



MIDWEST BUILDINGS

TECHNOLOGY APPLICATION CENTER

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Improving Display Lighting Efficiency

LIGHTING EFFICIENCY MEASURES

PROJECT PROFILE

MARKET SECTOR

COMMERCIAL AND INSTITUTIONAL

QUICK FACTS

LOCATION:

Madison, Wisconsin

FACILITY TYPE:

Retail, historical buildings, theatre

OWNER:

Various

SIZE:

1,000–20,000 ft²

MEASURES INSTALLED:

2006–2007

EFFICIENT DISPLAY LIGHTING

MEASURES INSTALLED:

- CFLs for downlights, sconces
- Cold Cathode CFLs for dimming needs
- LED window signage
- LEDs for display cases
- LED 'holiday' lighting



ALL PHOTOS: COURTESY ENERGY CENTER OF WISCONSIN

As Orange Tree Imports demonstrates, energy efficient display lighting can be beautiful.

Display lighting for retail or cultural applications has been a challenging frontier for efficient equipment. Such applications are focused heavily on light quality, and many in the industry are slow to change from established methods—this is especially true when it comes to retrofitting existing stores and institutions. In Madison, Wisconsin, this challenge has been met for many of the stores in the popular downtown shopping area. As a result, many stores are seeing significant savings in their utility bills, while maintaining the desired lighting quality.

The stores in the downtown district rely heavily on visual presentation of their wares to prompt window shoppers to come in, and to draw more than momentary attention. Display lighting is typically dense and on for long hours (if not continuously), and is therefore a prime candidate for energy savings measures if the barriers to

efficient products can be overcome. Barriers include a lack of consumer information, inertia to use these products, and concerns about quality and maintenance.

Jim Mapp of the Wisconsin Department of Administration has taken an innovative approach to overcoming these barriers by exposing these businesses to new lighting options without risk. When Jim sees inefficient display lighting being used in a building, he simply walks in with some similar but more efficient light bulbs—such as CFLs and modern ceramic metal halides—which he offers to the owners to try for free. Armed with knowledge of the energy demands for each type of bulb, he quickly calculates the energy savings the owners will likely experience based on a few answers regarding lighting use. After trying out the samples, owners can then decide for themselves whether to continue buying the efficient lights or revert to the old lights.

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“Most of these stores are very interested in any savings they can get on operating expenses—we are demonstrating that there are more efficient lights for virtually any kind of fixture, all which can save them money.”

—Jim Mapp, Wisconsin
Department of Administration

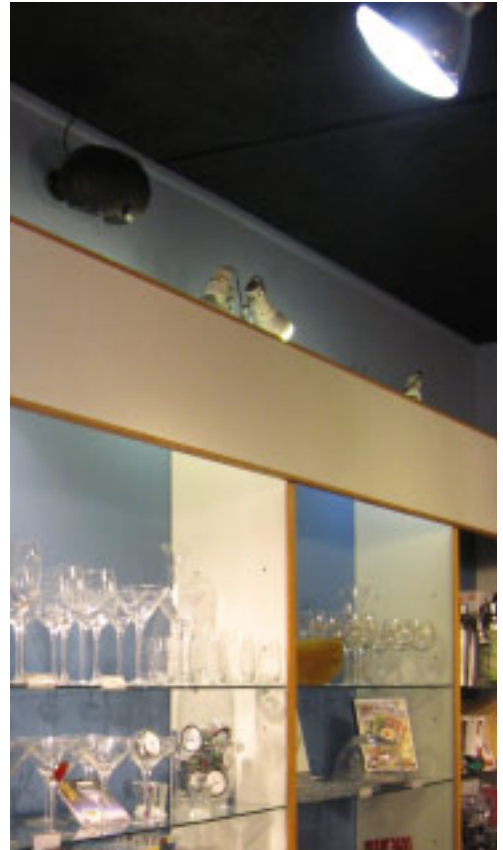
For many, sticking with the more efficient lights has been the easy choice. John Hayes, owner of Goodman’s Jewelers, has been happy with the change: “Our new display lights are working out fine...The color is definitely better; we prefer it for display over the [old] lights.” Along with saving energy and lowering electric bills, many of the lights require lower maintenance, and do not compromise light quality (which is often improved, as at Goodman’s). For some applications, the lights even resulted in better comfort. At one local art gallery, for example, the conditions under the lights were noticeably cooler after Jim’s lamps were installed. This effect also leads to lower air-conditioning bills in the summer: in general, energy efficient lighting results in 10–15% additional savings just in cooling energy. Though a few of the new lamps have burned out sooner than expected, the majority of the lamps have lasted longer than the old technologies.

The following are some examples of stores that Jim has worked with:

Goodman’s Jewelers is a generational family-run Jewelry business that has been a cornerstone of State Street for years. When displaying jewelry for sale, lighting level and color can have a significant effect on the appearance of the merchandise. Jim helped Goodman’s lower their bills while improving their displays.

