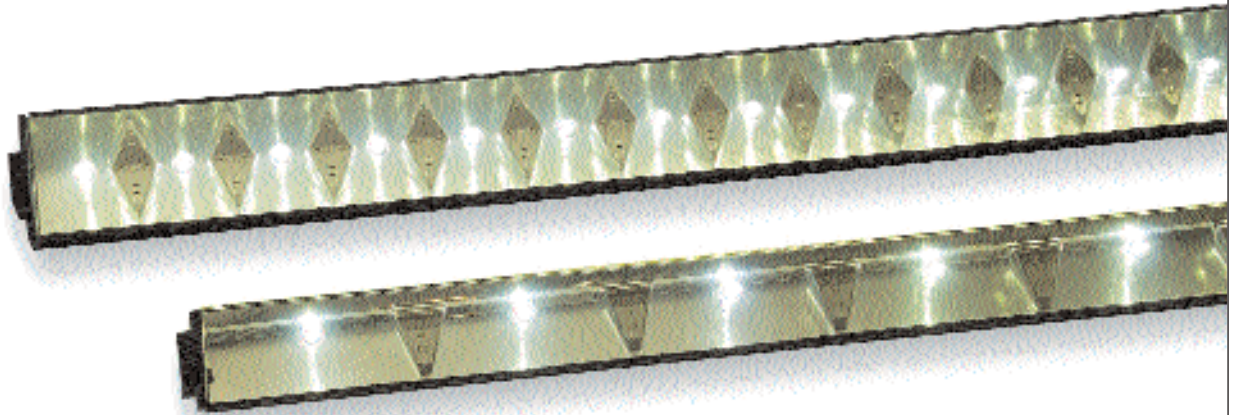


Tracking LED Traction: More Retailers Deploy GE's LED Refrigerated Display Lighting Solution

By Ravi Kaushik, Retail Display Lighting Product Manager, Lumination, LLC



LEDs offer big maintenance advantages versus fluorescent lamps

Wal-Mart Stores, Inc. announced in November 2006 that it would outfit low- and medium-temperature refrigerated display cases in more than 500 US stores with a GE LED solution from Lumination, LLC, a GE company formerly named GELcore, LLC.

In stores where the new GE LED solution will be put to work, Wal-Mart expects to net up to 66 percent energy savings, compared with fluorescent technology. Wal-Mart will employ occupancy sensors and LED dimming capabilities to reduce the time the LED refrigerated display cases are at 100 percent light levels, moving from 24 hours to approximately 15 hours a day.

"GE is a key ally in our effort to develop and deploy technologies that enhance the performance of our stores," said Charles Zimmerman, vice president of prototype and new format development at Wal-Mart. "GE's inventive LED Refrigerated Display Lighting Solution is a strategic tool in Wal-Mart's pursuit of a 30 percent reduction in energy and 20 percent reduction of greenhouse gas emissions at our stores. These are the kinds of commitments that we're making to be both an efficient and profitable business, as well as a good steward of the environment."

"The installation of GE's efficient, long-life LED Refrigerated Display Lighting Solution instead of the incumbent fluorescent technology allows Wal-Mart to aggressively pursue its environmental sustainability goals," said David Elien, president of Lumination. "This massive application of GE-quality LED

technology is another shining example of how green is green."

The combined environmental impact of a 500 store installation represents an annual 35 million pound reduction of carbon dioxide emissions. It also equals the good that comes from planting over 4,464 acres of trees or removing over 3,143 cars from the road for every year the LED lighting operates in place of fluorescent lighting. Wal-Mart estimates energy cost savings of a 500 store retrofit, one of the top energy-saving initiatives it will pursue in 2007, will exceed \$2.6 million annually.

Wal-Mart reports that subsequent phases of the initiative will be aimed at retrofitting existing refrigerated display cases at many of its worldwide network of 6,689 stores. "We have committed to invest up to \$500 million annually on energy-efficient technologies," said Zimmerman. "It's our hope that one day all our reach-in refrigerated display case lighting will use energy-efficient LEDs."

Foothold Where it's Cold

More recently, Walgreens, an early adopter of energy-efficient technologies and a GE customer since 1968, has specified the GE LED Refrigerated Display Lighting Solution for refrigerated cases in all new stores. It is considering retrofitting existing stores with the solution, as well.

"Through our relationship with GE and the use of innovation in lighting technology, we have been able to deepen our commitment to reducing our company's energy usage," says

Tim Schmid, divisional vice president of construction and facilities management at Walgreens. "We look forward to continuing this partnership well into the future."

According to GE's recently issued ecomagination annual report, Walgreens' commitment to energy efficiency extends to ceiling lighting in 5,600 stores in the US and Puerto Rico. By deploying GE's high-efficiency T8 linear fluorescent lamps and centralized lighting controls, Walgreens is reducing its energy consumption by 133 million kWh and CO2 emissions by 81,000 metric tons annually. The program will benefit the environment while resulting in annual energy savings of more than \$10 million.

