

Interagency Lighting Demonstration Improves Illumination and Saves 75% Energy

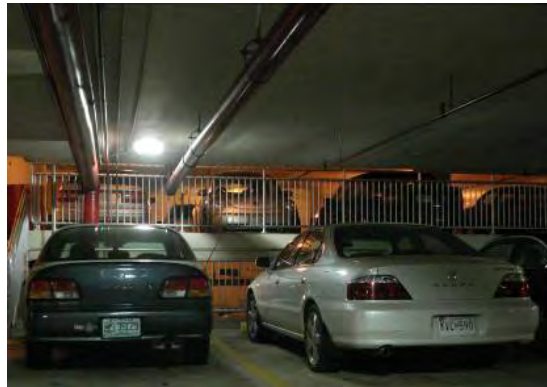
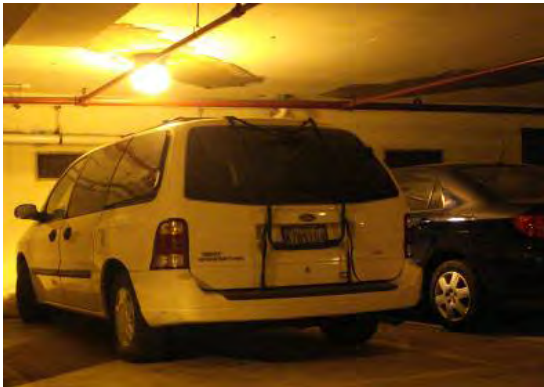


The U.S. Department of Energy (DOE) is collaborating with the U.S. Department of Labor (DOL) to demonstrate LED parking garage lighting in a federal facility. This interagency project not only showcases state-of-the-art LED lighting technology in a commercial setting, it also demonstrates the federal government's commitment to implement and encourage sound energy management and investment practices to enhance our nation's energy security and environmental stewardship.

The DOE GATEWAY Solid-State Lighting (SSL) Technology Demonstration program has partnered with DOL to evaluate a lighting retrofit of the Frances Perkins Building parking structure, where 19 LED luminaires manufactured by Philips Wide-Lite have replaced a portion of the existing high-pressure sodium (HPS) system.

Preliminary Results

Preliminary measurements of the new LED luminaires suggest a total electricity savings of more than 75 percent over the previous lighting system, with greatly improved uniformity. The HPS system provides a yellow, near-monochromatic appearance with visible shadows, while the LED system's broad-spectrum "white light" provides a heightened ability to discern colors, and offers more uniform illumination. Initial reaction of garage users to the new lighting has also been very positive.



White vehicles under HPS (left) and LED (right)

Table 1: Comparison Between Illumination and Power Draw of the Two Lighting Systems

| Product | Illumination (fc) Avg | Uniformity Max to Min | Measured Wattage | Wattage Reduction |
|---------|-----------------------|-----------------------|------------------|-------------------|
| HPS | 8.44 | 22:1 | 139 | -- |
| LED | 3.97 | 7:1 | 62 | 50% |

As Table 1 notes, the “Max to Min” variation in light distribution for the HPS system (22:1) is more than three times that of the LED (7:1). This variation results in more bright spots, gaps, and shadows under the HPS. In contrast, the LED system is better at directing light where it is needed, resulting in greater uniformity.

The tabulated energy savings of 50 percent reflects the LED system operating at full power, but at the DOL garage, each new luminaire achieves additional savings by employing a motion detector that dims it when the space is unoccupied. On average, DOE estimates that each LED luminaire will operate at full power for just 6 hours per day and at low power 18 hours per day, resulting in an overall energy savings of more than 75 percent relative to the HPS system. What’s more, operating the LED system in a dimmed state greatly increases its lifetime compared to driving it at full power. Dimming capability, therefore, offers multiple energy and economic benefits to the LED system.



LED on left, HPS on right



The VizorLED installed at DOL

The installed product at this GATEWAY site is VizorLED by Philips Wide-Lite, which was a 2009 “Best in Class” winner of the Next Generation Luminaires™ competition. This U.S.-made product features indirect optics to reduce potential glare and control options including a dimmable driver and programmable integral motion detector.

Government-Industry Collaborative Efforts Accelerate Energy Savings

The DOE-DOL parking garage project demonstrates how multiple government-industry collaborative efforts can converge for maximum impact and accelerate the market adoption of high-efficiency, high-performance LED products in appropriate applications.

GATEWAY Demonstration Program—Through the DOE GATEWAY demonstration program, manufacturers, host site organizations, and DOE lighting experts join forces to showcase real-world installations of LED systems in a variety of commercial and residential applications. GATEWAY demonstration results provide experience and data on LED product performance and cost-effectiveness. DOE widely shares the results of completed projects, including analysis of data collected, projected energy savings, payback analysis, and user feedback. www.ssl.energy.gov/gatewaydemos.html

DOL Headquarters—The Frances Perkins Building has been a model for energy efficiency since it earned ENERGY STAR® status in 2008. To maintain the ENERGY STAR rating and to meet federal energy reduction goals, improvements in energy efficiency must be made each year to the facility. The building is owned by the General Services Administration (GSA), a member of DOE’s Commercial Real Estate Energy Alliance, which promotes technology that will reduce the energy consumption and greenhouse gas emissions of the commercial real estate market. www.eere.energy.gov/buildings/alliances

Next Generation Lighting Industry Alliance (NGLIA)—NGLIA is an alliance of lighting manufacturers formed to foster industry-government partnership to accelerate the technical foundation and ultimate commercialization of SSL systems. The Alliance supports demonstrations, development of standards, and other market development activities. Philips is a founding member. www.nglia.org

Federal Energy Management Program (FEMP)—FEMP facilitates the federal government’s implementation of sound, cost-effective energy management and investment practices, providing assistance through project transaction services, applied technology services, and decision support services. www.eere.energy.gov/femp

Next Generation Luminaires (NGL)—This commercial design competition recognizes both superior aesthetic design and energy efficiency, and VizorLED, the Philips Wide-Lite product, was recognized as a 2009 “Best in Class” winner. The competition is jointly sponsored by DOE, the Illuminating Engineering Society of North America (IES), and the International Association of Lighting Designers (IALD). www.nglhc.org

CALiPER Test Program—DOE’s CALiPER program conducts anonymous testing of off-the-shelf LED products and compares the results with manufacturers’ claims. Round 10 of CALiPER testing examined a number of parking structure products, including the stand-out Philips Wide-Lite product. www.ssl.energy.gov/caliper.html

Commercial Building Energy Alliances (CBEAs)—DOE established the CBEAs to transform the energy efficiency of commercial buildings. CBEA efforts include the development of performance specifications, and this DOE-DOL demonstration project was used as a test case to aid in the development of a specification for parking structure lighting, which is now being used as a guide for similar installations across the country. www.eere.energy.gov/buildings/alliances