

Key Facilities

Many of Sandia's unique research facilities are available for use by industry, universities, academia, other laboratories, state and local governments, and the scientific community in general. User and collaborative facilities are a unique set of scientific research capabilities and resources whose primary function is to satisfy DOE programmatic needs, while being accessible to outside users.



The **National Solar Thermal Test Facility (NSTTF)** primary goal is to provide experimental engineering data for the design, construction, and operation of unique components and systems in proposed solar thermal electrical plants, which have three generic system architectures: line-focus (trough and continuous linear Fresnel reflector systems), point-focus central receiver (power towers), and point-focus distributed receiver (dish-engine systems). In addition, the NSTTF can provide high heat flux and temperatures for materials testing or aerodynamic heating simulation; large fields of optics for astronomical observations or satellite calibrations; a solar furnace; and a rotating platform for parabolic trough evaluation. The NSTTF is sponsored by the DOE Office of Energy Efficiency and Renewable Energy (EERE); significant recent infrastructure improvements were funded by the ARRA.



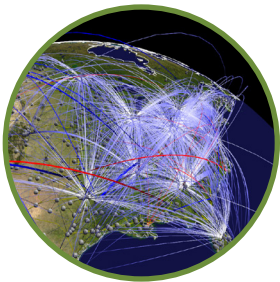
The **Joint BioEnergy Institute (JBEI)** is a San Francisco Bay Area scientific partnership led by LBNL and including the Sandia, the University of California campuses of Berkeley and Davis, the Carnegie Institution for Science, and the Lawrence Livermore National Laboratory. JBEI is sponsored by the DOE Office of Science (SC) with a mission to advance the development of the next generation of biofuels—liquid fuels derived from the solar energy stored in plant biomass. JBEI is focused on the efficient conversion of lignocellulosic biomass, the most abundant organic material on the planet, into these biofuels. JBEI is organized into four divisions: Feedstocks, Deconstruction, Fuels Synthesis, and Technologies.



The **Combustion Research Facility (CRF)** is an internationally recognized DOE SC-sponsored collaborative research facility. CRF scientists, engineers, and technologists conduct basic and applied research aimed at improving our nation's ability to use and control combustion processes. Research ranges from studying chemical reactions in a flame to developing laser diagnostics for combustion-science research. Most of the CRF's work is done in collaboration with scientists and engineers from industry and universities. Visiting researchers collaborate with the CRF staff and bring with them experience and knowledge that enhances and brings new approaches to collaborative research.



Sandia's **Battery Abuse Testing Laboratory (BATLab)** is at the forefront of testing the limits of what batteries can safely handle and provides critical data for developing the next generation of batteries—doing everything imaginable to batteries (e.g., crushing, piercing with nails, heating to boiling) in the lab to make sure that once a battery is in commercial use, it will be safe and reliable. The BATLab tests cells from the size of a laptop computer battery up to packs weighing several hundred pounds. The BATLab team has been recognized for its ability to perform scientific analysis and a full range of measurements. The BATLab is sponsored by DOE EERE.



The **National Infrastructure Simulation and Analysis Center (NISAC)** is a DHS-sponsored modeling, simulation, and analysis program comprising personnel in Washington D.C. and from Sandia and Los Alamos national laboratories. NISAC analyzes critical infrastructure and key resources, including their interdependencies, vulnerabilities, consequences, and other complexities. NISAC provides strategic, multidisciplinary analyses of interdependencies and the consequences of infrastructure disruptions across critical infrastructure and key resource sectors at national, regional, and local levels. NISAC experts have developed and are employing tools to address the complexities of interdependent national infrastructures, including process-based systems dynamics models, mathematical network optimization models, physics-based models of existing infrastructures, and high-fidelity agent-based simulations of systems.



The **Photovoltaic Systems Evaluation Laboratory (PSEL)** is a multi-user, multi-sponsor facility that conducts research in PV cells, modules, and arrays and performs detailed, comprehensive analysis in PV systems design, optimization, and characterization in real-world scenarios. PSEL conducts research on behalf of the DOE, DoD, and other customers, often in collaboration with industry/academic partners. PSEL supports developing domestic and international standards that reduce market barriers to greater adoption of solar technologies while also improving operator/installer safety as well as system reliability and functionality. PSEL's testing, analysis, and validations provide unbiased evaluations of current and proposed standards. PSEL also has a demonstrated history of appropriately handling proprietary data.



The **Center for Integrated Nanotechnologies (CINT)** is determining the scientific principles that govern the design, performance, and integration of nanoscale materials. CINT's emphasis is on exploring the path from scientific discovery to the integration of nanostructures into the micro and macro worlds. This involves exploring, experimentally and theoretically, nanoscale behavior; developing many synthesis and processing approaches; and understanding new performance regimes, testing new designs, and integrating nanoscale materials and structures. Integration is key to exploiting nanomaterials, and the scientific challenges that it poses are at the heart of CINT's DOE SC-sponsored mission. Our activities bring together university faculty, students, other national laboratory scientists, and industrial researchers to propose, design, and explore integrating new nanoscale materials into novel architectures and microsystems.



The **Distributed Energy Technologies Laboratory (DETL)** conducts research with industry and academic partners to integrate emerging energy technologies into new and existing electricity infrastructures. DETL's DOE EERE-sponsored research spans generation, storage, and load management at the component and systems levels and examines advanced materials, controls, and communications to achieve a reliable, low-carbon electric infrastructure. DETL's reconfigurable infrastructure simulates many real-world scenarios (e.g., island and campus grids, remote operations, and scaled portions of utility feeders and the transmission infrastructure). DETL researchers analyze the effects of high penetration of renewable technologies and distributed energy on the grid and resolve issues of grid interconnectivity, controls, security, safety, performance, reliability, and interoperability.



The **National Supervisory Control and Data Acquisition (SCADA) Test Bed** is a DOE Office of Electricity Delivery and Energy Reliability-sponsored resource to help secure our nation's energy control systems. It combines state-of-the-art operational system testing facilities with research, development, and training to discover and address critical security vulnerabilities and threats to the energy sector. Sandia R&D efforts range from autonomous agent systems applied to SCADA, to cryptographic security, system assessment, and red-team activities. Sandia is able to complement its communication and control capabilities with actual generation and load facilities for distributed energy resources.