

## Compliance

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### A Recipe for Success Serving up serious energy savings for restaurants

Pacific Gas & Electric's Food Service Technology Center has found that lighting typically accounts for 13 percent of a restaurant's energy usage. However, lighting controls can reduce lighting energy by 50 percent in existing buildings and by at least 35 percent in new construction, according to the New Buildings Institute.

As energy costs increase, meeting energy code compliance requirements for lighting controls is an effective and simple way for restaurants to offset these costs and modernize energy management. This helps by making food service and dining spaces more comfortable and improving functionality for employees and customers. Lighting controls enhance the guest experience while dramatically increasing energy efficiency, leading to increased profits and significant operational savings. In fact, Business Energy Advisor's "Managing Energy Costs in Restaurants" guide states that a 20-percent reduction in energy costs will translate into an additional 1 percent in profit.

Energy-saving lighting control strategies—such as automatic shut-off, daylight zone control, level control, dimming, scheduling and receptacle control—create an ambient, functional and energy-efficient space. Building energy codes such as ASHRAE Standard 90.1, IECC, and Title 24, Part 6 mandate these automatic lighting controls for all commercial spaces, including restaurants, with the basic goal of reducing energy usage. With this goal in mind, energy code requirements for lighting controls have become more and more complex.

Understanding Lighting Control Requirements ASHRAE 90.1 and IECC, which is based on ASHRAE 90.1, represent the most commonly adopted energy codes, defining the minimum energy-efficient lighting control requirements for new construction, as well as new systems installed in existing buildings. A number of states also have specific energy codes requiring the extensive use of lighting controls, such as California Title 24, Part 6. Energy code requirements vary from location to location. To determine which energy code to use, restaurant owners and their planning team should check with their local building code officials.

Specific lighting control requirements for restaurants to keep in mind, as mandated by ASHRAE 90.1, IECC, and Title 24, Part 6 include:

- More controls required in every project: Manual-on (vacancy) or auto-on (occupancy) to no more than 50 percent.
- Space control: All spaces shall include visible control devices, such as occupancy sensors, continuous or stepped dimming control devices (photocells, entry stations or system controllers) or, if vacancy, entry stations.
- Daylighting zone control: Take advantage of natural daylight to light a space instead of electrical lights. Side-lit (typically windows) and top-lit (typically skylights) areas must be separately controlled by a photocontrol, which must be continuous dimming.
- Separate controls are required for special applications such as displays, tasks, accent, case and stairwell lighting.
- Receptacle control: At least 50 percent of all receptacles in a restaurant's office must be controlled via occupancy sensing or relay-based scheduling with override capabilities. This is accomplished using similar automatic shut-off functions as general area lighting. Title 24 requires controlled receptacles to be installed within 6 feet of each other or split receptacles.
- Parking garage lighting zones must be controlled by a device that reduces power by 30 percent after 30 minutes of vacancy, and open exterior walls must utilize automatic daylight harvesting. Title 24 requires partial-off of the parking garage lighting of 20 to 50 percent of max with additional requirements for daylight harvesting.
- Exterior lighting must be controlled by a photocell to turn lighting off when sufficient daylight is available and reduce advertising or sign lighting power by 30 percent when closed. Title 24 requires outdoor lighting to be controlled by photocell or an astronomical time clock and time-based controller with additional requirements to reduce lighting power.

- All lighting controls must be tested by a party not involved with the design or construction team to ensure they are working properly. Title 24 requires that all lighting systems be tested by a certified lighting control acceptance test technician.

California Title 24, Part 6 lighting control requirements are more stringent, requiring demand response, service metering and disaggregation of electrical circuits:

- Demand response is a control method that will respond to a demand response signal and reduce the total lighting loads during peak levels of electricity use by 15 percent. This is only required for buildings greater than 10,000 square feet.
- Energy metering requires metering and data collection on service. Load disaggregation requires the ability to measure multiple load types. This requirement can also be met by the installation of metering on the system.

Tools for Compliant Lighting Control Restaurant owners can appreciate the simplicity and flexibility of a user interface that allows them to create the perfect ambiance while meeting energy code compliance with the push of a button or automated scheduling. From these interfaces, restaurants can take advantage of lighting controls that range from simple and advanced scene control to event scheduling with daylighting zone control that improves lighting quality and simultaneously reduces energy costs.

Wireless solutions offer additional flexibility and are ideal for retrofits. Interior lighting, signage and site lighting can be controlled automatically with advanced controls based on operating hours with an astronomical time clock.

Tools to help meet lighting control energy code requirements include:

- Occupancy and vacancy sensors. Occupancy sensors offer auto-on and auto-off switching of loads. Vacancy sensors offer manual-on and auto-off control.
- Room controllers offer multiple layers of control for a single space, including occupancy sensing, multilevel control, photocell or time of day (scheduling) control and simple daylight harvesting.
- Relay panels offer centralized control for multiple areas, photocell or time of day (scheduling) control and advanced daylight harvesting. They are also networkable for larger systems and connect to BAS/BMS. Relay panels are ideal for controlling large groups of loads.
- Distributed controls use a digital network to control addressable devices such as ballasts, relays, photocells and occupancy sensors. This allows fixtures or groups of fixtures connected to a single circuit to be controlled independently. Distributed controls are similar to relay panels, but are ideal for more granular control.

Another key feature to keep in mind when designing a lighting control system for a restaurant involves selecting a compatible LED control solution. When planning an LED control solution, it is important to understand that different driver types require different solution technologies. Once the driver type is determined, the restaurant owner should refer to their LED control solution provider for a range of compatible options in LED control to ensure optimal performance.

**Design for Success** There is no one-size-fits-all approach to restaurant lighting controls. Each restaurant has unique needs for the dining area, kitchen space, offices, restrooms, parking lots, site lighting and signage. With the introduction of stringent energy codes mandating the extensive use of lighting controls and the need for restaurants to reduce their energy usage to improve their profitability, more restaurant owners are increasingly turning toward smarter lighting designs to take advantage of energy savings and meet energy code compliance. Advancements in control technology have automated energy savings to make energy code compliance easier for restaurants.

John Busch has led more than 900 hours of training on California Title 24 2013 code compliance for more than 3,600 attendees, including engineers, architects, contractors, facility managers and other end users. Busch is also a 2013 California Title 24, Part 6 Certified Lighting Control Acceptance Test Technician.