Another retailer, BJ's Wholesale Club, has been testing the GE LED Refrigerated Display Lighting Solution for over a year. In a November 2006 Supermarket News article, Michael Pace, energy engineer for BJ's said, "Fluorescent lighting at cold temperatures is very hard to deal with, so we see a lot of advantages to LED. The newest generation of LED lights also makes the colors on the products look much brighter and color true. We just have to find ways to justify the investment."

Evaluation and testing of the GE LED Refrigerated Display Lighting Solution continues to progress at BJ's and eight of the top 10 US supermarket chains, all potential Lumination customers.

Research Confirms Appeal of LEDs

In its study funded by the New York State

Energy Research and Development Authority, "Lighting Supermarket Freezers with LEDs," Rensselaer Polytechnic Institute's Lighting Research Center (LRC) found that shoppers overwhelmingly prefer LED lighting inside supermarket freezer cases when it comes to merchandise appeal and the brightness, comfort and evenness of the freezer lighting.

The LRC evaluated a prototype four-door, LED lighting freezer case installed at an Albany, NY, Price Chopper supermarket. The Tyler Refrigeration freezer used in the two-year study was outfitted with several 1



high power white LEDs in a lighting system designed by Lumination (then known as GELcore). LRC studied shoppers' preferences of two test freezers installed side by side: an LED-lighted freezer case and a case using conventional fluorescent lighting.

According to the LRC, shoppers said that products were more appealing and lighting was brighter, more even and more comfortable to look at inside the LED freezer.

"Even though the average illuminance level

of the fluorescent-lighted freezer was slightly higher, the uneven distribution of the fluorescent lighting led to areas at the center of each glass door that had roughly half of the average LED light level," N. Narendran, Ph.D., LRC director of research, said in an LRC news release. "This likely led to the perception that the LED case was brighter."

Narendran also points out studies have shown that higher (bluer) color temperatures can also bring a perception of greater brightness. The LEDs had a correlated color temperature (CCT) of 5,500°K, while the fluorescent lamps had a lower CCT of 3,500°K.

Solution Gives Retailers More Reason to Chill with LEDs

GE engineers and technologists developed the company's LED Refrigerated Display Lighting Solution over a period of years. The company worked closely with retailers and major refrigerated display case and refrigerated display case door manufacturers to design a solution that's widely compatible for retrofit and new installations. Comprehensive and ongoing real world testing conducted by GE optimizes the levels of energy and maintenance savings that retailers will achieve.

"Our sustainability team and senior management recognize the game-changing impact of GE's cutting-edge refrigerated case LED solution," said Zimmerman.

"GE introduced us to its prototype LED refrigerated solution early on. And through discussions among both companies' technology teams and lots of testing, I think we helped GE drive development to where we are now. Our commitment to the application of this GE technology runs deep."

To date, GE has more than 20 customer installations worldwide. Wal-Mart is the first Lumination customer to roll it out in a widespread application.

"Our collaboration with OEMs and end-users helps us manage the development of every GE LED solution," said Elien. "We're connected with customers and OEMs not only when it's time to sell, but also when it's time to brainstorm, think big, innovate or drive continuous improvement based on customer needs. We're in this together and our success depends wholly on how we can contribute to

the success of customers and OEMs."

Primary benefits of GE's RoHS-compliant, UL-approved LED Refrigerated Display Lighting solution include:

- Improved product visibility with reduced light-source glare on products and floors
- Hidden light source provides better access to products for stockers and consumers
- More robust and better for the environment than fluorescent lamps because it doesn't contain glass or mercury, uses less energy and it doesn't produce UV or infrared light
- Up to 78 percent energy savings compared with VHO fluorescent lamps in a five door fixture
- Over two times the life of fluorescent lamps in a cold environment reduces maintenance costs and hassles (50,000 vs. 18,000 hours)

GE's LED Refrigerated Display Lighting solution also saves watts by lessening the load on the compressor. For every light watt reduced in a frozen food case, the compressor works less hard, saving ~ 0.45 watts. On a five door case, the additional energy savings from a reduced load on the compressor, can reach 70 watts vs. T8 fluorescent; 134 watts vs. HO fluorescent; and 330 watts vs. VHO fluorescent.

With the GE LED solution, re-lamping cycles can extend beyond five years instead of the two year cycle time that is typically associated with fluorescent lamps. It offers a color of ~4,800 CCT and color-rendering index of 72.

Chain Retailers Do the Math

GE's LED Refrigerated Display Lighting Solution, and its Tetra LED signage solutions, could appeal to any retailer operating hundreds or thousands of locations. Wal-Mart uses the Tetra Power White LED Lighting System from GE for channel letter signage (700 signs installed or retrofit to date).

"Wal-Mart is a leader among retailers, and we think its use of energy-saving GE LED solutions will speed adoption across the entire retail channel," said Elien.

Ravi Kaushik is retail display lighting product manager for GE's Cleveland-based LED business, Lumination, LLC. His responsibilities span new product innovation and leadership, multi-generational product development and marketing strategy.

More information is available at www.led.com.