Orange Tree Imports is a specialty import retail store dealing in everything from picture frames to chocolates. With the addition of efficient display lighting, it is much more comfortable in the store during the busy summer shopping season.

The Orpheum Theatre is a historic theatre with intimate display lighting in the lobby and hallway areas. The lobby is used as a restaurant and the theatre is used for both movies and performances. The operators strive for an elegant, historic look including many large chandeliers, which have now been replaced with CFLs without any notice from patrons.



(Top) Efficient lamps can often be retrofit inexpensively without changing the existing light fixtures.

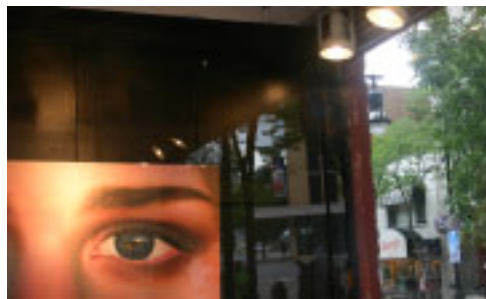
(Above) The Orpheum Theatre has even replaced old incandescent lamps in their large antique chandeliers without a noticeable difference in aesthetics.

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Location	Lamps Replaced (quantity and type)	Annual Savings kWh	Annual Savings Dollars
Goodman Jewelers	52 lamps, assorted types (50–65 W)	5,846	\$643
Orange Tree Imports	120 flood lamps (50–65 W)	40,938	\$4,503
The Soap Opera	32 R30 and R40 lamps, 1 PAR lamp (100–150 W)	12,690	\$1,396
State Historical Museum	74 R20 and R30 lamps (50–65 W)	14,841	\$1,633

FUNDING AND ASSISTANCE:

Retrofits were kickstarted with a state grant, but the majority of new lamps were purchased by owners once the potential savings were recognized.

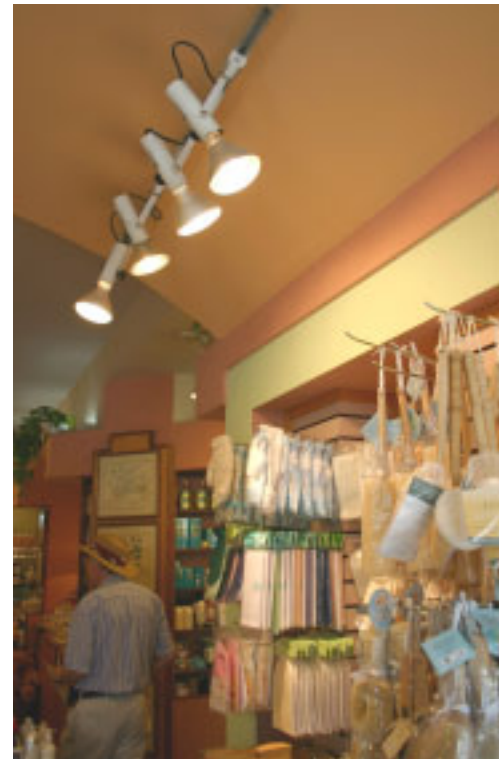


Jim Mapp has lowered the operating expenses of dozens of businesses along State Street—Madison's premier shopping district—including the State Street Gallery shown above.

State Historical Museum houses a combination of temporary and permanent displays of historical significance to Wisconsin. Many of the lights used for display in the front of the building are on 24 hours a day; efficient bulbs in these areas were vital in cutting down on the Museum's consumption.

These energy savings can be easily replicated in any store or building with display lighting. Operators of these establishments should keep the following recommendations in mind:

- Many efficient lights last longer than traditional incandescent ones. However, it is still important to keep efficient lights in your store's inventory for when they fail.
- Efficient lighting now comes in a multitude of colors. Color is described by a color temperature, such as 3,000 K, a warm color for higher-end shops. The Color Rendering Index (CRI) is also used to describe how well the light displays the



Efficient display lighting has decreased energy usage at The Soap Opera store and kept the shopping area cooler in the summer.

The Soap Opera, a boutique selling personal care products, has used several new fluorescent bulbs in place of the existing inefficient bulbs that used up to 150 W of electricity per bulb (almost six times what the new bulbs use!).

true colors of objects (a CRI of at least 70 is needed in retail).

- Lighting controls can affect energy usage as much as the choice of fixtures and lamps. Lights should be timed so that only the most efficient lights are on after hours; display lighting should be on a separate timer.
- Calculate your location's lighting power density to determine how efficient your lighting system is. Simply divide the total wattage of all lights by the square footage. A retail store can effectively operate with a lighting power density of 1.8 W/ft², with somewhat higher densities required for displays.



FOR MORE INFORMATION

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