

U.S. Army Reserve 88th Readiness Division Finds Big Savings

The United States Army Reserve (USAR) 88th Readiness Division (88th RD) was recognized in two 2017 Interior Lighting Campaign (ILC) exemplary recognition categories. The troffer lighting upgrade projects at the two recognized sites are expected to save more than 246,000 kilowatt-hours (kWh) annually, or roughly enough electricity to run 23 homes for a year.

Background

One project was recognized in the Highest Percentage of Annual Energy Savings for Troffer Lighting Retrofits in the Large Project category. This project involved the retrofit of 1,225 troffers and reduced energy use by 72% at the COL P. Schulstad U.S. Army Reserve Center (USARC) in Arlington Heights, Illinois.

The other project was recognized in the Highest Percentage of Annual Energy Savings for Troffer Lighting Retrofits in the Medium Project category. This project involved the retrofit of 94 troffers at the 1LT Robert L. Poxon USARC in Southfield, Michigan, that reduced energy use by 63%.

Learn More

U.S. Army Reserve 88th Division
(Readiness)

www.usar.army.mil/88th-RD/



The 88th Readiness Division upgraded troffers at locations in four states. Two of the troffer upgrade projects were recognized for excellence at sites in Michigan and Illinois.

Photo credit 88th RD.

The majority of the troffers upgraded at these two recognized sites were two-lamp (58-Watt), three-lamp (88-Watt) and four-lamp (112-Watt) 2' x 4' T8 fluorescent luminaires. The upgrades included installation of 24 to 50-Watt light-emitting diode (LED) luminaires as well as the installation of occupancy sensors throughout both facilities. The sensors are believed to contribute up to 25% of the energy use reduction.

The two recognized projects were among a group of upgrade projects completed by the 88th RD at four sites located in Ohio, Michigan, and Illinois totaling 516,000 square feet (ft²) of lighted space.

The 88th RD supports the Army Reserve soldiers and civilians located in the Midwest, Great Plains, and Northwest states, and the 88th RD jurisdiction includes 9.5 million ft² of building space in facilities located across a 19-state region.

Project Drivers and Successes

With goals to reduce energy use, the 88th RD Energy Team was driven to find projects that met funding criteria. “These projects met the requirements for the project savings-to-investment ratio and payback periods to qualify for supplemental funding from the Army Reserve Installation Management Directorate (ARIMD),” said Chris Jackson, Energy Manager for the 88th RD.

This project received funding from ARIMD and was contracted through the Department of Justice. 88th RD staff worked with Con Edison Solutions, who then subcontracted the work out to LRI Energy Solutions.

At the 1LT Robert L. Poxon USARC project managers estimated lighting energy savings of approximately 15,000 kWh per year. At the local utility power rate of \$0.12/kWh, the upgraded fixtures should save nearly \$1,800 per year in electricity costs. At the much larger COL P. Schulstad USARC, where 1,225 troffers were retrofit to LED systems, project managers estimated lighting energy savings of approximately 231,000 kWh per year. With Illinois’ lower utility rate of \$0.07/kWh, the upgraded fixtures should save nearly \$16,200 per year in electricity costs. “Since the retrofit fixtures were brought online, the project has shown substantial savings of as much as 60% in monthly lighting energy costs. We predict this will have a significant impact on our annual energy use intensity,” said Jackson.

Energy savings and maintenance cost savings were key goals of the project. A reduction of solid waste disposal material was also a contributing factor for installing retrofit lighting fixtures versus whole fixture replacements according to Gregg Herman, 88th RD General Engineer. The 88th RD Energy Team expects a measurable reduced number of

labor hours and repair costs with the LED retrofit lighting compared to the existing conventional light fixtures as a result of the longer life of the LED fixtures.

Not only do the lamp replacements take maintenance staff time, they also cause disruptions to the work space. Both the Michigan and Illinois facilities are used for training, administration and storage.

Minimizing disruptions in the facilities was another significant reason that the 88th RD chose to retrofit the existing fixtures rather than replacing the entire fixtures. The reduced time and effort to install a retrofit as well as lower component costs when compared to a traditional fixture replacement were other considerations. An additional benefit of retrofitting was that it minimized disturbance to ceiling tiles and support structures.

The choice to retrofit rather than replace came with challenges. Project staff found that the LED lamps require a specific type of dimmer that can reduce the voltage to very low levels while keeping the fixture illuminated. The original dimmer switches, used previously with the T8 lamps, were not compatible with the LED lamps and had to be changed out. Also, soon after the retrofit, several of the fixtures had early failure of LED segments, resulting in dark spots in the fixture covers. These burned out strips were replaced by the lighting contractor soon after they were installed.

Despite the challenges, the 88th RD Energy Team agreed that the obstacles encountered on the projects were kept to a minimum through close coordination and hard work of the Department of Justice Contract Office Representative, operations personnel, and facility managers. As a result the project was pretty straightforward.

