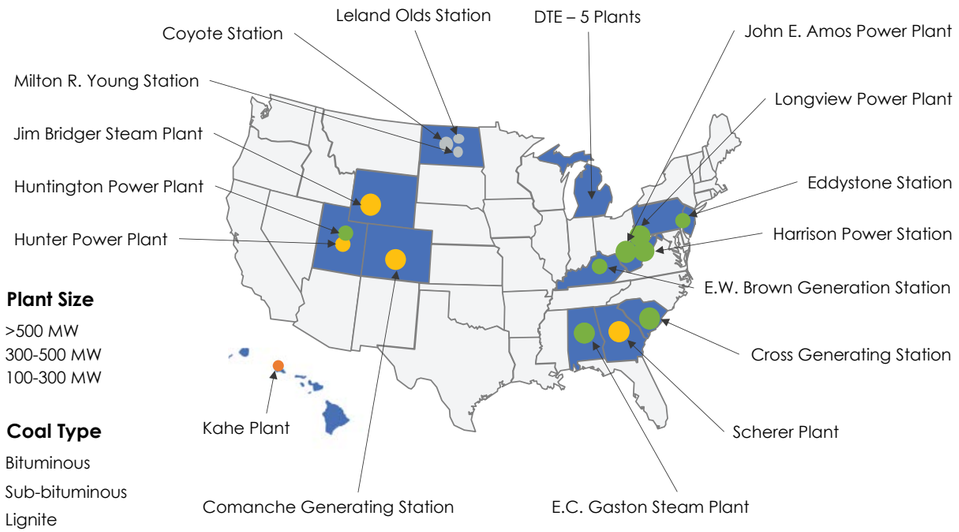
WIDESPREAD INDUSTRY TESTING DRIVING CRITICAL R&D ON EXISTING COAL-FIRED FLEET TECHNOLOGIES

Partnering with utility providers to advance technologies for improved performance and reduced cost – boosting fleet efficiency, longevity, and competitiveness of coal-fired power plants across the U.S.

DEVELOPING TECHNOLOGIES WITH INDUSTRY TO IMPROVE FLEXIBILITY, RELIABILITY, AND EFFICIENCY OF COAL-FIRED POWER PLANTS

Researchers in industry, NETL, and academia have partnered with 19 utilities to perform testing and research at 21 power plants across the U.S. to improve the flexibility, reliability, and efficiency of existing and new coal-fired power plants. These field tests are focused on advanced sensors for temperature, corrosion, ash deposition, and online coal analysis; improved load-following capability, energy storage, efficiency improvements, intelligent controls, condition-based monitoring, component performance improvement, advanced component and system modeling; and technologies using artificial intelligence, machine learning, and data analytics.



Advanced technologies are being tested at existing coal-fired power plants ranging in size from 135 MW to 952 MW. These tests include a wide range of coals (bituminous, sub-bituminous, and lignite), boiler types (cyclone-fired, opposed-wall fired, and tangential-fired configurations), and steam conditions (sub-critical, supercritical, and ultra-supercritical).

UTILITY PARTNERS

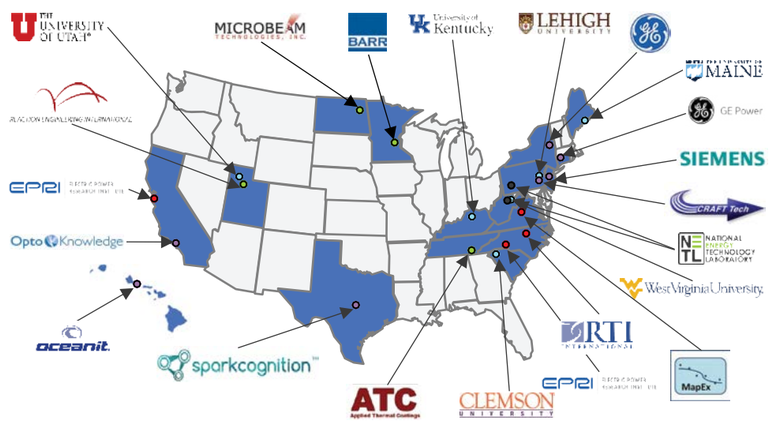
OTTER TAIL POWER COMPANY · Exelon · BASIN ELECTRIC POWER COOPERATIVE · Northern Municipal Power Agency · Hawaiian Electric Maui Electric Hawai'i Electric Light · DTE · Southern Company · NorthWestern Energy · santee cooper · AEP AMERICAN ELECTRIC POWER · KU · Xcel Energy · IDAHO POWER · NEXTera ENERGY · MONTANA-DAKOTA UTILITIES CO. · FirstEnergy · Minnkota Power Cooperative · PACIFICORP · Longview Power

IMPROVING THE EXISTING COAL FLEET

The Improvements for Existing Plants R&D initiative includes over $65M of federal funding totaling over $80M of cost shared R&D. Across 31 projects, recent achievements include:

- ✓ Installation of an extended low-load boiler system
- ✓ Testing of an online coal tracker with combustion system performance prediction
- ✓ Testing of wireless temperature and corrosion sensors
- ✓ Testing of ultrasonic sensors for real-time temperature profiles
- ✓ Detecting and diagnosing premature equipment failure using machine learning
- ✓ Testing improved condenser coating technology

PROJECT PERFORMERS



Industry's widespread involvement in this R&D establishes the relevance and importance of the technologies to the existing U.S. coal-fired power generation fleet and to the Coal FIRST Initiative.

RESEARCH PARTNERS

FERCo · KWJ ENGINEERING · Curran International · Hendrix Engineering Solutions Inc. · UND INSTITUTE FOR ENERGY STUDIES THE UNIVERSITY OF NORTH DAKOTA · Cranfield University · GREAT RIVER ENERGY · Rhysics · B&W · Corrosion Management Ltd. · ASPINITY · ENVIRONETIX · UCI University of California, Irvine · Carl Bozzuto · NORTH AMERICAN COAL · AECOM · agile sciences · R·I·T · SENTEK INSTRUMENT LLC · MLJ Consulting · Los Alamos NATIONAL LABORATORY · ACT · ET Energy Technologies Inc. · EAPC · ARKEMA · Airflow Sciences Corporation · Envergex · OAK RIDGE National Laboratory · Bright Generation Holdings LLP

AWARD NUMBERS
DE-FOA-0001989
DE-FOA-0001728
DE-FOA-0001686

PROJECT BUDGET
TOTAL AWARD VALUE
$80.3M
DOE FUNDING
$66.7M

CONTACTS

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CORE COMPETENCIES

- ENERGY CONVERSION ENGINEERING
- PROGRAM EXECUTION and INTEGRATION
- SYSTEMS ENGINEERING and ANALYSIS

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