

# PRODUCTS LIGHTING

Toshiba International Corp.'s 2200K candelabra expands the company's 180 Series LED Candle line and is meant to replace 15W incandescent candles. It lasts up to 16 times longer and uses 84% less energy than incandescents, according to Toshiba. [toshiba.com](http://toshiba.com)



## BRIGHT IDEAS

NEW LAWS MEAN FEWER INCANDESCENT BULBS. A LOOK AT CFL, LED, AND HALOGEN OPTIONS.

Text Scott Gibson

**Household light bulbs** as we've known them are rapidly becoming historical curiosities. Their replacements not only use less energy and last longer, but also let us manipulate light in entirely different ways.

What's forcing widespread change in lighting is the Energy Independence and Security Act of 2007, which toughened energy efficiency standards. Some old bulbs are exempt from the new requirements, but the law leaves most residential lighting with three alternate technologies: halogen incandescents, compact fluorescent lamps (CFLs), and light-emitting diodes (LEDs).

Halogens, CFLs, and LEDs are more efficient—or, in industry talk, have a higher efficacy—than conventional incandescents and last up to 50 times longer than old-style bulbs. For example, to get the same amount of light as a conventional 60-watt incandescent (about 800 lumens), you can use a 43-watt halogen incandescent, a 15-watt CFL, or a 12-watt LED, according to U.S. Department of Energy figures. Annual energy costs for that lamp—based on two hours of use per day and an energy cost of \$0.11 per kilowatt hour—drop from \$4.80 for the standard incandescent to \$3.50, \$1.20, and \$1.00, respectively.

Two other factors go into choosing a light source: color temperature and color rendering. Conventional incandescents cast a relatively warm light, roughly 2700K. Higher color temperatures mean cooler, whiter light. If you want colors to appear as they would under an incandescent light source, look for a color rendering index (CRI) of close to 100.

Of the three alternatives, CFLs and halogen incandescents have the lowest up-front costs. Halogen incandescents are the most familiar

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of the three, having the same shape as old-style bulbs. In the industry, this is called an A19 lamp, where “A” is the rounded shape and “19” is the diameter in 1/8-inch units. They’re relatively inexpensive, are not affected by on–off cycling, are compatible with all models of dimmers, and turn on instantly. They cast a slightly cooler light than standard incandescents, with a color temperature of 2900K to 3000K.

But halogen incandescents don’t last that long (1,000 to 3,000 hours), and produce more heat than the other sources.

CFLs use about 75 percent less energy to produce the same amount of light as a standard incandescent, and they last up to 10,000 hours. Most CFLs are designed to screw into standard sockets, and are made with a tube of glass formed into a spiral or into folds. Some have coverings that give them the look of a conventional bulb.

CFLs save a lot of energy but also have some annoying shortcomings. Many of them take time to warm up, and many are not dimmable. They contain small amounts of mercury so they should be—and, in some areas, may legally be required to be—recycled. They also don’t perform very well in cold temperatures, have shortened life spans with frequent on–off cycling, and will fail if subjected to too much vibration.

LEDs are the future of light. They have become increasingly versatile and useful as residential lighting sources. With color temperatures that match those of incandescent bulbs, LEDs are manufactured in a number of shapes and sizes. They are slightly more energy efficient than CFLs, and they last much longer—15,000 hours and up.

Unlike CFLs, they’re not affected by frequent on–off cycling or by vibration, and their performance doesn’t suffer in cold temperatures. In fact, an LED produces 10 percent more light at 35 F than it does at 70 F. LEDs produce relatively little heat and no UV radiation. They also contain no mercury, reducing disposal costs.

LEDs, however, are not compatible with all dimmers, and light output can suffer when the diodes don’t get enough ventilation.

Then there is the cost. Prices have fallen and should continue to go down, and utility rebates can be obtained depending on where you live. But good-quality LEDs aren’t cheap. “They will never be two bucks,” says Cheryl Ford, Osram Sylvania’s marketing manager. However, “LEDs are going to be the future,” says Brian Vedder, LED portfolio manager at Philips. “[They’re] going to be what people put into their houses.”

*This article appeared in Builder in March 2013. For a longer version of this article, visit [go.hw.net/lightbulbs](http://go.hw.net/lightbulbs).*



The 60W equivalent (800 lumens) Micro Mini CFL from Osram Sylvania uses 13W of electricity and produces light with a color temperature of 2700K, just like a conventional incandescent. These CFLs come in spiral, BR lamps, and three-way models, in wattages from 5W through 33W. [sylvania.com](http://sylvania.com)



GE’s Energy Smart Bright from the Start 60W-equivalent lamp combines a halogen incandescent with a CFL. Drawing only 15W, it produces light of 2500K—as warm as a standard incandescent. GE says the Energy Star-qualified lamp should last 8,000 hours. [ge.com](http://ge.com)



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