The new LED fixtures provide a more even illuminance when compared with the old T8s. Project staff recorded pre- and post-installation illuminance levels at the height equivalent to a 30-inch desktop showing an increase in illuminance levels.

Next Steps

The 88th RD currently has a lighting retrofit project at the PFC Grella Army Reserve Center in North Canton, Ohio, and has several other projects staged for upgrades in Idaho, Wisconsin, and Iowa. The 88th RD anticipates using the same lighting technologies and controls in those projects as were used in the Michigan and Illinois projects.

Lessons Learned

- Close coordination between the Contract Office Representative, operations personnel, and facility managers kept obstacles to a minimum.
- Retrofit was preferable to full replacement to minimize disturbance of ceiling tiles and disruption of active workplaces.
- LED luminaires are not compatible with all dimmers, and compatibility should be verified prior to installation.

Projects at a Glance

	Medium Project	Large Project
Project Location	Southfield, MI	Arlington Heights, IL
Total Area of Project	8,000 ft ²	94,000 ft ²
# of Troffers Upgraded	94	1,225
Annual Energy Savings	15,000 kWh	231,000 kWh
Energy Use Reduction	63%	72%
Annual Energy Cost Savings	\$1,800	\$16,200

Before and After Retrofit — Southfield, MI - medium site

	Before	After
Technology	2-4 lamp T8 fluorescent	LED
Number of Troffers	94	94
Wattage per Troffer	62-112-W	30-50-W
Annual Energy Use	23,800 kWh	8,800 kWh

Before and After Retrofit — Arlington Heights, IL - large site

	Before	After
Technology	2-4 lamp T8 fluorescent	LED
Number of Troffers	1,225	1,225
Wattage per Troffer	58-112-W	24-40-W
Annual Energy Use	322,000 kWh	91,000 kWh

Federal Energy Efficiency Requirements for Interior Lighting

Although every site, whether federal, private, commercial, or industrial, can benefit from the energy savings, maintenance savings, and lighting quality improvements, offered by energy-efficient lighting, federal sites have another motivator. They must ensure compliance with the multiple laws, executive orders, and Federal Acquisition Regulations, which mandate that federal agencies meet efficiency requirements in all procurement and acquisition actions that are not specifically exempted by law.

ENERGY STAR® Lighting

Federal laws and requirements mandate that agencies purchase ENERGY STAR® qualified products. To find ENERGY STAR qualified lighting products, see www.energystar.gov/productfinder/.

Federal Efficiency Requirements

In cases where there is no ENERGY STAR product category, the agency must comply with FEMP-designated efficiency requirements.

The table below lists the minimum federal efficiency requirements that various categories of interior LED lighting must meet to be eligible for purchase by federal agencies.

FEMP LED Purchasing Guidance

For more information on high-efficiency lighting technologies and information for federal agencies, including lighting requirements language for contracts, visit energy.gov/eere/femp/purchasing-energy-efficient-commercial-and-industrial-led-luminaires.

FEMP and the DOE LED Lighting Facts® program have partnered to offer a tool that allows federal users to identify LED lighting products that meet the minimum federal efficiency requirements.

The FEMP Acquisition Guidance Product List allows users to search for interior lighting products in the six categories in the table below that meet federal requirements. The tool provides a pre-screened list of products and federal users can screen on a large range of other product metrics, including color temperature, power factor, and beam angle. Find qualifying products at www.lightingfacts.com/LFPowered/FEMP.

Helpful Guides

LED Retrofit Kits, Tubular LEDs, and Lighting Controls: An Application Guide — This document provides guidance for retrofitting existing fluorescent troffers including the LED and associated control options available, the pro/cons and costs/benefits of each option, and agency specific requirements (where applicable). www.energy.gov/eere/femp/downloads/led-retrofit-kits-tleds-and-lighting-controls-application-guide

Forrestal Tubular LED Demonstration Project: Lessons Learned — This document provides lessons learned from the relighting project at the James V. Forrestal Building. Project consisted of replacing the existing fluorescent lamps with tubular LEDs. www.interiorlightingcampaign.org/sites/default/files/FEMP-LessonsLearnedForrestal-TLED.pdf

Wireless Occupancy Sensors for Lighting Controls: An Applications Guide for Federal Facility Managers — This guide describes the different types of sensors, appropriate applications, and expected energy savings. www.energy.gov/eere/femp/downloads/wireless-occupancy-sensors-lighting-controls-applications-guide-federal-facility.

Measurement and Verification of Energy Savings and Performance from Advanced Lighting Controls — This document provides a framework for measurement and verification. www.energy.gov/sites/prod/files/2016/03/f30/mv_lighting_control_wireless.pdf

Proven Specifications

Use these specifications, developed by DOE's Better Buildings Alliance and the DesignLights Consortium, to specify performance expectations, warranty, and testing requirements for your lighting projects.

