

# Mission Assurance through Energy Assurance DoD Installations and the Use of ISO 50001

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A popular adage states you can't manage what you don't measure. Perhaps nowhere is this assertion more true than for the nation's largest energy user, the U.S. Department of Defense (DoD). DoD's installations represent 284,000 buildings and over 2 billion square feet, consuming 1 percent of the total energy expended in the United States at a cost of almost \$4 billion.<sup>1</sup> These installations depend on a vulnerable commercial grid subject to disruptions from aging infrastructure, severe weather, and terrorism. Furthermore, most bases operate in a fiscally constrained environment. Spending money on water and energy bills means critical mission priorities may have to be sacrificed. Conversely, better

resource management can free additional capital to devote to those priorities.

The voluntary energy management standard, International Organization for Standardization (ISO) 50001, "Energy Management Systems—Requirements and Guidelines for Use," provides a framework for integrating energy management into an organization's business processes. Its structure aligns with other ISO management system standards, such as ISO 9001, "Quality Management Systems," and ISO 14001, "Environmental Management Systems." U.S. military installations use ISO 50001 implementation to deliver sustained year-to-year energy and carbon savings and

<sup>1</sup> Jeffrey Marqusee, Craig Shultz, and Dorothy Robyn. *Power Begins at Home: Assured Energy for U.S. Military Bases*, The Pew Charitable Trusts, 2017.

## The DoD's Installations

4 billion dollars spent\*



2 billion square feet



284,000 buildings



1 percent of the total energy consumed in U.S.



\* Marqusee, Schultz & Robyn, 2017.

comply with mandates, such as the Energy Independence and Security Act of 2007 and the more recent John S. McCain National Defense Authorization Act. The latter directs military branches to examine “energy and climate resilience” in every installation master plan.

Keys to successful implementation of the standard include a commitment from upper management, establishment of an energy team, identification of major energy users, establishment of energy targets and tracking use, and publication of successes. While some organizations simply implement the standard, others go further by pursuing third-party certification to demonstrate best practices in energy management.

Marine Corps Air Station Beaufort (MCAS Beaufort) and the Oklahoma City Air Logistics Complex (OC-ALC), located at Tinker Air Force Base, implemented ISO 50001 and are already reaping the benefits. MCAS Beaufort is a 7,000 acre Marine Corps air base just outside of Beaufort, South Carolina, and OC-ALC is one of the largest units in the Air Force Materiel Command. A further look at both cases illustrates the advantages of implementing the standard.

## MCAS BEAUFORT

In 2013, MCAS Beaufort implemented a state-of-the-art energy management system (EnMS) as part of its energy solution. The goal was to establish a base-wide culture of continual energy performance improvement to meet the energy and water mandates set by Marine Corps Installations Command. MCAS Beaufort proposed a 30-month implementation of an ISO 50001-conformant EnMS in partnership with the Lawrence Berkeley National Laboratory and Georgia Institute of Technology (Georgia Tech). The initiative created a framework that enables MCAS Beaufort to understand its energy usage and subsequently improve energy performance.

## Benefits

Some of the benefits of Beaufort's ISO 50001 implementation include the following:

- Visible demonstration of alignment with DoD's strategy for mission readiness
- Better analytical tools for energy management decisions
- Standardized and disciplined energy management practices that survive personnel changes
- Increased awareness and communication regarding energy management performance across the organization
- Energy cost savings.

According to Neil Tisdale, utilities director and energy manager of MCAS Beaufort, “One of the most valuable aspects of the standard is the emphasis on significant energy users. It helped us to concentrate on things that were more important and we were able to generate efficiencies and save money as a result.”

An example of a significant energy user is the corrosion control facility, an area used for prepping and painting jets. Temperature, humidity, and exposure to compounds in aerospace coatings must be tightly controlled. In addition, air blowers use large amounts of energy as they push and pull air through the facility depending on the mode of operation. The building was metered to track natural gas and electricity usage, enabling identification of periods when energy-intensive equipment could be turned off. Greater communication from the energy management team to the facility with reminders to switch off equipment when not in use has created accountability, greatly decreasing energy usage.




