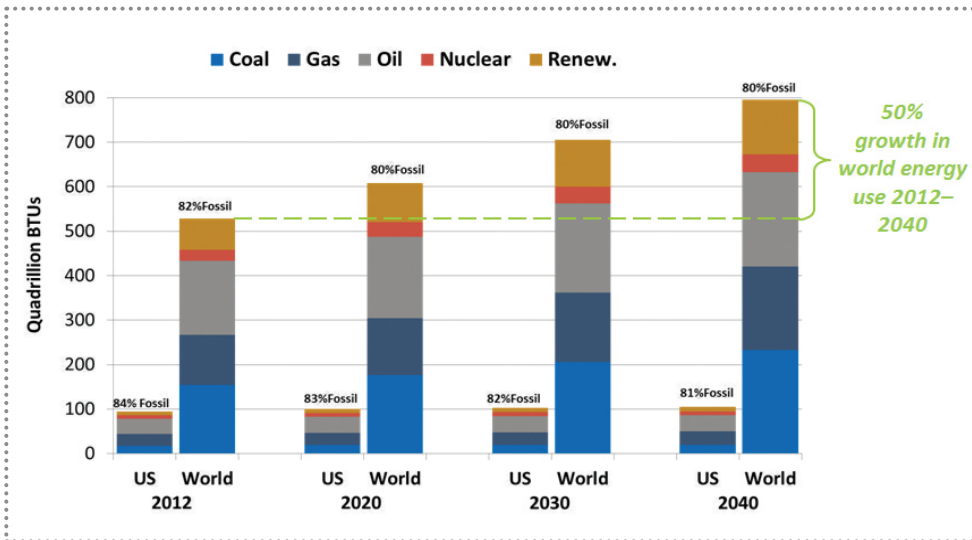
### WHO WE ARE

The National Energy Technology Laboratory (NETL) facilitates the responsible and effective use of our Nation's extensive fossil resources. NETL is one of 17 laboratories in the U.S. Department of Energy's National Laboratory System and the only National Lab dedicated to fossil energy 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. Today, at state-of-the-art facilities in Pittsburgh, Morgantown (WV), and Albany (OR), NETL analysts conduct in-depth energy studies, as researchers develop advanced energy technologies and accelerate their commercialization in the United States and around the world. As the only National Lab that is both government-owned and -operated, NETL is uniquely positioned to cultivate strategic partnerships that accelerate the development of technology solutions. NETL's collaborations with industry, academia, and other government organizations supplement the laboratory's research and energy analysis portfolios. Through this strategic approach, NETL addresses our most compelling energy challenges, creating solutions for today and options for tomorrow.

## NETL RESEARCH IS CRITICAL TO MEETING U.S. ENERGY REQUIREMENTS

Fossil energy provides quality of life to millions of Americans, sustains America's manufacturing and high-technology industries, fuels economic growth and stimulates technical innovation.

Tremendous technological effort and innovation has diversified the energy portfolio to meet ever increasing global demand. Even so, studies project that fossil energy will be required to supply expanding world energy markets, and will continue to satisfy nearly 80 percent of the energy demand for decades.



Along with economic progress, widespread utilization of fossil fuels has brought environmental challenges that must be addressed, most notably generation of carbon dioxide, particulate matter, and sulfur dioxide. Also emergent are technical and environmental challenges associated with fossil fuel production and chemical-to-electrical energy conversion efficiencies. As a result, NETL must focus science and technology development efforts on the creation of energy technology solutions that utilize affordable and abundant fossil energy while achieving environmental sustainability.

## 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.

### COMMERCIALIZATION

Technology available for wide-scale market use

### DEPLOYMENT

System demonstration in operational environment

### SYSTEM TESTING

System performance confirmed at pilot-scale

### DEVELOPMENT

Technology component validated/integrated

### DISCOVERY

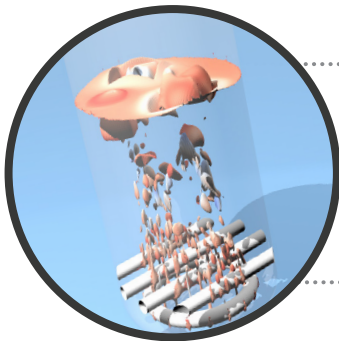
Concept identified/proven at laboratory-scale



## 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.



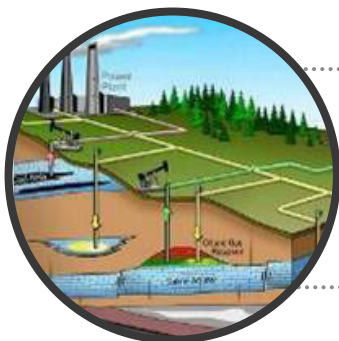
### COMPUTATIONAL SCIENCE & ENGINEERING

High Performance Computing  
Data Analytics



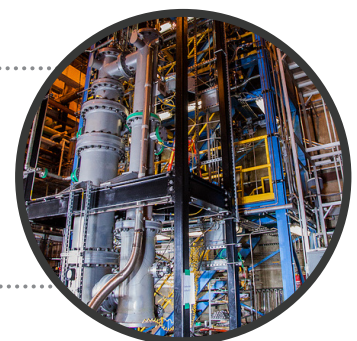
### MATERIALS ENGINEERING & MANUFACTURING

Structural & Functional  
Design, Synthesis & Performance



### GEOLOGICAL & ENVIRONMENTAL SYSTEMS

Air, Water & Geology  
Understanding & Mitigation



### ENERGY CONVERSION ENGINEERING

Component & Device  
Design & Validation



### SYSTEMS ENGINEERING & ANALYSIS

Process & System  
Optimization, Validation & Economics

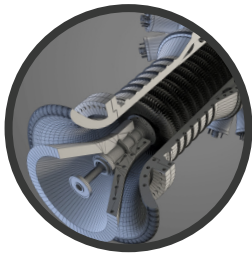
## TECHNOLOGY THRUSTS

NETL is leveraging core competencies to pursue technology thrusts within the organization's enduring mission elements and in support of DOE and FE goals.



## COAL TECHNOLOGY THRUSTS

## OIL & GAS TECHNOLOGY THRUSTS



### SYSTEMS ENGINEERING & ANALYSIS

Technologies that greatly improve plant efficiencies, reduce CO<sup>2</sup> capture costs, increase plant availability, and maintain the highest environmental standards

### ENHANCED RESOURCE PRODUCTION

Maximize recovery and reduce environmental impacts of conventional, unconventional and offshore resources



### CARBON CAPTURE

R&D and scale-up technologies for capturing CO<sup>2</sup> from new and existing industrial and power-producing plants

### ENVIRONMENTALLY PRUDENT DEVELOPMENT

Water quality and availability, air quality, induced seismicity, and development intensity

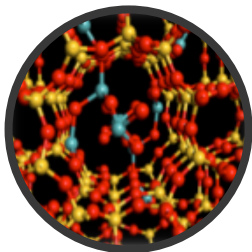


### CARBON STORAGE

Safe, cost-effective, and permanent geologic storage of CO<sup>2</sup>

### TRANSMISSION & DELIVERY

Quantifying, detecting and reducing methane emissions from the natural gas value chain



### CROSS CUTTING RESEARCH

Materials, sensors, and advanced computer systems for future power plants and energy systems integrated with CCS

### METHANE HYDRATES

Developing technology to enhance recovery, and unlocking the potential of the next energy frontier



### Contacts

Customer Service  
1.800.553.7681