

Energy Efficient Lighting



Replacing standard incandescent light bulbs is a bright idea that cuts energy consumption and costs.

All buildings can realize significant cost savings and reduced energy use by choosing energy efficient lighting. Making the switch to energy efficient lighting is a good way to get started on becoming more eco-efficient, since it typically has such a short payback period.

Compact Fluorescent Lamps

Compact fluorescent lamps (CFLs) and tubes require less than one-third the electricity used by incandescent lamps to achieve the same illumination levels, and can last 10 to 13 times longer. They currently come in sizes from 5 to 30 watts and can replace 25 to 150 watt incandescent lamps in many applications (e.g., wall and ceiling mounted fixtures, exit and directional signs, floodlights, display lighting, and task lighting). Generally, CFLs are most suitable wherever precise beam control is not required, although some newer models may be suitable for this type of application.

Converting incandescent bulbs to compact fluorescents can lower relevant energy costs by up to 50 percent per bulb per year, with short payback periods. For instance, according to a Natural Resources Canada publication, replacing 100 40-watt incandescent lamps with compact fluorescents may save from \$550 to \$1,300 per year and have a simple payback period of six months to a year, depending on applicable electricity rates. You can estimate savings for your building by considering the number and cost of bulbs to be replaced, interest rates, electricity costs, and possible government or utility financial incentives.

To get the same amount of light from a compact fluorescent bulb as you expect from an incandescent, read the label to compare light output, or lumens, and not the watts. Watts equal the energy used, not the amount of light. Lumens should be equal between the incandescent and the compact fluorescent bulb. Fluorescent lamp model designations are complex and may be confusing. To facilitate your purchasing decisions, we have provided an explanation of lamp types and designations in this fact sheet.

Task Lighting

Lighting is more efficient when it is applied directly to a task (for instance, a bright light over a desk), rather than illuminating the entire room at the same lighting level. Task lighting is appropriate for front desks in reception areas, guest rooms, and offices.

Lighting Controls

Controls such as photo-sensors, occupancy sensors, and timers can save energy by turning lights off when they are not needed. This approach is particularly effective for security lighting, lighting in infrequently used rooms, and lighting in public rest rooms and guest room bathrooms.

Lighting Considerations

Consider the following factors when choosing bulbs that will be a good fit for your building's lighting needs:

- Amount of visible light output required (lumens)
- Efficiency of the lamp (efficacy)
- Impact on the cooling loads
- Lighting color and quality
- Types of building fixtures



Energy Star is a government backed program run by the U.S.EPA to help businesses and individuals protect the environment through energy efficiency.

Energy Star labeled products are widely available and information specific to hospitality industry can be found on the Energy Star website:

<http://www.energystar.gov>

Electronic Ballasts

A ballast is the part of a lighting fixture that transforms and controls electrical power to the lamp (*i.e.*, light bulb). Electronic ballasts present numerous benefits over standard magnetic ballasts. First, they eliminate the flicker, hum, and poor color rendering associated with older fluorescent lighting. Equally important, electronic ballasts are 10 to 15 percent more efficient, last longer, and have lower maintenance costs.

For instance, when standard F40 fluorescent lamps on magnetic ballasts are replaced with higher efficiency T8 lamps and an electronic ballast system, the T8 lamps save a total of 32 watts per four lamp fixture. The electronic ballast can save 44 watts per fixture, for a total 40 percent reduction in electricity use. Another efficiency offered by electronic ballasts is their ability to operate up to four individual lamps simultaneously, compared to a maximum of two for conventional ballasts.

Exit Signs

Alternative lighting is also available to replace incandescent lamps in exit and directional signs. Options include compact fluorescents and light emitting diodes (LEDs). A typical, "long life" incandescent exit

sign consumes 40 watts and must have lamps replaced every eight months, whereas a typical compact fluorescent exit sign consumes 10 watts needs to be replaced only every 1.7 years. LEDs compare even more favorably: a typical LED exit sign uses less than 5 watts and lasts for 80 years. Installing compact fluorescent or LED bulbs can thus lead to significant energy and cost savings. Cost savings per sign are typically between \$30 - \$50 per year and payback periods are from one and two years.

St. Francis Hotel in San Francisco, California,

replaced 1,600 incandescent lamps with compact fluorescent bulbs. Total project costs were \$39,915 (US), but annual savings amounted to \$85,200 (US), for a return on investment of less than six months. The switch resulted in an 82 percent energy reduction for lighting.

Lamp Model Designations

Lamp size and shape can be determined from the lamp model designation, a series of numbers and letters that appears on the lamp. For instance, **F40/T12/HO/WM** translates as:

- F** = Fluorescent
- 40** = Wattage (except for energy-saver lamps and units longer than 48 inches, where the number represents the length of the bulb in inches)
- T** = Tubular shape
- 12** = Diameter in eighths of an inch ($12/8 = 1.5$ inches); other common sizes are T-8 and T-10
- CW** = Cool White, indicating lighting color; other manufacture specific labels, such as SP35 and D835 are also used to indicate phosphor type and color temperature.
- HO** = High Output; VHO (very high output) is another option.
- WM** = Watt-Miser®; manufacture-specific designation for an energy-saver lamp; other designations include SS (SuperSaver®) and EW (Econ-o-watt®); these letters appear only if appropriate.