Berkeley Lab

Leadership in Science

Lawrence Berkeley National Laboratory (LBNL) has been a driving force behind investigations in particle physics and the nature of matter and energy in the universe since its founding, in 1931. As the birthplace of accelerator-based physics and nuclear medicine, LBNL has evolved into a multidisciplinary laboratory that works: to understand and advance physical, chemical, biological, and earth systems for sustainable energy and environmental solutions; to conduct ultrafast science to engineer systems at quantum, atomic, and molecular scales, understanding and fabricating nanostructured materials and devices; and to advance physics and cosmology, conducting computational science of scale, and developing new scientific approaches to the science and engineering of complex biosystems. LBNL is operated by the University of California for DOE.

Multi-Program Laboratory

LBNL is a multi-program laboratory that receives most of its funding from Office of Science programs, including: Advanced Scientific Computing Research, Basic Energy Sciences, Biological and Environmental Research, High Energy Physics, Nuclear Physics, and Fusion Energy Sciences. LBNL is also funded by DOE's Offices of Energy Efficiency and Renewable Energy, Civilian Radioactive Management, Fossil Energy, and Nonproliferation and National Security.

Mission

LBNL's mission advances three goals. LBNL attempts to solve the most pressing and profound scientific problems facing humankind, such as using basic science for a secure energy future, understanding living systems to improve the environment, health, and energy supply, and understanding matter and energy in the universe. LBNL also builds and operates scientific user facilities and trains next generation scientists and engineers.

Core Competencies

- Sustainable energy science and technology, including supply, energy storage, and efficiency
- Soft x-ray and ultrafast science, photon and particle beams, including national user facilities
- Nanoscience, materials synthesis and characterization
- Multidisciplinary and integrated biology and environmental science, including climate change
- Computational science, applied mathematics, and electrical and mechanical engineering
- Advanced detector systems for astrophysics, high energy physics, and nuclear science

Lab-at-a-Glance

Location: Berkeley, CA

Type: Multi-program laboratory

Contract Operator: University of California

Responsible Field Office: Berkeley Site Office

Website: http://www.lbl.gov/

Physical Assets:

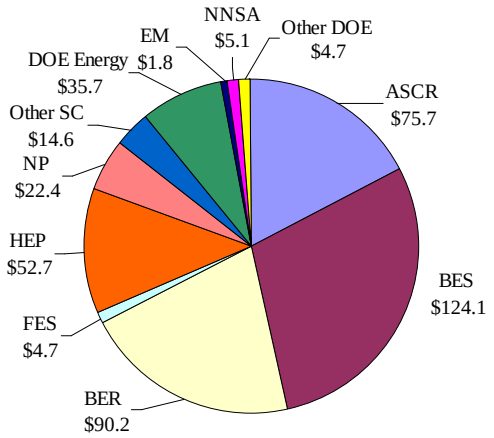
- 202 acres (leased) and 108 Buildings
- 1.6M GSF in Active Operational Buildings
- 125K GSF in Non-Operational Buildings
- Replacement Plant Value: $964.3M
- Deferred Maintenance: $53.3M
- Asset Condition Index
  - Mission Critical: 0.95 (Good)
  - Mission Dependent: 0.98 (Excellent)
- Asset Utilization Index: 0.97 (Good)

Human Capital:

- 2,708 Full-time equivalent employees
- 3,068 Total employees: 239 faculty, 295 postdocs, 321 graduate students, 174 undergraduates
- 6,935 Facility users and visiting guests

FY 2007 Total DOE Funding: $431.7M

FY 2007 DOE Funding by Source *(BA in Millions):*



FY 2007 Non-DOE/Non-DHS Funding: $117.3M
FY 2007 Dept. Homeland Security: $2.9M

Major User Facilities

- **Advanced Light Source (ALS):** one of the world's brightest sources of ultraviolet and soft x-ray synchrotron radiation delivering advanced microscopies, spectroscopies, and structural analysis for scientific and technological research .
- **Energy Sciences Network (ESnet):** a high-speed computing network, data and connectivity backbone serving thousands of DOE scientists and collaborators worldwide.
- **Joint Genome Institute (JGI):** a center for genome sequencing and information sciences serving the scientific community and DOE missions in bioenergy, bioremediation, and carbon sequestration.
- **National Center for Electron Microscopy (NCEM):** houses TEAM, the world's highest resolution electron microscope, and other advanced microscopes and tools for electron micro-characterization of materials.
- **National Energy Research Scientific Computing Center (NERSC):** a leading provider of high-performance computing tools and expertise that enable computational science of scale and complex scientific applications.
- **Molecular Foundry:** a nanoscale science user facility for the characterization, design, and synthesis of "soft" (biological and polymeric) and "hard" (inorganic and microfabricated) building blocks and functional assemblies.

Recent Scientific Achievements

- Design and fabrication of the world's highest resolution electron microscope which images single atoms.
- Development of nanostructured solid polymer electrolytes to enable rechargeable lithium-metal batteries.
- Discovery of "dark energy," an antigravity force, through observation and computational data analysis.
- Demonstration of the link between breast cancer and the surrounding extracellular matrix.
- Sequenced more than 550 genomes and their computational genome analysis and annotation.
- Creation of the world's smallest electrical switch, smallest nano-radio, and the smallest motor.
- Construction of the world's highest field dipole magnet.
- Mathematical and computational models that provide ultra-high resolution analysis of turbulent flames.
- First optical acceleration of electron bunches to GeV energies with narrow beam spread.
- Observation of the early structure of the universe in the microwave radiation afterglow of the Big Bang.

Awards

- 11 Nobel Laureates worked or are working at the Laboratory
- 84 memberships in the National Academies of Science, Engineering, and Medicine (affiliated)
- 13 National Medals of Science
- 3 Fermi Awards
- 27 Lawrence Awards
- 44 Industrial Research 100 Awards