



The Walmart parking lot in Leavenworth, Kansas, was the first to implement the DOE's CBEA LED Site Lighting Specification

Walmart Parking Lot Goes LED

Leavenworth, Kansas

WALMART PROFILE

Established: 1962

Number of Stores: 8,900+ worldwide

Employees: 2 million +

No. of Parking Lots with LEDs*:
60 sites shipped, 20 sites installed,
300 sites in various stages of design/permitting

No. of Parking Lots Planned to Use LEDs: 300+

"Walmart has used the LED Site (Parking Lot) Lighting Specification, Parking Structure Lighting Specification and the LED Refrigerated Case Lighting Performance Specification as the basis to develop bid specifications for these products."

— Ralph O. Williams, Walmart Senior MEP Systems Engineer

Largest Retailer Goes LED

Walmart, based in Bentonville, Arkansas, has been exploring energy-efficient alternatives for many years. In 2008, Walmart joined the Retailer Energy Alliance (REA) formed by the U.S. Department of Energy (DOE) under its Commercial Building Energy Alliance (CBEA). The REA brings together similar types of end users to exchange information and leverage buying capacity to help expedite market adoption of energy-efficient technologies and design practices. One activity undertaken was the development of a CBEA light-emitting diode (LED) Site (parking lot) Lighting Specification.

The Supercenter in Leavenworth, Kansas, offered a test case to see if an LED system could meet the specification requirements while being competitive with conventional systems when maintenance and energy costs were figured into the equation. The parking lot covered more than 500,000 square feet and, because this was a new site, the pole layout was designed specifically for the LED luminaires.

Walmart had historically had concerns with the use of LEDs due mostly to cost and reliability. However, the combination of lower LED fixture prices and the emphasis on LED reliability in the CBEA Specification got Walmart's attention.

The Technology Competitors

The LED system was compared to two systems: a 1,000 watt (W) pulse-start metal halide (PMH) (Comparison 1) and a 400-W PMH (Comparison 2).

The Details

- The initial costs of LED luminaires are more than offset by reduced electricity and deferred maintenance costs over the life of the LED luminaire
- Life: Walmart expects the LED luminaires to provide the lighting for at least 10 years

*As of April 2012

CBEA LED Site (Parking Lot) Lighting Specification

The specification was developed with the goal of accelerating the market availability of LED site lighting products that meet CBEA members' performance requirements. DOE released CBEA LED Site Lighting Specification v1.3 on February 15, 2012.

Key details of the specification:

- Luminaires' backlight, uplight, and glare rating should be characterized per IES TM-15.
- Luminaires should carry a 5-year warranty covering the luminaire, finish, and power supply.
- Testing requirements are identified.
- Different amounts of light (illuminance) are needed for different parts of the parking lot.
- Both power density and illuminance requirements are by lighting zone; different environments need more or less light (and thus use power differently).

For more information about the CBEA LED Site (Parking Lot) Specification, please visit:
http://www1.eere.energy.gov/buildings/alliances/parking_lot_lighting.html

www.buildings.energy.gov

- Leavenworth melded electricity rate: \$0.056 per kilowatt-hour (\$/kWh)
- Operating hours: 11.5 hr/day or 4,200 hr/year.

The Initial Results

Comparison	Energy Savings	Simple Payback @ \$0.056 / kWh	Simple Payback @ \$0.1022 / kWh*
LED vs. 1,000-W PMH	63%	7.5 years	4.5 years
LED vs. 400-W PMH	44%	6.2 years	4.4 years

* The average national electricity rate of \$0.1022/kWh provides a comparison for other sites.

Although the LED system cost more than either of the PMH systems when comparing initial costs, the LED system had lower costs at the end of the 10-year analysis period.

The Results After Two Years

In the two years since Leavenworth was completed, Walmart has redesigned their prototypical design. The changes between the typical installation done previously and the installation being done since the redesign are shown in the table below.

Item	Typical Installation	Redesigned Installation
Fixtures	94	74
Pole Height	38 ft	42 ft
# of Poles	34	30

As a result of the redesign, a 21% reduction in fixtures and 12% reduction in the number of poles has lead to increased energy savings and shorter payback periods as shown below.

Comparison	Energy Savings	Simple Payback @ \$0.056 / kWh	Simple Payback @ \$0.1022 / kWh*
LED vs. 1,000-W PMH	71%	4.6 years	2.7 years
LED vs. 400-W PMH	56%	2.7 years	1.9 years

Although the LED system cost more than either of the PMH systems when comparing initial costs, the LED system had lower costs at the end of the 10-year analysis period.

What's Next

Walmart continues to install LEDs in new store parking lots, with over 300 in various stages of planning and permitting as of April 2012. A retrofit program will be instituted when return on investment criteria are achievable.