Case Study: Big-Box Retail Parking Lot

LIGHTING ENERGY EFFICIENCY IN PARKING CAMPAIGN

Overview

When it comes to achieving significant sustainability gains, an international retail giant has unique opportunities to cut energy use. With a total of 4,500 sites, Walmart's commitment to efficiency in parking lighting in new construction and retrofits is paying off in major savings.

As a result of its lighting upgrades Walmart received individual Lighting Energy Efficiency in Parking (LEEP) Campaign awards for a superstore, a neighborhood market and a Sam's Club. Across 100 stores including both new and retrofitted sites, over 40 million square feet in surfaces for parking and over 100,000 parking spaces, Walmart is saving over 15 million kWh each year as a result of lighting upgrades.

Leavenworth, KS. Image courtesy of Walmart Stores, Inc.

Keys to Success

According to John Davidson, senior manager for system designs, the impetus for the conversion to LED lighting began in Walmart's international market, which prompted the launch of a sustainability initiative and a challenge by senior leadership to install more efficient lighting in Walmart parking lots. The U.S. team accepted the challenge, driven primarily by an interest in energy cost savings and total cost of ownership, followed by enhanced security.

As a proof of concept, LED lighting was installed at a Rogers, Arkansas site for one year in 2012, with the understanding that it would be removed if it was not deemed successful. In addition to realized energy savings, security at the site reported the ability to see much better with the LED lighting and more accurately discern color than with the incumbent HID system. Walmart had also previously played an active role in the development of LED specifications for the Better Building Alliance. The company then adopted those specifications portfolio-wide in 2012.

"We've been able to recoup approximately 80% energy savings over the HID alternative and enjoy a reduced maintenance program, in addition to the enhanced visibility."

John Davidson, Senior Manager for System Designs, Walmart

Results	
Energy Savings	130,000 kWh, a savings of 60%
Lighting Power Density (W/sq. ft.)	0.04, a reduction of 60%
Simple Payback	Less than 3 years (across all locations)
Installation and Maintenance	The new technology required both internal and external training to successfully apply LEDs to a parking lot. Finding lighting designers was a challenge initially, so a training program was organized through the vendors; certified designers approved the photometrics.
Overall Performance	LED parking lot lighting and wall-mounted fixtures on the building have helped address dark sky issues and diminish light pollution, increasing visibility and enhancing security.

Now, through the Walmart sustainability program, all new store prototypes are delivered with LED lighting in the parking lot. Remodels and expansions also take advantage of LED lighting benefits where feasible as Walmart store managers often request replacement of HID lighting with LEDs, for the energy savings and the better visibility across the parking lot. Retrofits to LED lighting are completed where feasible, and the conversion of any given store depends both on a committed project manager and the store budget.

Also, after an LED conversion, stores often get positive feedback from area residents related to reduced light trespass. LED parking lot lighting and wall-mounted fixtures on the building itself, with their directional light, have helped address dark sky issues and diminish light pollution.

Simple payback on LED investments averages less than three years. Although the initial capital investment is relatively high, Walmart takes advantage of utility incentive programs where available, which helps defray costs. Ultimately, the quick simple payback makes it appealing, as does the total cost of ownership over the long term.

Lessons Learned

- When employing LED technology, consider the level of training required for design, maintenance and troubleshooting. As Walmart first started to integrate LEDs into its parking lots, it had to rethink its approach to lighting. With the lower lumen output of LEDs, the team focused more attention on fixture light distribution and pole placement, resulting in improved lighting in transitional and boundary spaces, and in the parking lot.
- The new technology required both internal and external training to successfully apply LEDs to a parking lot. Finding lighting designers was a challenge initially, so a training program was organized through the vendors; certified designers approved the photometrics.
- In environments where everyone is used to HID lighting, there will be uncertainty about what to do in the event of an LED lighting failure. The team that services the lighting will need training. Assure that the manufacturer covers this support through the warranty.

LEEP Award Winning Site	
Location:	117 sites nationwide and individual stores in CA, MN, and OK
Solution:	LED designs with low lighting power density
Awards:	Largest Portfolio Wide Annual Absolute Energy Savings Highest Percentage Energy Savings in a Retrofit at a Single Parking Area (Torrence, CA) Highest Absolute Annual Energy Savings in a New Construction Single Parking Area (Cottage Grove, MN) Highest Percentage Energy Savings in a New Construction Single Parking Area (Warr Acres, OK)

Next Steps

Fueled by impressive results, LED parking lot lighting projects have taken on a momentum of their own and are now a key part of Walmart's sustainability initiative. The company anticipates integrating LED parking lot lighting at some 200 new sites by the spring of 2015, at an average of 300,000 square feet per site.

Learn More

Through the Better Buildings Alliance, members across different market sectors work with the U.S. Department of Energy's (DOE) exceptional network of research and technical experts to develop and deploy innovative, cost-effective, energy-saving solutions that lead to better technologies, more profitable businesses, and better buildings in which we work, shop, eat, stay, and learn.

Learn more about how to join the Better Building Alliance's Lighting Energy Efficiency in Parking Campaign, at www.leepcampaign.org/. LEEP Participants are collectively saving over 120 million kilowatt-hours and over $10 million annually across 430 million square feet of lots and garages by upgrading to high efficiency parking lighting.

Find more resources and guidance on lighting in the Better Buildings Solution Center.