

OAK RIDGE NATIONAL LABORATORY— 50001 READY FACILITY

BACKGROUND

The Oak Ridge National Laboratory (ORNL) in Oak Ridge, Tennessee, is the largest of the U.S. Department of Energy's open science laboratories. Its mission is to deliver scientific discoveries and technical breakthroughs that accelerate the development and deployment of solutions in neutron science, global security, and clean energy while creating economic opportunities for the nation. One of ORNL's missions in facility operations is the unique opportunity of hosting one of the world's most advanced high-performance computers to assist in research and solving challenges in diverse scientific fields. Energy efficiency is especially critical at ORNL due to the energy and water resources required to house these high performance computer systems.

ORNL is an organization already familiar with the management systems standards approach to continuous improvement, through its certifications with the ISO 14001 (environmental management) and ISO 9001 (quality management) standards. Understanding the cost and environmental benefits of energy efficiency, the ORNL Facility Management Division (FMD) uses EPA's Energy Star Portfolio Manager to track and improve energy efficiency in all metered buildings on its campus, and participates in DOE's Better Buildings and Smart Energy Analytics initiatives. In addition, the ORNL FMD ensures federal compliance by conducting annual energy audits on the 65 largest buildings under its management (more than three million square feet of offices, labs, and mixed-use buildings) and dedicates annual operating funds for energy conservation projects, such as their most recent installation of smart meters and utility meter data systems to allow better visibility into energy usage patterns and opportunities.

To complement the benefits of investments in advanced metering technology, ORNL recognized the advantage of implementing a structured process to take its energy performance to the next level. The Laboratory was in a prime position to deploy a system that could facilitate and document continuous energy and water usage reductions and help to improve operational costs.



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SOLUTIONS

After learning more about 50001 Ready at DOE's annual **Energy Exchange** conference, the ORNL energy team obtained the approval and support of the FMD Division Director to implement the 50001 Ready system. The Facilities and Operations Laboratory Leadership was on board to provide the support needed for the success of the project. The 50001 Ready Navigator guidance and tools helped ORNL formally document its energy management processes and procedures and organize data records. The modestly-sized ORNL energy team particularly appreciates the efficiencies of a central system for storing its plans, policies, work breakdown structure, energy data, and conversion equations. The formalized system took about one year to implement and has surpassed expectations in identifying relevant variables and accelerating energy analyses through the emphasis of life-cycle energy analysis and staff engagement.

"Due to the complexity and mission-specific nature of our facilities, obtaining the DOE 50001 Ready recognition is an impressive achievement that came after a lot of effort and collaboration among ORNL associates."

– Ann Weaver, Director
ORNL Facilities Management Division

“The resources provided by the 50001 Ready Navigator helped us to initiate a systemic and organized approach to document the ORNL energy efficiency program. Best practices, policies, procedures, federal guidance, and quality energy data are now cataloged, organized, and accessible in a logical structure that is well-designed to advance our efforts in efficient and sustainable facility operations.”

– Ann Weaver, Director
ORNL Facilities Management Division

Implementing a 50001 Ready Energy Management System

- ▶ **Significant energy users (SEU).** Building-level energy data from advanced utility meters was used to determine the facilities using the most energy and helped bring consideration and clarify priorities for potential energy efficiency projects across the large and diverse ORNL campus.
- ▶ **Central repository for documents with project management tools.** Following the guidance found in the 50001 Ready Navigator tool, the ORNL energy team set up a central repository tailored to the specific needs of their facilities. The team designed a Work Breakdown Structure (WBS) with color coding to differentiate documents from annual performance records with the SEU analysis linked to folders containing the relevant analyses. Keeping these files up to date will be critical to future savings and maintaining 50001 Ready’s approach of continuous improvement and will enable them to make annual progress toward energy and water use goals.
- ▶ **Legal requirements.** Though rigorous and challenging, the energy team found Task 5 of the Navigator tool particularly useful because it engaged them with critical legal questions regarding their energy management system. The flexibility afforded by the Navigator’s structure further supported ORNL’s Energy Program team in the development of an annual timeline and tracking system tailored to the unique set of compliance and reporting requirements.
- ▶ **Navigator resource documents.** ORNL made extensive use of the Resource Documents housed in the Navigator tool and also found the Full Descriptions sections for each task very useful.

OTHER BENEFITS

After implementing training and communications measures in accordance with Tasks 20 and 21 of the Navigator tool, the FMD energy team developed a communication plan to engage the wider ORNL workforce in energy-saving efforts and training opportunities that will benefit the energy program goals.

Key Takeaways

The FMD energy team met early with ISO 14001 compliance associates, who provided useful advice on the tasks, planning steps, and strategies for meeting these goals while maintaining conformance to contract requirements. Being able to draw on the success of previous experience with ISO program structures accelerated the adoption of the **50001 Ready** systems.

Keys to success include collaboration with knowledgeable team members (including legal and regulatory experts), and guidance from subject matter experts in both facility operations and energy research. Management has expressed interest in renewing its 50001 Ready status next year with potential to expand the program at ORNL within the next two to five years.



Aerial Overview of ORNL in 2017. Photo Credit: Jason Richards