## Challenges

The implementation of ISO 50001 was not without challenges. MCAS Beaufort faced a typical hurdle for most organizations: resource availability. Implementation takes dedication of time and effort; every unit in the installation must be involved. Base personnel, already subject to multiple requirements and inspections, can feel burdened by these additional responsibilities. The varying values placed on energy efficiency caused another challenge. Bases tend to view energy efficiency as a way to comply with statutes and executive orders rather than as an essential element of energy security. Despite these challenges, as of June 2018, MCAS Beaufort is 6.3 percent below its 2015 energy use baseline. The pilot training center, a 100,000 sq. ft. space, has maintained its baseline despite having added additional equipment, such as flight simulators.

## OC-ALC

Like other ISO management system standards, ISO 50001 certification is voluntary. OC-ALC was the first federal organization to earn ISO 50001 certification. The complex is the largest tenant at Tinker, using 60–70 percent of the energy on the base as it performs depot maintenance, repair, and overhaul of aircraft and accessory components for the Air Force, Air Force Reserve, National Guard, Navy, and foreign military sales. OC-ALC employs more than 10,000 personnel, has a \$3.4 billion local economic impact, and has over 54 facilities, covering 8.1 million square feet. Under normal budgetary conditions, achieving ISO 50001 certification and implementing large-scale capital improvements would not be possible.

However, in December 2016, OC-ALC awarded a 25-year energy savings performance contract (ESPC). The \$262 million project is the largest ESPC awarded to date by the Air Force. The ESPC enables the Air Force to fund upgrades using annual energy and operational savings, providing a budget-neutral approach to funding capital improvements. The team at OC-ALC included the ISO 50001 implementation in the ESPC, offsetting costs associated with the initial certification and three-year recertification. ISO 50001 was the glue for the ESPC because it provided a structure capable of supporting such a long-term project. The driver for ISO 50001 certification, according to Joseph Cecrle, OC-ALC energy manager, was "to establish a data-driven management system for



energy where our energy management efforts were not responding to crises but rather something that spans the entire organization and uses data to make inform[ed] decisions."

OC-ALC is not new to the concepts of plan-do-check-act or continual improvement. The Air Force mantra, art of the possible, guides the thinking behind a variety of quality systems, such as AS 9110 for aerospace quality management certification. The addition of ISO 50001 was natural and easy to accept. Using the Lawrence Berkeley National Laboratory and Georgia Tech gap analysis of its energy program, the OC-ALC team implemented a structured and

systematic approach to energy management and started the certification process in earnest in April 2016.

## Benefits

Some of the demonstrated benefits of the ISO 50001 implementation and certification have included

- leadership engagement, including permission and support from the top command in implementing energy management activities;
- cultural change and a sense of organizational pride;
- increased discipline and follow through;
- changes in the procurement process, resulting in more efficient supply chains;
- focus on the process energy versus regular heating and cooling; and
- energy reductions and energy cost savings (14.1 percent below FY15 baseline).

OC-ALC is currently projecting its 2018 fiscal year utility costs at \$22.5 million—higher than 2017, but lower than 2014 through 2016. The trend in decreased annual utility costs year over year speaks to the value of the system:

- 2014, \$31.4 million
- 2015, \$28.6 million
- 2016, \$24.5 million
- 2017, \$19.8 million.