Better Buildings Alliance Model Technical Specification: High-Efficiency Troffers www.betterbuildingssolutioncenter.energy.gov/resources/high-efficiency-troffer-performance-specification

Designlights Consortium Networked Lighting Control Systems Specification www.designlights.org/content/CALC/SpecificationAndQPL

Interior Lighting Campaign



2017 Interior Lighting Campaign
 Highest Percentage of Annual Energy Savings for Troffer Lighting Retrofits - Medium Project
 Highest Percentage of Annual Energy Savings for Troffer Lighting Retrofits - Large Project

**U.S. Army Reserve
 88th Division (Readiness)**

Presented by the U.S. Department of Energy
 June 25, 2017

Dr. Kathleen Hagan
 Deputy Assistant Secretary for Energy Efficiency



On June 25, 2017, the 88th RD was 1 of 13 organizations recognized by the Interior Lighting Campaign (ILC) for

Efficiency Requirements for Commercial and Industrial LED Luminaires

Luminaire Type	Light Output	Luminaire Efficiency (LE)
Commercial: Linear Ambient ^a	≥375 lm/ft	≥119 lm/W
Commercial: 1-Foot by 4-Foot Troffers	≥1,500 lm	≥119 lm/W
Commercial: 2-Foot by 2-Foot Troffers	≥2,000 lm	≥111 lm/W
Commercial: 2-Foot by 4-Foot Troffers	≥3,000 lm	≥115 lm/W
Industrial: Low Bay	≥5,000 to <10,000 lm	≥109 lm/W
Industrial: High Bay	≥10,000 lm	≥128 lm/W

^a Includes luminaires with both direct and indirect lighting components

exemplary energy performance in their application of high efficiency troffer lighting systems at the 2017 Building Owners and Managers Association International Conference and Expo, in Nashville, Tennessee.

The ILC encourages facilities to install energy-efficient lighting as well as lighting occupancy or daylight controls to cut energy use and deliver occupant satisfaction. By adopting more efficient lighting, such as systems that meet the Better Buildings Alliance [specification](#) for troffers, building owners can save up to 50% on a one-for-one basis, and up to 80% with the use of controls.

The ILC's overall goal is to achieve the replacement of 2 million planned or installed high-efficiency interior lighting solutions (troffer, high-bay, low-bay, and suspended linear lighting systems and controls) by April 2018.

ILC Recognition Received

- Highest Percentage of Annual Energy Savings for Troffer Lighting Retrofits - Medium Project
- Highest Percentage of Annual Energy Savings for Troffer Lighting Retrofits - Large Project

Join the ILC

Federal sites are encouraged to join the ILC. The ILC will provide you with:

- technical assistance
- information on financing and incentives
- lighting savings calculators.

Federal sites commit to:

- building or retrofitting at least one building space with high-efficiency lighting. (Sites built or retrofitted with complying fixtures any time after January 1, 2013 are eligible to compete.)
- Share your results.

Report your actual energy savings by April 2018 for a chance to be recognized at the ILC recognition event at the Illuminating Engineering Society 2018 Annual Conference, August 2018, Boston, Massachusetts.

ILC Recognition Categories

ILC recognition spans four application categories including troffers, high-bay, low-bay, and suspended linear. There are also special recognition categories including best use of lighting controls, largest number of facility projects, largest portfolio-wide energy savings, and sector recognition, including a category for federal agencies.

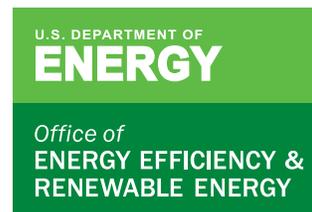
2018 ILC Exemplary Performance Recognition categories include:

- Highest Annual Energy Savings for Lighting Retrofits
- Highest Percentage of Annual Energy Savings for Lighting Retrofits
- Highest Annual Energy Savings for Lighting New Construction
- Highest Percentage of Annual Energy Savings for Lighting New Construction
- Special Recognition Categories:
 - Best Use of Lighting Controls in a Single Building
 - Largest Number of Facility Projects
 - Largest Portfolio-wide Annual Energy Savings
- Recognition may also be presented to participants in the federal sector. ■



Through the Better Buildings Alliance, members in different market sectors work with the U.S. Department of Energy's exceptional network of research and technical experts to develop and deploy innovative, cost-effective and energy-saving solutions that lead to better technologies, more profitable businesses, and better buildings in which we work, shop, eat, stay, and learn. Join today to start saving energy in your commercial buildings through programs like the Interior Lighting Campaign, www.interiorlightingcampaign.org. Photo courtesy of Pacific Northwest National Laboratory.

“The adoption of advanced interior lighting technologies continues to bring U.S. businesses and other organizations significant energy savings,” said the Energy Department’s Deputy Assistant Secretary for Energy Efficiency Kathleen Hogan. “By investing in more efficient lighting, ILC partners demonstrate how cost-effective measures can make a big difference in a building’s energy consumption.”



For more information, visit: energy.gov/eere/femp

DOE/EE-1745 · PNNL-SA-131219 · February 2018