"Our researchers are achieving scientific breakthroughs to provide clean, reliable, and secure energy to support a robust domestic economy."

Moe Khaleel,
Associate Laboratory Director

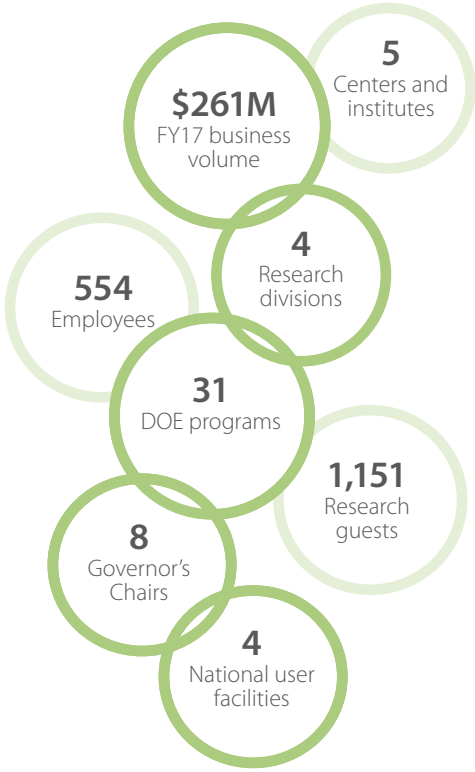
Energy and Environmental Sciences

Oak Ridge National Laboratory's energy and environmental research plays a pivotal role in America's clean, efficient energy future. Our researchers deliver breakthroughs in support of US Department of Energy missions, offering a unique culture of entrepreneurship for translating science into solutions for the most critical problems facing society at the nexus of energy, environment, and security.

Our scientists and engineers work with many of America's best innovators and businesses to research, develop, and demonstrate cutting-edge technologies and to break down market barriers in sustainable transportation, renewable power, and energy efficiency for homes, buildings, and manufacturing.

From exploring plant genes to creating better crops for biofuels, feedstocks, and materials for automobiles and wind turbines, to applying quantum physics and unique monitoring, communications, and controls to protect the power grid, we bring a multidisciplinary focus to resolve some of the biggest challenges in energy and the environment.

Clean energy innovations are indispensable to effective long-term solutions in a changing environment. Accelerating their widespread application will help to provide affordable, reliable energy to support a thriving economy.



Our Research

Biosciences—Advancing science and technology across eight interdisciplinary research themes in genomics, computational biology, microbiology, microbial ecology, biophysics and structural biology, and plant sciences to better understand complex biological systems and their relationship with the environment.

- **Center for Bioenegy Innovation—**Leading breakthroughs for a new generation of cost-effective, sustainable bioproducts and advanced biofuels.

Environmental Sciences—Providing solutions for society by expanding scientific knowledge and by developing innovative strategies and technologies across the environmental dimensions of energy, global and regional change, and sustainability.

- **Next-Generation Ecosystem Experiments–Arctic—**Advancing predictive understanding of the structure and function of the Arctic terrestrial ecosystems in response to climate change.
- **Spruce and Peatlands Responses under Changing Environments—**Assessing the response of northern peatland ecosystems to increases in temperature and exposures to elevated atmospheric CO_2 concentrations.

Energy and Transportation Sciences—Encompassing four highly renowned national user facilities (below) focused on delivering innovative solutions in efficiency for applications in advanced manufacturing, energy-saving homes and buildings, sustainable transportation, and renewable electricity generation.

Electrical and Electronics Systems Research—Translating the science and engineering of measurement, instrumentation, signal processing, and electric machines into technology solutions that ensure America's prosperity by addressing challenges in power grid resiliency and security and the nuclear, national security, clean energy, and environmental sectors.

2013-2017

2,601 journal publications

506 invention disclosures

197 patent applications

163 issued patents

49 patent licenses

6 copyright licenses

87 cooperative research and development agreements

122 strategic partnership projects

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National User Facilities

The **Building Technologies Research and Integration Center** offers a wealth of experimental and computational tools and expertise on building envelopes; equipment and fluids for heating, cooling, and appliances; and system and whole-building performance to support development and performance characterization of technologies that maximize the cost-effective energy efficiency of residential and commercial buildings.

The **Carbon Fiber Technology Facility** is a 390 foot processing line with a capacity of up to 25 tons of carbon fiber per year for demonstrating advanced technology scalability and producing market-development volumes of prototypical carbon fibers and serves as the last step before commercial production scale.

The **Manufacturing Demonstration Facility** helps industry adopt new technologies that reduce life-cycle energy use and greenhouse gas emissions, lower production costs, and create new products. The Lab's expertise helps manufacturers reduce risks and validate their investments in innovations that will create the products —and high-paying jobs—of the future in lightweight metals, stronger materials, 3D printing, and more.

The **National Transportation Research Center** helps industry, academia, and other agencies accelerate the development and deployment of efficient and secure transportation technologies. Research focuses on electrification, efficiency of combustion and emissions, data science and connected vehicles, and materials for future systems.