OAK RIDGE NATIONAL LABORATORY FACT SHEET
MANAGED BY UT-BATTELLE FOR THE DEPARTMENT OF ENERGY

Building Technologies Research and Integration Center

Reducing the energy/carbon footprint of the nation's buildings is essential for tackling climate change and will be an enormous challenge. Buildings account for 43% of the nation's carbon emissions and the consumption of 39% of our total primary energy, 71% of our electricity, and 55% of our natural gas. The importance of buildings is amplified because some renewable energy technologies are most economical when using buildings as their deployment platforms—for example, generating power with building-integrated photovoltaic cells, lighting and heating water with direct sunlight, and space conditioning and water heating with energy from the ground.

Building Technologies Research and Integration Center (BTRIC), in the Energy and Transportation Science Division (ETSD) of Oak Ridge National Laboratory (ORNL), focuses on research and development of new building technologies, whole-building and community integration, improved energy management in buildings and industrial facilities during their operational phase, and market transformations from old to new in all of these areas.

The DOE programs supported by BTRIC are primarily within the Office of Energy Efficiency and Renewable Energy (EERE), and include:

- Building Technologies Program (BT),
- Federal Energy Management Program (FEMP),
- Industrial Technologies Program (ITP),
- Weatherization and Intergovernmental Program (WIP),
- Solar Energy Technologies Program (SETP).

BTRIC also supports other federal agencies, state agencies, and the private sector through DOE's "work-for-others" and "user facility" programs.

ORNL's work in pursuit of energy and environmental sustainability of the built environment is broad-based, addressing residential and commercial, as well as new and existing buildings. Organizationally, the BTRIC consists of three groups:

- Building Envelope Research
- Residential, Commercial, and Industrial Energy Efficiency
- Whole-Building & Community Integration

Building Envelope Research Group

The envelope (the fabric separating indoor and outdoor environments) is the main determinant of the amount of energy required to heat, cool, and ventilate a building, and can significantly influence lighting energy needs in areas accessible to sunlight. The Building Envelope Research Group is devoted to developing affordable envelope technologies that improve the energy efficiency, durability, and environmental sustainability of residential and commercial buildings. The research addresses: systems (walls, roofs and foundations), components (sheathings, membranes, and coatings), materials, and the fundamentals of heat, air, and moisture transfer. In addition to advancing performance, durability, and affordability of traditional envelope solutions (high-R, airtight), increasingly the group is focusing on multifunctional solutions. Here the envelope serves as a filter, selectively accepting or rejecting solar radiation and outdoor air, depending on the need for heating, cooling, ventilation and lighting at that time, and using the heat capacity of the building structure to minimize peak energy demands and overheating from solar gain.

OAK RIDGE National Laboratory

Residential, Commercial, and Industrial Energy Efficiency Group

The Residential, Commercial, and Industrial Energy Efficiency Group works to optimize the energy performance of buildings and industrial facilities through applications research, technical assistance, and technology deployment.

The team's comprehensive knowledge of buildings and energy use spans multi-building sites, whole-building systems, system components, and multi-level interactions. The team helps federal and private-sector customers conserve energy through cost-effective energy-management best-practice tools and strategies such as planning, metering, benchmarking, assessments, retro- or continuous commissioning, implementing capital projects, and financing those projects when direct funding is not available (rather than waiting for direct funding).

Whole-Building and Community Integration Group

The Whole-Building and Community Integration Group supports the U.S. Department of Energy's goals of Zero Energy Homes (ZEH) by 2020 and Zero Energy Buildings (ZEB) by 2025 through a research focus on sustainable whole-building and community integration, including the scanning of international technology developments and sustainability approaches, and cross-cut activities to use green buildings and communities as test-beds and seed markets for emerging deep-savings energy efficiency, solar and other renewable, transportation, distributed energy, and grid-integration technologies. Other research within the group is currently focused on developing integrated styles of equipment that provide the same amenities as baseline equipment while consuming half the energy overall, and far less than that during utility peak load periods. Savings come from a variety of sources: applying improved model-based design processes, recycling heat between end uses, and incorporating emerging materials, components, subsystems, wireless communications, sensors and controls.

Building Technology Research and Integration Center National User Facility

Private sector laboratories are not available to conduct many of the tests and experiments possible using the building technologies laboratories at ORNL, which have been designated as national user facilities. In these cases, the facilities at ORNL can be accessed by entering into a facilities user agreement. Such agreements can be proprietary or non-proprietary. Generally the user provides the test specimens (the materials or walls or roofs). Scheduling of user tests must not interfere with the DOE-sponsored research ORNL is conducting with use of these same experimental facilities.

Point of Contact:
Patrick Hughes, Director
Building Technologies Research and Integration Center
Energy and Transportation Science Division
Oak Ridge National Laboratory
P.O. Box 2008, Bldg. 3147
Oak Ridge, Tennessee 37831–6070
www.ornl.gov/btric

OAK RIDGE National Laboratory