

## Compact Fluorescent Lights and Light-Emitting Diodes for the Home

According to the U.S. Department of Energy, lighting constitutes about 22 percent of the typical American household's energy budget. If everyone replaced just one bulb in their residences with a compact fluorescent light or light-emitting diodes we would save enough energy to light more than three million homes for a year; collectively save more than \$600 million in annual energy costs; and prevent greenhouse gases equivalent to the emissions of more than 800,000 automobiles.

CFLs are four times more efficient and last 10 times longer than a typical incandescent light bulb. Current CFLs are versatile and can be used just about anywhere an incandescent bulb can be used. These bulbs are readily available and now come in a variety of shapes, sizes, wattages and color ranges (i.e., bright white, cool white). The reported typical life expectancy of a CFL is about 10,000 hours.

Even with the many advantages of CFLs, they may only be a short-term solution for replacing incandescent bulbs. Disposal of CFLs is a concern and will be covered in a future GreenerDENR. Significant advances in LEDs are occurring and are expected to eventually take over the lighting market.

An LED is not technically a light bulb. Each LED is less than one millimeter square. To make a bulb, several LEDs are grouped together in a containment structure, such as a plastic or glass globe. Creating a white LED light has been one of the challenges the industry faced to turn LEDs into everyday useful lights for illumination.

LEDs produce more light per watt than CFLs and incandescent lights. Among the advantages of LEDs is that they can be dimmed without affecting the quality of the light (the light from an incandescent bulb typically turns more yellow as it is dimmed); they fail more slowly (become dimmer over time); are highly shock resistant; are ideal for frequent on/off cycling; light up very quickly; they don't contain mercury; and, they are much cooler to operate (unlike an incandescent bulb, you can touch an LED when it is on).

The biggest advantages of LEDs are their longevity and energy efficiency. Typical LED bulbs can last up to 50,000 hours, while the typical fluorescent bulb is rated at about 10,000 hours and an incandescent light bulb around 1,000 hours. LEDs are currently about 10 times more efficient than a comparable wattage incandescent light bulb in turning energy into light.

Before you run out to buy enough LED bulbs to outfit your house, there's something you should know -- LEDs are currently much more expensive to purchase than incandescent light bulbs (\$40 - \$110 each, compared to about 50 cents for an incandescent). The good news is the cost of LEDs is expected to decline significantly in the next few years. Until then, you may want to consider swapping out some or all of the very old fashioned, inefficient and costly incandescent bulbs for CFLs. The next generation of LEDs being developed (organic light-emitting diodes) is expected to be even more efficient, inexpensive and flexible.