



Advanced Lighting Controls

For most retail facilities, lighting is a major part of the electric bill, sometimes over 50 percent. Lighting retrofits are a great way to reduce it, but when considering energy efficiency changes many retailers overlook the possibilities of good lighting controls.

When you pay for commercial electricity, your electric bill will be one of two major types:

Smaller Customers (generally under 100 kilowatts of demand) - The primary charge for electricity will be **energy**, which is the total kilowatt-hours used during the billing period.

Larger Customers (generally over 100 kilowatts of demand) - The electric bill will include two principal charges, **demand** and **energy**. Demand is the charge for the maximum kilowatts you need at one time, and energy is for the total kilowatt-hours used during the billing period. In addition, some customers pay higher rates for "on peak" periods and lower rates for "off peak" periods.

Lighting energy use is the watts of the lighting system times the hours of operation. Demand is the maximum watts of the lighting system when all lights are on. With intelligently designed controls, both can be reduced and so can your electric bill.

What is a Control System?

Lighting controls can be as simple as a switch that turns lights on and off. With fluorescent and LED lighting, it also makes sense to dim lights because apparent brightness is not linear – lights operating at 25% light output look about 1/2 as bright as lights at full power. To save the most energy, lighting controls reduce light levels to as low as needed, and then turn them off when not needed.

Lighting can be controlled by control **devices** or control **systems**. Control devices are self-contained, such as programmable time switches or motion sensors, and in many cases can save quite a bit of energy. But for larger facilities, a lighting control system is generally used. Often housed within cabinet(s) located in electrical rooms, control systems allow the programming of lighting operations based on time of day, astronomic (sunrise-sunset) time, calendar time (days of the week or year), and inputs from remote sensors such as photoelectric detectors, motion detectors, or manual override switches.

Control systems can be wired or wireless. In new construction or existing buildings with accessible tile ceilings, a wired system may often be best. Wired systems are the most reliable, easy to set up and easy to commission. Wireless systems are generally better in existing buildings, especially without accessible ceilings, or when controlling existing outdoor lighting systems.

Control Strategies

Because retail lighting is often "full on" all day long and off when the store closes, the energy savings potential isn't always obvious. Here are some ways to add lighting controls to your retail environment:

1. **Perfect time** Turn lights on and off at precise times, leaving little to waste. For instance, turn off store windows right at closing and just at opening, especially in malls without night viewers. Adjust automatically for daylight savings time, holidays, and different schedules on different days of the week. This can be used for interior and exterior lighting and signs.

TRADE ARTICLE

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2. **Dim for Late Night and Early Morning** For facilities with extended hours of operation or periods of stocking, dim lights 50-75%. This is proven better than turning off some of the lights. Use for interior and exterior lighting and signs.
3. **Harvest daylight** For stores with skylights, dim interior lights or turn them off when there is enough daylight.
4. **Dim for Evening Hours** Many stores can dim interior lights after sunset. This method is especially great for convenience and grocery stores where high light levels are needed by day but a softer light level would be fine at night. Don't worry about video cameras – there will be enough light and they automatically adjust.
5. **Motion Sensors** Motion controlled lighting can be used to turn lights down or off when rooms are not occupied. They can be especially effective for storage and stock, toilet rooms, dressing rooms, and outdoor security lighting. Use them to turn "up" lights when cars approach service canopies at night.

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A lighting control system that can dim lights, program on and off times, and decide which lights to control is generally considered an **advanced lighting control system**. Advanced lighting control systems can produce significant energy savings, but to make them worth their while, they should be used in conjunction with dimmable lighting systems. This is where LED's come in – they are easy to dim, making them an ideal combination with advanced controls.

What can you expect? It depends a lot on the size of the facility, the lighting type and wattage, hours of operation, and the utility rate being paid. Here are a few examples of monthly energy cost savings:

- **Big box store (250,000 sf) with skylights** Skylights can be used to reduce the electric bill at least \$4,000 per month by using daylight harvesting and an advanced lighting control system.
- **Service Canopy with 8 dual pumps (6000 sf)** Turning off signs and canopy lights during the day, and dimming lights between midnight and 6AM (with a panic override switch, if needed), controls can reduce the electric bill at least \$100 per month.
- **Big Parking Lot (5 acres)** Adding controls that dim LED parking lot lighting to 20% between 10PM and 5AM will save \$200-300 per month.

Advanced lighting controls typically make significant energy savings possible as part of a lighting retrofit. Don't be fooled by a short payback on only part of a project. Installing a large project with a 5-year payback returns more money to the customer than a small project with a 1-year payback. In these days when basic investments have tiny returns, a 20% annual return on a large investment is unusually good, and controls should be part of the plan on any project. As an added bonus, a controls investment will reduce maintenance costs, and for many projects, an additional incentive from Focus on Energy will sweeten the pot.

Sidebar

Your Lighting Control System Provides Retail Sales Messaging

One lighting manufacturer has announced a retail sales message system. It communicates with shoppers' cell phones, using fixture mounted sensors to constantly monitor the location of the shopper. Messages can be sent to the shopper to help them find certain products, or as a promotional tool to direct shoppers to a customized deal. The key to success is knowing where shoppers are, and lighting systems provide the platform for sensors. The advantage? Using the same network for lighting control and sales messaging reduces upfront costs.