

Pollution Prevention (P2) Opportunities for the Hospitality Sector: Energy Efficient Lighting, Occupancy Sensors and Programmable Thermostats

Providing a comfortable and inviting atmosphere for guests is one of the top priorities in the hospitality industry. One of the easiest ways to create such an environment is to leverage heating, cooling, and lighting technologies that cater to guests both in individual rooms and in shared or common spaces like the gym or lobby. Incorporating occupancy sensors, programmable thermostats, smart thermostats, energy efficient lighting, and dimmable lighting throughout the property will not only create a harmonious and well-synchronized ambiance, but it can also help to save money.



Energy Efficient Lighting

Lighting is not just a priority when designing a hotel or creating a specific type of ambiance; it is also a high-return, low-risk investment. Energy efficient lighting creates many opportunities for enormous energy savings that can be coupled with cost-saving rebates through programs such as Energy STAR, Arizona Public Service, and the Salt River Project.^{1,2,3} Using CFL and LED lamps reduces thermal emittance of the fixtures in which they are housed, thus alleviating some of the strain on air-conditioning systems to maintain appropriate temperatures.⁴

Additionally, the lifespan of energy efficient lighting is often superior to that of traditional lighting.⁵ The maintenance staff will have more time to tend to guests matters rather than be tied up changing lamps.

Retrofitting Light Fixtures

T12 lamps (which have poor color rendition and cause eye strain) were commonly installed in commercial buildings and used for many years, but they have become outdated by newer, more energy efficient T8 and T5 lamps.

If the current lighting output and arrangement is satisfactory, but there is a desire to improve the efficiency of the output and potentially save money, retrofitting may be a great option. Retrofitting a lighting system can include replacing components like lamps, ballasts, lenses, and/or reflectors, which is much more affordable than replacing the whole unit. Occupancy sensors are also considered to be a form of retrofitting.

Why Should I Retrofit My Light Fixtures?

Arden Realty, a facility in Beverly Hills, saw savings that amounted to roughly 3,920 kWh/year in electricity for lighting use as well as a reduction of 1,253 kWh/year in cooling energy. Overall, this facility cut energy use by over 140,000 kWh/year by replacing T12 lamps with T8 lamps, retrofitting reflectors in some fixtures, installing a variety of occupancy sensors, and replacing incandescent lamps with compact fluorescents.⁶

LED and CFL Lighting

Light-emitting diodes (LEDs) and compact fluorescent lamps (CFLs) are two variants of energy efficient lighting.

After years of technological research and development, LEDs and CFLs now offer comparable or better light quality than other types of lighting, such as incandescent lamps.⁷

Typically, energy efficient lamps use about 25%-80% less energy than traditional incandescent lamps, and they last 3-25 times longer.⁸ LED bulbs and CFLs also produce less heat, which will help reduce wasted energy from air conditioning systems. With continual advancements in technology, LED and CFL lamps offer a wide variety of lamp shapes, sizes, functions, and outputs to accommodate a large number of specialized tasks.

Dimmable Lighting

Dimmer controls provide variable intensity lighting in order to better accommodate a multitude of tasks. When a lamp is dimmed, it reduces its wattage and output which helps save energy. Guests also enjoy the ability to control their own lighting to suit their mood. Unlike incandescent lights, CFLs do not lose their efficiency with dimming.⁹ It is possible to change the lamp and



ballasts in fluorescent lighting fixtures rather than replacing them entirely in order to be used with a dimmer. LED lamps can be used with dimmers so long as they are designed for dimming. As the LED industry continues to expand, fully compatible LED dimmers are expected to become more readily available.¹⁰

Programmable/Smart Thermostats

Both programmable and smart thermostats can help reduce annual energy consumption up to 10% by leveraging the temperature, time of day, time of year, climate, and usage patterns to achieve the right balance between optimal comfort and energy efficiency.¹¹ These thermostats may be used in guest rooms, though they may provide the most utility when used in common areas to create a seamlessly integrated, highly-efficient heating and cooling system that provides guests with a world-class experience while reducing annual energy consumption.¹²

WiFi-enabled smart thermostats can automatically adjust heating and cooling settings for efficient and optimal performance.¹³ While it learns and adapts

to the preferred temperature, it can also provide energy use data that can be tracked and managed. With the use of a smartphone or tablet, staff can even remotely control thermostats from anywhere on the property. Often times, these thermostats come equipped with indicators like those that signal when it is time to change air filters or when there are malfunctioning HVAC components.

Occupancy Sensors

Wasting energy on lighting common areas that are unoccupied can result in exorbitant energy bills. Occupancy sensors detect when people are present in a room and turn the lights off after a certain length of time has passed since the occupants left. Installing and using occupancy sensors in shared areas such as restrooms, gyms, and conference rooms can result in up to 50% energy savings.¹⁴ Passive Infrared Sensors (PIR Sensors) implement heat difference detection by measuring infrared radiation. These sensors detect the presence of objects (such as people) that radiate a temperature that is different from the temperature of the background. Environmental Sensors detect the change in environment due to the presence of humans. Such changes include temperature, humidity, and carbon dioxide (CO₂) levels. Ultrasonic Sensors utilize technology that is similar to radar; they work on the Doppler shift principle. An ultrasonic sensor sends high frequency sound waves in an area and checks for trajectory changes and reflected patterns. If the reflected pattern changes, it assumes that there is occupancy. Microwave Sensors works similarly to Ultrasonic Sensors. These sensors usually have high sensitivity and detection range compared to other types of sensors. Keycard Light Slots detect when a hotel room is occupied by having the guest place their keycard in a slot to activate lights and thermostats. This is a great method to implement in guest rooms for reducing energy consumption. Smart Meters detect the change in power consumption patterns that are associated with distinct characteristics for occupied and vacant states.

References

- ¹ [Energy Star. Find Product Rebates & Other Special Offers.](#)
- ² [APS. Solutions for Business.](#)
- ³ [SRP. Ways to Reduce Costs.](#)
- ⁴ [Michigan.gov. Energy Efficient Lighting.](#)
- ⁵ [U.S. Department of Energy. Lighting Choices to Save You Money.](#)
- ⁶ [Energy Star. Lighting.](#)
- ⁷ [U.S. Department of Energy. LED Lighting.](#)
- ⁸ [U.S. Department of Energy. How Energy-Efficient Light Bulbs Compare with Traditional Incandescents](#)
- ⁹ [U.S. Department of Energy. Lighting Controls.](#)
- ¹⁰ [Energy Star. Your Guide to Dimmable Energy Star LED Lighting.](#)
- ¹¹ [U.S. Department of Energy. Thermostats.](#)
- ¹² [Energy Star. Which Programmable Thermostat is Best for Me?](#)
- ¹³ [Energy Star. Smart Thermostats.](#)
- ¹⁴ [U.S. Department of Energy. Wireless Sensors for Lighting Energy Savings.](#)

For translations or other communications aids, please email the Title VI Coordinator at idb@azdeq.gov.

Para traducciones u otras ayudas de comunicación, envíe un correo electrónico al Coordinador del Título VI al idb@azdeq.gov.