# Washington State Department of Ecology
# LED Lighting Upgrades Case Study

*The Departmenet of Ecology benefits from LED Upgrades*

## Project Background & Scope

The Washington State Department of Ecology headquarters in Lacey, Washington, has upgraded the lighting in the campus roadways, parking lots and garages, and interior public spaces to LED. The facility had already earned a Silver Leadership in Energy and Environmental Design for Existing Buildings (LEED-EB) certificate in 2005. In 2009, the governor challenged the agency to reduce its carbon footprint, save energy resources, and reduce maintenance and operating costs while acting as a model for other state agencies. Working with McKinstry Energy Services as their consultant, it was determined that a lighting upgrade would be a valuable component of those efforts.

The existing lighting in the parking garage and the street lighting for the campus consisted of 75- and 50-watt pulse-start metal halide (MH) lighting. Interior spaces were lit by MH halogen lamps, and compact fluorescent lamps (CFLs). The 13 and 26 watt CFLs were replaced by 10.5 Watt LEDs. McKinstry performed a lighting survey, researched efficient lighting options appropriate for the various applications, and chose products from Cree to meet the energy and financial budgets. For the roadways and parking lots, the LEDway Streetlight with a Type V medium light distribution was selected and installed on the existing poles. The color temperature (CCT) of 4300K is a bit higher (bluer) than the metal halide lighting they replaced. In the parking garages, the 304 Series LED Parking Structure Type V medium recessed luminaire was installed. A source CCT of 4300K CCT was used to match the correlated CCT of the existing source. Indoors and in a few exterior locations, LR-6 recessed can downlights were installed. In the stairwells, a tubular-shaped linear floodlight was used which can also be used outdoors.

The operating hours of the lights in the parking lots and roadways are controlled by a control system that is tied to the photocells and timers of the building automation system (BAS). The parking garage also uses the timing schedule from the BAS in conjunction with occupancy-based bi-level occupancy controls. The interior lights are tied to the BAS and the card entry system.

## Results

Stephen Fry, the building architect for the facility, is pleased with the lighting upgrade, even though it has not been trouble-free. Visibility in the outdoor areas is improved and the warm 3000K CCT of the indoor lighting has been well accepted by the occupants. There have been numerous premature driver failures in all of the different fixture types; some occurred right away and others occurred up to ten months later. No failures have occurred since then. When exterior luminaires failed due to driver problems, field replacements have been made. However, when interior fixtures failed, driver replacement was not possible and the entire product needed to be replaced.

BONNEVILLE POWER ADMINISTRATION

The energy savings as of March 2013, provided by the facility's engineer, are shown in the table below.

Acknowledging the high first cost of this project, Fry stated that they calculated the combined payback time of the energy-saving measures funded implementation using multiple funding sources including grants, certificates of participation and internal funds.

| Lighting Type | Baseline | Proposed | Savings (kW) | % Savings |
|---|---|---|---|---|
| Exterior | 80,109 | 18,230 | 61,879 | 77.2% |
| Interior recessed can | 408,975 | 71,669 | 337,306 | 82.5% |
| Parking garage | 197,345 | 43,289 | 154,056 | 78.1% |
| Total | 686,429 | 133,188 | 553,241 | 80.6% |

## Lessons Learned

Fry believes that Ecology's efforts to thoroughly research replacement lighting products and manufacturers was time very well spent. The LED industry is rapidly evolving, and up-to-date information is critical to the success of a project. He invites those who are interested to visit the facility on weekdays between 8 a.m. and 5 p.m.; visitors who would like to talk to facility staff are asked to make an appointment ahead of time.

## Additional Resources

**Customer**
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**Manufacturers**

Cree Lighting: http://www.cree.com/lighting

- Parking garage lights http://www.betaled.com/us-en/LEDProducts/LEDParkingLight.aspx
- Street lights http://www.betaled.com/us-en/TechnicalLibrary/TechnicalDocuments/Ledway-street-lights.aspx
- Downlights http://www.cree.com/lighting/products/indoor/downlights-us/lr6-277v\

Cooper Lighting: Stairwell lights http://www.cooperindustries.com/content/public/en/lighting/products/indoor_ceiling_wall_mount_lighting/wall_mount/_125544.html

**Contractor**
McKinstry: http://www.mckinstry.com/contact

## Considerations for Purchase

Before purchasing LED lighting:

- Understand warranty coverage and length. Coverage might include various components, field repair, shipping and labor, over 5 to 10 years. Warranty eligibility may require multiple LEDs to fail before replacement.
- Install a sample before committing to a purchase.
- Check your local utility for available incentives.
- Engage a professional to provide lighting that meets your needs, complies with energy code, and is compliant with utility incentive requirements.

Most utility incentives for LED lights use a qualified list:

- For light bulbs, look for ENERGY STAR products: http://www.energystar.gov/index.cfm?c=manuf_res.pt_lighting
- For commercial light fixtures, refer to Design Lights Consortium qualified product lists: http://www.designlights.org

Additional questions to ask are listed at this U.S. Department of Energy website: http://www.eere.energy.gov/buildings/ssl/what-to-ask.html