



U.S. DEPARTMENT OF
ENERGY

Office of
Science

Projects

ORNL is able to support aspects of the DOE mission by identifying and then pursuing major activities that build on ORNL's core strengths and capabilities. The following projects are underway.

4000 Area Switchgear Vault, Institutional General Plant Project...

Home to some of the highest technology research and computing infrastructure in the world, ORNL requires a level of electrical power quality and reliability that is significantly higher than typical industrial and research settings. In order to meet this unique power need, ORNL has undertaken an initiative to upgrade its electrical system to reduce voltage sags and interruptions in service through a series of projects that will improve power quality and reliability. One of these projects is the 4000 Area Switchgear Vault, that when completed, will increase the electrical distribution system reliability for the research and high performance computing users.

Titan supercomputer...

Oak Ridge National Laboratory is home to Titan, a supercomputer. Titan's true importance, however, is accelerating scientific discoveries and engineering innovations, largely through the Innovative and Novel Computational Impact on Theory and Experiment program. For 2013, INCITE awarded 1.84 billion core hours on Titan to dozens of researchers in industry, academia, and government using simulations to solve grand challenges.

Carbon Fiber Technology Center...

Oak Ridge, Tennessee is home to the Oak Ridge National Laboratory's new Carbon Fiber Technology Facility (CFTF). This 42,000 ft² innovative technology facility offers a highly flexible, highly instrumented

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carbon fiber line for demonstrating advanced technology scalability and producing market-development volumes of prototypical carbon fibers.

The CFTF serves as a national testbed for the Oak Ridge Carbon Fiber Composites Consortium, a public-private partnership enabling a national network for innovations in manufacturing. The consortium's mission to forge industry – government collaborations to accelerate the development and deployment of lower-cost carbon fiber materials and processes and create a new generation of strong, lightweight composite materials that will improve America's competitiveness.

MAXLAB facility...

Residential and commercial buildings of tomorrow could use less energy because of research that will be performed at the new \$16 million Maximum Building Energy Efficiency Research Laboratory at Oak Ridge National Laboratory. The 18,000-square-foot facility features a high bay area for building and studying large-scale wall assemblies and a low bay area that houses a heating, ventilation and air conditioning lab. Together, the bays will be used to advance the energy efficiency and durability of building envelopes, equipment and appliances. Both bays are flexible in operation and able to support many types of experiments that will be performed by ORNL researchers and industry partners.

The international ITER project for fusion...

ITER is a large-scale scientific experiment that aims to demonstrate that it is possible to produce commercial energy from fusion.

The Q in the formula on the right symbolizes the ratio of fusion power to input power. $Q \geq 10$ represents the scientific goal of the ITER project: to deliver ten times the power it consumes. From 50 MW of input power, the ITER machine is designed to produce 500 MW of fusion power—the first of all fusion experiments to produce net energy.

During its operational lifetime, ITER will test key technologies necessary for the next step: the demonstration fusion power plant that will prove that it is possible to capture fusion energy for commercial use.

The science going on at ITER—and all around the world in support of ITER—will benefit all of mankind.