

CROSSCUTTING RESEARCH



NETL

NATIONAL ENERGY TECHNOLOGY LABORATORY

The **Crosscutting Research Portfolio of Programs** uniquely fosters enabling technology applications across multiple fossil energy systems and operational platforms, efficiently leveraging resources to accomplish the strategic goals, objectives and performance measures common to several fossil research areas.

Often, processes and materials that advance one technology platform may well have application in another with little to no modification.

The **Crosscutting Research Program Portfolio** leverages the latest technology trends such as:

- Data analytics
- Advanced manufacturing
- High-performance computing



The program's advanced capabilities accelerate progress toward addressing the challenges facing today's fossil power plants and realize the next generation of fossil energy technology platforms.

Developed technologies improve power plant efficiency and reduce operating and maintenance costs while maintaining reliable and resilient energy infrastructure.

The **Crosscutting Research Portfolio of Programs** utilizes the advanced technological capabilities of the National Energy Technology Laboratory, including its open-source **Multiphase Flow with Interphase eXchanges (MFiX)** software suite for multiphase modeling, **Extreme Environment Materials (ExtremEmat)** consortium to accelerate materials development and the **NETL Joule Supercomputer** for complex modeling and simulations.

Our programs also accelerate the development of science and engineering-based solutions across a range of technology maturities from concept to market through the creation of strategic partnerships with stakeholders who share our interest in maximizing the value of our nation's fossil resources.

Creating partnerships is in our DNA, and our partners are local, regional, national and international, including other government laboratories, universities, research organizations and the private sector. We team with these institutions to drive affordable technology solutions across a broad range of fossil energy applications and operational platforms.

ADVANCED ENERGY MATERIALS — Develops cost-effective structural and functional materials capable of operating under extreme conditions that revolutionize energy systems and leverages advanced analytical capabilities to develop, modify and qualify new materials.

SENSORS AND CONTROLS — Novel sensors monitor key parameters while operating in harsh environments with real-time measurement capabilities. The data collected from sensors is vital in enhancing plant reliability and improving efficiency of key plant components. This program also includes Data Analytics, Controls, and the Cybersecurity research needed to bring fossil power plants into the 21st century.

MODELING, SIMULATION AND ANALYSIS — Focuses on developing and applying advanced computational tools at multiple scales: atomistic, device, process, grid and market to accelerate development and deployment of fossil fuel technologies. NETL is a world leader in multiphase flow modeling that simulates complex energy processes.

WATER MANAGEMENT — Addresses the competing needs for water consumption through a series of dynamic and complex models and analyses that are essential in informing and deciding priority technology R&D initiatives. New water treatment technologies economically derive clean water from alternative sources, reducing total water demand, including innovative wastewater treatment processes that reduce operational cost and complexity.

UNIVERSITY TRAINING AND RESEARCH — The Crosscutting Program sponsors two of the longest-running university training programs that reinforce fossil energy research-based education including an emphasis on science and technology at historically black colleges and other minority institutes.

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