Lawrence Berkeley National Laboratory—50001 Ready and ISO 50001 Certification

WHY 50001 READY?

The U.S. Department of Energy's 50001 Ready program is a self-paced, no-cost way for organizations to build a culture of structured energy improvement that leads to deeper and sustained energy and GHG savings. Recognition is available for facilities and organizations that self-attest to the implementation of an ISO 50001-based energy management system without external audits or certifications.

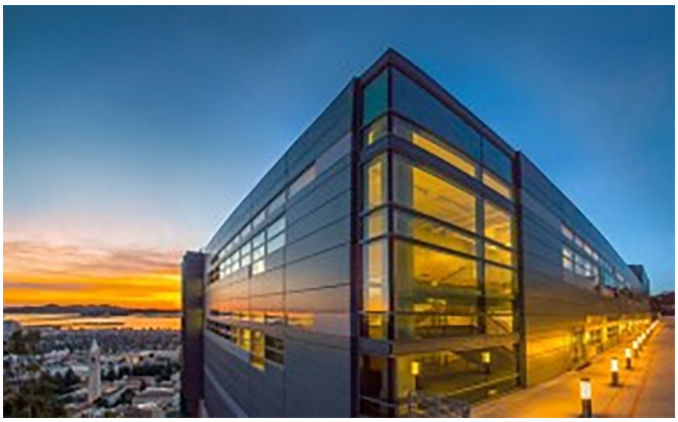
Overview

Founded in 1931, the mission of Lawrence Berkeley National Laboratory (LBNL) is to bring science solutions to the world. As of 2023, the Lab was associated with 16 Nobel prizes and home to approximately 3,600 full-time employees, including 82 members of the National Academy of Sciences and 16 National Medal of Science awardees. The Lab also serves faculty and scholars, visiting scientists and engineers, and over 14,000 facility users from around the world.

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 maintains its 50001 Ready recognition and ISO 50001 certification, since attaining them in 2020. The Lab's **ISO 50001 manual**, the keystone of its program, is publicly available to serve as a resource for others pursuing ISO 50001.

The ISO 50001 process is critical to the Lab's maintenance of very strong efficiency metrics:

- Lab-wide energy consumption per square foot excluding major process loads has decreased 28% since FY 2015. See **Energy Consumption per Square Foot Compared to Baseline**.
- Lab-wide natural gas consumption is 28% lower than in FY 2015. See **Energy Consumption Compared to Baseline**.



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*

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

– John Elliott, Chief Sustainability Officer, LBNL

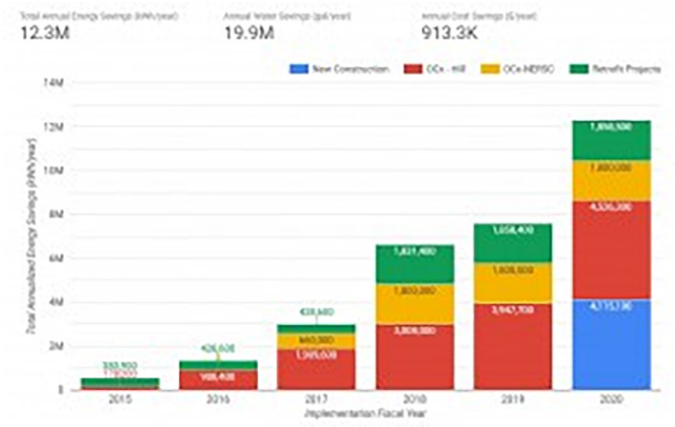
LBNL launched its sustainability program in 2012 and subsequently began to align its energy-management activities with International Organization for Standardization (ISO) 50001 and ISO 14001 principles. To achieve 50001 Ready status, the Lab took measures involving 2.1 million square feet of built space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

Solutions

The Lab has a number of federal, state, and University of California greenhouse gas reduction targets, and longer-term mitigation has become the focus of its energy efficiency activities. The ISO 50001 energy-management standard and 50001 Ready provide the organizational structure required to build an energy-management program that will scale well and endure.

Key Takeaways: 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 comprehensive manual that maps the standard's requirements into coherent and consistent processes. The manual organizes and links to data and metrics, key documents, and procedures, providing a central and day-to-day resource for the team. And it continually evolves as requirements change and processes are improved.



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.

- **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.

"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

Other Benefits

The team identifies and implements energy-efficiency measures, capital improvements, and monitoring systems 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** since 2015. All the Lab's efforts to achieve and maintain these savings are strengthened by following the ISO 50001 standard.

The team has recognized that the standard goes beyond technical issues 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 pushes LBNL to be more rigorous and systematic—in data collection, documentation, and communications. The LBNL team works to ensure that new energy-efficiency measures help meet the Lab's broader goals, not just audit requirements. The Lab has also observed benefits not directly related to energy use, such as improved comfort in buildings and less wear and tear on equipment.

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." Learn more and view LBNL's ISO 50001 manual at **iso50001.lbl.gov/**.

"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, LBNL

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.
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