



SHOWCASE PROJECT: LAWRENCE BERKELEY NATIONAL LABORATORY — 50001 READY AND ISO 50001 CERTIFICATION

SOLUTION OVERVIEW

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The mission of Lawrence Berkeley National Laboratory (LBNL) is to advance the scope of human knowledge and seek scientific solutions to some of the greatest problems facing humankind. Founded in 1931, the Lab is associated with 13 Nobel prizes and is home to approximately 4,400 full-time employees, including 80 members of the National Academy of Sciences and 15 National Medal of Science awardees. The Lab also serves faculty and scholars, visiting scientists and engineers, and over 12,700 facility users.

LBNL's contributions to energy-efficient technologies have helped organizations worldwide collectively save billions of dollars and reduce their carbon footprint. When it comes to its own facilities, the Lab is committed to leading by example. LBNL earned 50001 Ready recognition in June 2020 and attained ISO 50001 certification in September.

Berkeley Lab launched its sustainability program in 2012 to align its energy-management activities with International Organization for Standardization (ISO) 50001 and ISO 14001 principles. To achieve 50001-Ready status, the Lab took measures involving 2.1 million square feet of built space and all activities that entail energy and water use (e.g., high-performance computing) or affect energy and water performance (e.g., procurement).

“Our primary motivation for pursuing ISO 50001 is to ensure that energy and water management activities are strategic, effective, and persistent. Persistence was the goal—to show that any savings generated through investment today would still be around in 10 years.”

John Elliott, Chief Sustainability Officer
LBNL

LOCATION

Berkeley, California

SOLUTIONS

Greenhouse gas reduction is important to the Lab, and longer-term mitigation targets became the focus of its energy efficiency activities. The ISO 50001 energy-management standard and 50001 Ready provided the organizational structure required to build an energy-management program that will scale well and endure.

Implementing a 50001 Ready Energy Management System

- **50001 Ready Navigator:** Energy team members began by consulting 50001 Ready templates and the online Navigator tool's step-by-step guidance for implementing and maintaining an energy management system and aligning it to the ISO 50001 global standard.
- **Clear Leadership:** The Lab assigned a dedicated project manager to make sure that the process of aligning energy and water management activities to the standard were completed on a deliberate timeline, with strong leadership support, and with full engagement by a cross-functional team of subject matter experts within the Lab.
- **High-Level Manual:** One of the most helpful strategies was to create a documentation strategy. In particular, the team developed a manual that mapped the standard's requirements into coherent and consistent processes. The manual serves as a high-level guide that links to other key documents, allowing users easy access to the information needed. At only 24 pages, the comprehensive manual can evolve with emerging requirements.
- **Outside Expertise:** Team members also tapped into outside expertise, hiring the Enterprise Innovation Institute of the Georgia Institute of Technology to assist in training and fully aligning activities to the standard.

Benefits

The team identified and implemented energy-efficiency measures, capital improvements, and monitoring systems such as SkySpark, which alerts the team when building performance may be degrading. Although it is difficult to identify direct correlation between specific actions and outcomes, the Lab has achieved significant energy savings over the past five years. All the Lab's efforts to achieve and maintain these savings are strengthened by following the ISO 50001 standard.

"I would strongly recommend 50001 Ready and ISO 50001 certification for organizations seeking to effectively manage their energy and achieve lasting results. Following the ISO 50001 standard is one of the best ways to institutionalize a strong energy management practice. You still have to do the work, but 50001 provides a great way to organize your efforts and helps push you to do everything that is truly needed to be successful."

John Elliott, Chief Sustainability Officer
LBNL

The team quickly recognized that the standard goes beyond the technical to encompass the critical human factors that determine success or failure in an organization's long-term management of energy. The team-driven, tailored processes have also become part of the Lab's culture, available and understandable to everyone from leadership to new staff. In addition, 50001 Ready pushed LBNL to be more rigorous and systematic—in data collection, documentation, and communications. The LBNL team worked to ensure that new energy-efficiency measures helped meet the Lab's broader goals, not just audit requirements. The Lab also observed benefits not directly related to energy use, such as improved comfort in buildings and less wear and tear on equipment.

“The responsibility for energy management should not fall on one or two people. Sustainable change across an organization is best achieved through a diverse team with clear roles.”

Karen Salvini, Sustainability Project Manager
Berkeley Lab

Key Takeaways

- Create a diverse team and designate a project manager
- Build leadership support, and consider having a key executive sponsor
- Develop and continually refine an operational manual usable by everyone involved
- Leverage existing resources and systems where possible
- Encourage sustained improvement by closely tracking challenges and successes

The Lab’s ISO 50001 certification third-party audit reported that its “[energy management] system documentation, beginning with the high-level manual, is what I would consider to be among the best in class, combining detail with ease of use to create an effective road map of the system.” View LBNL’s ISO 50001 manual at iso50001.lbl.gov/.

OTHER BENEFITS

Annual Energy Use

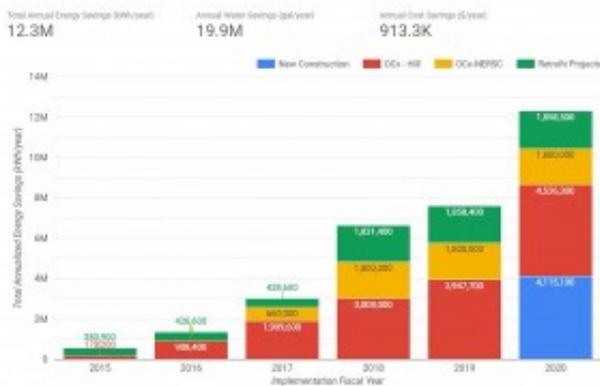
Annual Energy Cost

Energy Savings

Cost Savings



Berkeley Lab's Shyh Wang Hall is an innovative LEED-certified gold building that houses the National Energy Research Scientific Computing Center (NERSC)'s computing resources on its lower levels. Taking advantage of the naturally cool San Francisco Bay Area climate, NERSC's machine room is cooled "passively" using only outside air. The machine room also features a unique isolation floor to protect computing assets from seismic activity. Photo credit: LBNL



A large portion of the savings was attributed to operational improvements. The figure shows operational savings in red and yellow. Green includes capital retrofits and projects pursued through a typical project management structure, and blue is new construction.



Members of LBNL's ISO 50001 and Ongoing Commissioning Teams (left to right from the top): Tony Petelo, Raphael Vitti, Erik First, Gonzalo Padilla, Matt Rivas, Ricky Brambila, Chris Weyandt, Deirdre Carter, Norm Bourassa, John Chernowski, Karen Salvini, Kushal Malvania, Jingjing Liu, John Elliott. Photo credit: LBNL