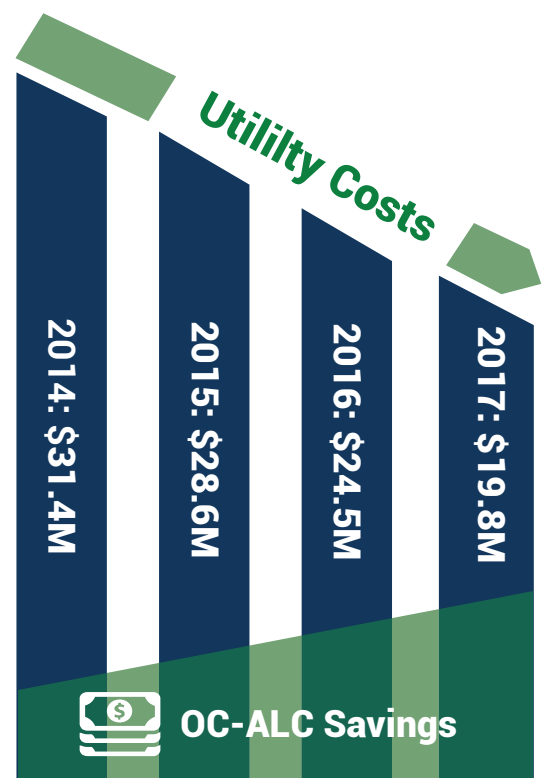
## Challenges

Implementation at OC-ALC wasn't without challenges. ISO 50001 requires increased communication across an organization, which can be daunting with over 10,000 employees. But, through engagement and empowering people to take more accountability and responsibility for energy use, the OC-ALC has benefited from employee-proposed, no cost solutions. Each area of significant energy use

has a team, distributing the commitment to the system across the organization. For example, one team identified some cooling towers that were only needed during low use, weekend demand but were being run 24 hours a day, 7 days a week. This opportunity to reduce usage had been overlooked by others because they were not familiar with the equipment and process requirements.

Communicating performance results is also a priority. For its energy performance indicator, OC-ALC developed a control chart that analyzes monthly fluctuations and offers simplicity in communicating energy management in a meaningful way. The control chart reflects the measures taken and illustrates the improvements in energy usage over time. As with MCAS Beaufort, the identification of significant energy users pinpoints areas where efficiencies can be achieved.

According to Joseph Cecrle, OC-ALC energy manager, "In each one of the significant energy use areas, we have a team stood up in that area







that understands their production requirements. We let them set their plans, goals, and objectives because they know their production process much better than I as an energy manager would. We provide the opportunities, support modeling, and data analysis. But they come up with the ideas."

Another challenge is keeping the momentum going. "You just have to keep pushing the cart forward," says Joseph. The commander sets the tone for implementing the EnMS and ISO 50001 certification simplifies the transition when commanders change. "So far, every leadership change has reaffirmed the ISO 50001 system as being part of the organization. In fact, having the system makes the change easier."

The project at OC-ALC began in 2014 when the team initiated market research and continued through achievement of certification in April 2017. The certification process itself took about a year with Ken McKuen heading up the effort as the ISO 50001 program manager. Ken started the process in earnest in April 2016. Advanced Waste Management Systems, Inc. (AWM) performed the certification. Certification bodies, such as AWM, are assessed for competence by an accreditation body, such as the ANSI-ASQ National Accreditation Board (ANAB), which is recognized via successful peer review as ISO/IEC 17011 compliant under the International Accreditation Forum Multilateral Recognition Arrangement.





"AWM is proud to be the certification body for OC-ALC. It has been great to see the leadership and dedication that OC-ALC puts into energy management and the results achieved. The model established should set a great path for other sites to follow. Accreditation by internationally recognized organizations, such as ANSI and ANAB, adds additional value via oversight which confirms the independence and rigor of these audits and substantiates trust and confidence in the OC-ALC achievements." – *Rob Ellis, CEO of AWM*

## THE WAY AHEAD

Ogden Air Logistics Complex at Hill Air Force Base and Warner Robins Logistics Complex at Robins Air Force Base (other complexes within the Air Force Sustainment Center, which encompasses OC-ALC and Tinker AFB) are pursuing ISO 50001 certification with the goal of achieving certification by 2020. ISO 50001 transforms the way organizations manage their energy and boosts resiliency. A recent revision to the standard places a stronger emphasis on the role of top management in instilling organizational cultural change. As DoD pursues energy resiliency as a priority and seeks cost effective solutions to improve mission assurance, ISO 50001 supplies a framework for achieving that mission.

## ABOUT THE AUTHOR

**Ann Howard** is director of Environmental Accreditation Programs at the American National Standards Institute.

