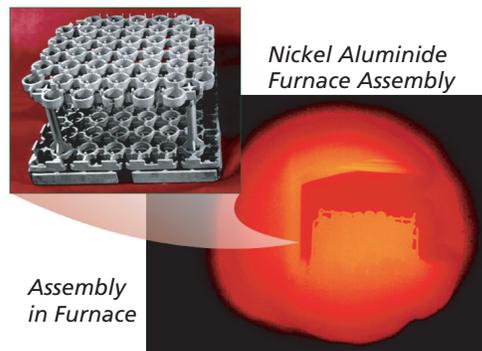


## Energy Efficiency and Renewable Energy Program

The Energy Efficiency and Renewable Energy Program develops sustainable energy technologies to create a cleaner environment, a stronger economy, and a more secure future for our nation. We are committed to expanding energy resource options and to improving efficiency in every element of energy production and use. Several key program elements are highlighted below.

### Increasing Industrial Energy Efficiency

Delphi, located in Saginaw, Michigan, is using a nickel aluminide alloy (developed at ORNL) in its heat treating furnaces. The alloy's high-temperature strength and corrosion resistance enabled Delphi to handle the same production in two new furnaces as in three furnaces built from conventional materials. Delphi is in the process of retrofitting all of its furnaces worldwide with these new components. Contact: Peter Angelini, 865-574-4565, angelinip@ornl.gov



### Reducing Oil Dependence through Transportation Efficiency

Transportation research capabilities at ORNL include emissions reduction and aftertreatment; advanced materials—carbon fiber composites, lightweight metals, ceramics, and intermetallics; modeling of vehicle crashworthiness; and power electronics for electric and hybrid vehicles. ORNL also analyzes transportation trends and policy scenarios and conducts engineering systems research for energy crops to support renewable fuels development. Contact: Richard Ziegler, 865-946-1204, zieglerr@ornl.gov

### Increasing the Efficiency of Buildings

ORNL's Buildings Technology Center is a national resource for research in many areas of building energy efficiency: advanced refrigeration; building insulation; interaction among roofs, foundations, and walls; moisture control; energy audits and monitoring; innovative building materials; and advanced lighting. ORNL also provides technical support to the Federal Energy Management Program. Contact: Jeff Christian, 865-574-5207, christianje@ornl.gov



Energy-Efficient Flyash Wall



### Distributed Energy Resources (DER)

ORNL has strong R&D capabilities in combustion technology, emissions characterization and mitigation, and materials development for advanced reciprocating engines and turbine systems. That expertise is being extended to small gas turbines. Fuel cell systems and components are being developed. Many aspects of electric power systems are being investigated, including transmission and distribution, interconnection of DER, reliability, restructuring, advanced control systems, and simulation and modeling. Contact: Mike Karnitz, 865-574-5150, karnitzma@ornl.gov

### Collaborations

Industry and the public are our customers. States and universities are key partners. The Program makes extensive use of CRADAs—partnerships between ORNL and private companies or entities that pool resources with ORNL to solve problems of mutual interest. In addition, the EERE Program has six National User Facilities that serve not only ORNL researchers, but also those from industry, universities, other laboratories, and other government agencies.

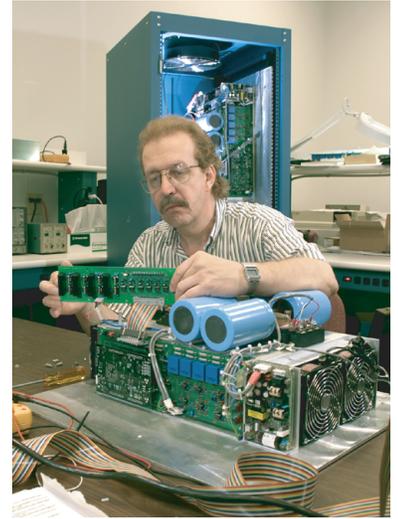


### **High Temperature Materials Laboratory (HTML)**

The HTML solves materials problems that limit the efficiency and reliability of advanced energy conversion systems. It serves as a focal point for multidisciplinary research on new ceramics and metallic alloys. The HTML has six centers: materials analysis, diffraction, thermophysical properties, mechanical characterization and analysis, machining and inspection research, and residual stress.

### **Buildings Technology Center (BTC)**

The BTC provides access to a unique collection of testing and analysis capabilities. Its mission is to help DOE, industry, and other customers identify issues and solve problems of major significance to building systems with solutions that are energy-efficient, environmentally sound, and cost-effective. The facility is composed of three centers: building envelope research, heating and cooling technology, and existing buildings research.



*Power Electronics Research at NTRC*

### **Bioprocessing Research and Development Center (BRDC)**

The BRDC houses equipment for the investigation of advanced bioprocessing concepts using stirred-tank and columnar bioreactors and a fermentation plant for large-scale batch and columnar experiments. The range of equipment sizes will accommodate both bench-scale experiments and large-scale demonstrations or process scale-up studies.

### **Metals Processing Laboratory User Center (MPLUS)**

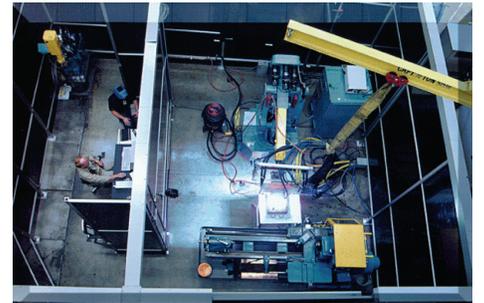
MPLUS provides access to equipment and expertise needed to solve metals-processing issues that limit the development and implementation of emerging technologies. Its goal is to improve the energy efficiency and global competitiveness of the U.S. metals industry. MPLUS includes four centers: metals processing, joining, characterization, and process modeling.



*High Temperature Materials Laboratory*

### **National Transportation Research Center (NTRC)**

NTRC seeks to assist industry in using unique, state-of-the-art hardware and computing technologies to address problems of national and international significance such as declining air quality, dependence on foreign oil supplies, traffic congestion, and highway safety. The Center includes the Composite Materials Laboratory; the Fuels, Engines, and Emissions Research Center; Photonics and Remote Sensing; and the Power Electronics and Electric Machinery Research Center.



*Infrared Processing at MPLUS*

### **Cooling, Heating, and Power Integration Laboratory (CHP)**

The CHP encourages the use of energy-efficient distributed energy (DER) generation systems, in which users generate part or all of the electricity they use on their own sites. This expands options for working directly with business and industry in effective performance and design of systems that will meet future needs.

#### *Contact:*

Marilyn A. Brown, Program Director

Phone 865-576-8152; fax 865-576-7572; email [brownma@ornl.gov](mailto:brownma@ornl.gov)

Mike Karnitz, Deputy Program Director

Phone: 865-574-5150; fax 865-241-0112; email [karnitzma@ornl.gov](mailto:karnitzma@ornl.gov)