



DCEO CASE STUDY

Parking Garage Lighting



Jefferson Street Parking Deck, Peoria, Illinois

PROJECT SUMMARY

As a way to trim costs, the City Council of Peoria was looking for ways to reduce the energy usage of city buildings. The numerous parking garages in the city provided a great way to start. The Facilities Engineers for the City of Peoria, Steve Myers and Jason Meeks have been steadily checking off energy-saving projects with the help of Department of Commerce and Economic Opportunity (DCEO) Illinois Energy Now Public Sector incentives for retrofit programs.

Parking garages generally have lights on 24 hours a day, 7 days a week, which can lead to quite high energy costs over time; the City of Peoria owns four large multi-story public parking garages. The 665-space Jefferson Street Parking Deck in Peoria was selected as the first to receive a lighting renovation and was converted from High Pressure Sodium lighting to more cost-effective induction lighting.

WHY RETROFIT LIGHTING?

Anyone who has tried to find a red car at night under yellow High Pressure Sodium lamps knows that HPS makes it very difficult to see color correctly. HPS lighting is actually the most energy efficient lighting type, but has a very poor Color Rendering Index (CRI). Many parking garages are also overlit, measuring as bright as 25 footcandles when required levels are 1-2 footcandles. Providing lighting levels closer to required levels can save a large percentage of energy costs.

City of Peoria - Jefferson St. Parking Deck

Client	City of Peoria
Building type	Parking Garage
Energy measures implemented	Lighting retrofit
Projected annual energy savings	\$36,000
Total DCEO incentive	\$46,657
Payback period without incentives	3 years
Payback period with incentives	1.7 years

RETROFIT SAVINGS POTENTIAL

Before retrofitting, the lighting in the five-level Jefferson Street garage was 100-Watt High Pressure Sodium lamps, which drew 128 watts per fixture. After crunching the numbers, Facilities Engineer Steve Myers decided to have the parking fixtures rebuilt as induction lighting – a very long-life type of lighting with much improved color rendering. The induction lighting he chose has a 100,000 hour life, which reduces maintenance costs significantly.

The rebuilt lights use 55-Watt induction lamps, and each fixture draws 58 watts. This is a difference of 70 watts per fixture, reducing the power draw by more than half. Additionally, the fact that the fixtures could be rebuilt meant big cost savings over installing new fixtures – about \$100 in savings per fixture.

The energy savings were calculated:
 $365 \text{ induction lamps} \times 16 \text{ hours per day} \times 70 \text{ watt difference}$
 $\times 365 \text{ days} / 1000 \text{ w per kW} =$
149,212 kWh in annual savings

An additional 15,403 kWh were estimated to be saved by retrofitting the existing 4' T12 fluorescent fixtures in the stairwells, work rooms, offices, and elevator lobbies with 28-Watt T8 lamps. T12 lamps are being phased out of production starting in July 2012. As a result, this very inefficient type of lamp will grow more expensive and difficult to find in the future. Luckily, T8 fluorescent lamps provide brighter and higher quality light along with energy savings of up to 47%.

Electricity costs currently average around \$0.09/kWh (2012 prices). The estimated total of 164,615 kWh annual electric savings would mean an annual cost savings potential from this upgrade of \$14,815.

RETROFIT DETAILS

The original high pressure sodium (HPS) 128-Watt fixtures were rebuilt into the new 58-Watt induction fixtures by Eco Lighting Solutions in Indiana. The City of Peoria performed the installation directly, using union electricians.

The original 4' T12 linear fluorescent lamps and magnetic ballasts were replaced with T8 lamps and electronic ballasts. The new lamps appear on the list of Consortium for Energy Efficiency (CEE) qualifying products under the Reduced Wattage T8 Specifications, and are therefore eligible for incentives from DCEO.

COSTS AND INCENTIVES

The total cost of the project was \$108,409. To offset a large part of this cost, Myers applied for both standard and custom incentives from DCEO. The induction lighting was eligible for custom incentives based on reduced wattage. The fluorescent lighting was eligible for standard incentives on a per-lamp basis. In total, DCEO provided a total incentive of \$46,657, bringing the out-of-pocket cost down to \$61,752 and saving the city 43% of the total project cost.

IMPLEMENTATION CONSIDERATIONS

The hardest part about the retrofits, according to Facilities Engineer Jason Meeks, was the logistics of implementation. "We had 60 to 80 extras (fixtures) on hand, and we had those sent out for retrofit," Meeks said of the process. "Then we would swap those in and send out the next batch, so we always had lights on in the parking deck." Each set of fixtures took two weeks to a month for the retrofitting company to rework, so the entire process of retrofitting a garage took half a year.

PROJECT REWARDS

Since the retrofit was completed, the quality of light is considerably improved in the parking garage. The color of the light is white instead of yellow, and it is much easier to find cars in the garage.

When the electricity bills arrived following the completion of the retrofits, there was even better news. The energy use of the garage had been cut in half and was saving around \$3,000 a month in energy costs - even more than expected! The additional savings were thanks to efforts by the garage operators to turn off unneeded lights in the garage during the daytime. Operators now switch off half the lights in areas where sunlight is sufficient. Lights in emergency exit pathways are of course left on for safety.

GOING FORWARD

The City Council was so pleased with the project that the other three parking garages in the city have also had their lighting re-done: the Twin Towers Garage and the Niagara Garage have both been retrofitted with induction lighting, and the Riverfront Garage lighting was replaced with new LED lighting. LED commercial lighting is growing in popularity and still undergoing development, but was chosen as a trial implementation for the Riverfront Garage in order to boost the lighting levels in that garage, which was previously underlit in some places.

The city council has also set up a rolling energy-savings fund to make future energy projects possible. Money saved on energy costs as a result of energy-saving projects goes into the fund, and will be used for the next energy project. The council hopes to be able to fund multiple projects over the coming years using this system.



ENERGY AUDIT SERVICES

SEDAC offers energy assessments as a free service for owners and operators of commercial and public buildings.

An energy assessment consists of the following services:

1. Analysis of one year's electric and natural gas utility bills, to look at costs and patterns of consumption.
2. Site visit of the building, to understand system types, equipment and operations.
3. Short list of preliminary recommendations.
4. Written report identifying energy reduction measures and available incentives.
5. Ongoing assistance with implementation questions.

MAY 2012

The Smart Energy Design Assistance Center (SEDAC) performs building energy assessments and conducts project verification walkthroughs on behalf of the DCEO Illinois Energy Now incentive program. Contact SEDAC for a free building assessment to identify energy cost reduction measures for your building, and to find applicable incentives for your energy efficiency projects. www.SEDAC.org | info@SEDAC.org

www.ilenergynow.org | 1-217-785-5081 | illinois.energy@illinois.gov

Illinois Energy Office
500 East Monroe Street, Springfield, IL 62701



Illinois
Department of Commerce
& Economic Opportunity
Pat Quinn, Governor