

L PRIZE® FIELD TESTING:**Merchandise Mart—
Chicago**

Lighting high-end design showrooms is a demanding business. Find out how the 60W equivalent LED bulb from Philips earned a thumbs-up from discerning users at Chicago's Merchandise Mart.

As an L Prize partner, the Midwest Energy Efficiency Alliance (MEEA) was keen to put Philips Lighting North America's 60-watt equivalent LED lamp through its paces during field testing. MEEA sought out a venue with diverse and demanding lighting applications—and settled on nothing less than the world's largest commercial building: the Merchandise Mart in Chicago.

What kind of marks would the Philips L Prize submission earn from discerning lighting users at this landmark Art Deco building? Would it deliver the anticipated energy savings along with a satisfying experience for tenants and customers? MEEA was anxious to find out and to appraise the potential of this new LED lighting as an efficiency improvement strategy for the Midwest region.

History-Making Savings

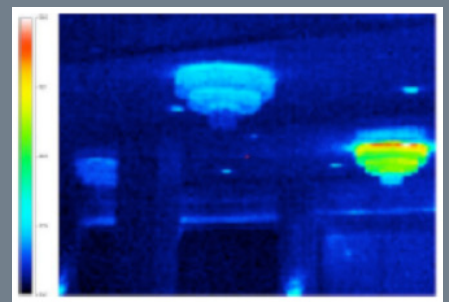
In all, the Philips submission was field tested in three distinct applications within the Merchandise Mart, most notably in the “wedding cake” light fixtures on the ground floor. These imposing octagonal fixtures—four feet in diameter—are a signature feature of one of the Mart's most utilized public spaces.

Initially, engineers and managers at the facility were skeptical; finding advanced lighting solutions that complemented



(Top) The “wedding cake” fixture on the far right contains the incumbent technology: nine 60-watt extended-life incandescent lamps. The fixture in the center features a one-to-one replacement of the incandescent lamps with the Philips lamps, while the fixture on the left uses five Philips lamps in place of nine incandescents. *Photo courtesy of MEEA.*

(Right) Infrared imaging reveals the stark differences in the amounts of heat given off by each fixture. *Photo courtesy of MEEA.*



the aesthetics of the historic building had proved challenging in the past. Yet the facility managers were also highly motivated to continually improve the environmental and energy footprint of the Merchandise Mart, as evidenced by the building's LEED Silver certification.

According to Mark Bettin, vice president of engineering for Merchandise Mart Properties, Inc., “We’ve piloted numerous energy-efficient lighting solutions within the Mart only to have to remove them. Performance is essential. We need lighting that achieves the right appearance in brightness, color, and uniformity.”

Long life is another vital performance aspect. With the fixtures at a height of eighteen feet, a large mechanical lift is required for lamp replacements.

Maintenance takes about an hour and twenty minutes per fixture, and disrupts tenants and clients. So the 25,000-hour expected life of the Philips lamp was a major draw for the facility's managers.

As a retrofit solution, would the Philips lamp succeed where others had fallen short? As the field testing demonstrated, the answer was “yes” on every count. The Philips submission for the 60-watt L Prize delivered performance that met or exceeded expectations.

- **Light levels.** The incumbent lighting scenario for the fixtures uses highly inefficient, extended-life incandescent lamps. A direct swap-out of Philips lamps for incandescents was deemed too bright a retrofit, so building staff tested a configuration substituting five Philips lamps for nine incandescents.

At a glance

Lighting Product	Number of Lamps	Total Wattage	Total Lumens	Energy Use Reduction
Extended-life 60W incandescent lamp	9	540	5,040	N/A
Philips 60W equivalent lamp	9	81	8,505	85%
Philips 60W equivalent lamp	5	45	4,725	91.7%

Merchandise Mart staff determined this was the most suitable match to the incumbent light levels.

- **Color temperature.** In previous re-lampings, color temperatures were found to be too cool to maintain the wedding cake fixtures’ appeal and blended poorly with surrounding light sources. But the warm correlated color temperature of the Philips lamp won approval from the staff of the Merchandise Mart, who judged it to align well with the needs of the space.
- **91% energy savings.** The retrofit most closely mimicking the light output of the incumbent scenario used five Philips lamps in place of nine extended-life incandescents, delivering an energy savings of over 91%. Even in a one-to-one replacement scenario, savings were an impressive 85%.

A Compelling Business Case

According to Mark Bettin, extraordinary lighting-energy savings is just one factor in the business case for the 60-watt LED replacement lamp in commercial applications using extended-life incandescents. “We observed a stark reduction in the amount of heat generated by the LED lamps versus the incandescent lamps. So we are excited about the prospect for mitigating the effects of lighting on our heating and cooling needs. Minimizing maintenance is another important consideration. And, aesthetically, we noticed that in addition to providing appropriate light levels and color temperature, the fixtures had a cleaner appearance with the LED lamps.”

Assuming an average electricity rate of \$0.115 per kilowatt-hour and 5,408 annual hours of operation, the estimated cost savings per fixture (using the 91%-savings scenario) is estimated at \$307.85. As MEEA concluded, “The results of an energy cost savings analysis present a strong economic case for retrofitting in this application. Assuming an incremental cost of \$50 per Philips lamp would still yield a payback period of less than one year for a retrofit, making this a highly appealing application to the operations staff even at a relatively high price point.”

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–Midwest Energy Efficiency Alliance (MEEA)

L•PRIZE®

U.S. Department of Energy

No light bulb in history has endured more extensive public testing than the winning L Prize entry from Philips Lighting North America. A highly energy-efficient replacement for the 60-watt incandescent bulb, the Philips lamp stood up to rigorous assessments in the laboratory and in the field.

For More Information

For more information about the L Prize competition, sponsored by DOE’s Solid-State Lighting program, see lightingprize.org.

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