

Let There Be LEDs

Greentips: January 2010

Union of Concerned Scientists

From: <http://www.ucsusa.org/publications/greentips/>

Compact fluorescent lightbulbs (CFLs) have become the go-to choice for energy-efficient lighting, consuming 50 to 80 percent less electricity than traditional incandescent bulbs. But an even more efficient option is light-emitting diode (LED) bulbs, which use semiconductor technology to convert electricity directly into visible light.

LEDs use a fraction of the electricity required by other light sources: a six-watt LED generates more light than an 11-watt CFL or 40-watt incandescent while using 45 percent less electricity than the CFL and 85 percent less than the incandescent. According to our research, if a million households each replaced one 40-watt incandescent bulb with a six-watt LED, and used it six hours per day, more than 53,000 metric tons of heat-trapping carbon dioxide would be kept out of the atmosphere per year.

LEDs offer other advantages as well:

- * **Longevity.** CFLs last about 10 times longer than incandescents (6,000 to 15,000 hours versus 1,000 to 2,000), but LEDs take the life-span prize, lasting 50,000 hours—nearly 23 years if used six hours per day—or more.

- * **Safety.** LEDs generate about 97 percent less heat than incandescent bulbs, making them a safer option for enclosed fixtures and for use on or near plants and flammable materials. And unlike CFLs, LEDs do not contain mercury (though the small amounts in CFLs do not pose a safety risk unless they are broken).

- * **Portability.** Lights that combine LEDs with miniature solar panels offer a convenient and environmentally friendly outdoor lighting solution (compared with connecting a string of lights to an outlet).

Despite the advantages, two important factors have thus far kept LEDs from entering the mainstream:

- * **Price.** LEDs currently have a significantly higher up-front cost than CFLs—\$35 for a six-watt LED versus \$4 or less for an equivalent 11-watt

CFL. While the LED would cost only \$30 to operate over its 25-year lifetime compared with \$55 for the CFL (based on a national average electricity cost of 10 cents per kilowatt-hour), outfitting your entire house with LEDs could be prohibitively expensive until costs come down.

* Light quality. LEDs generate a narrower, more focused beam of light than incandescent or CFL bulbs, so most work best as overhead lighting in smaller areas or as task lighting. Many also produce a bluish-white light that some people find harsh. However, new technology including "warm white" LEDs and bulbs with a diffuser lens (to spread the light) could help eliminate that concern.