

Solid Lighting Solutions

LEDs meet (and exceed) 2014 lighting efficiency standards

By Megan McKoy-Noe and Brian Sloboda

A new year calls for updated lightbulb efficiency guidelines. No need to use bulbs with a twist; light-emitting diodes (LEDs) can help you switch on savings.

Congress called for improved energy efficiency standards for traditional incandescent bulbs under the federal Energy Independence and Security Act of 2007.

By 2014, lightbulbs using between 40-W to 100-W must consume at least 28 percent less energy than classic bulbs. The change will save Americans an estimated \$6 billion to \$10 billion in lighting costs annually.

When the next wave of standards kicks in next month, traditional 40-W and 60-W incandescents will no longer be available. In their place, some consumers are filling the gap with a solid solution: LEDs.

'Solid' lighting

Incandescent bulbs create light using a thin wire (filament) inside a glass bulb—a delicate connection that can easily be broken, as frustrated homeowners can attest.



In contrast, LEDs are at the forefront of solid-state lighting—small, packed electronic chip devices. Two conductive materials are placed together on a chip (a diode). Electricity passes through the diode, releasing energy in the form of light.

Invented in 1960 by General Electric, the first LEDs were red—the color depends on materials placed on the diode. Yellow, green, and orange LEDs were created in the 1970s and the recipe for the color blue—the foundation for white LEDs—was unlocked in the mid-1990s. Originally used in remote controls, exit signs, digital watches, alarm clocks, and car signal lights, LEDs quickly gained momentum for large-scale lighting.

Measuring LED potential

The Arlington, Va.-based Cooperative Research Network has partnered with several electric cooperatives throughout the United States to test LEDs.

Researchers are cautiously optimistic; LEDs offer several benefits:

- LEDs could last longer, perhaps for decades
- The energy to use LEDs could be substantially less than that of compact fluorescent lamps (CFLs) or other fluorescents
- With no mercury content, LEDs are more environmentally friendly
- The products are rugged and more resistant to breakage
- LEDs perform well in cold climates, especially outdoors
- LEDs can be dimmed and produce a more pleasing light

However, some consumers avoid LEDs because the price tag exceeds normal lightbulb costs. But the true value lies in the lifetime of the bulb. It takes about 50 traditional incandescent bulbs, or eight CFLs, to last as long as one LED lamp.

Buyer Beware

Poor quality LED products are flooding the marketplace. Some are manufactured outside of the United States with components that produce low light levels, don't boast a long service life, or make exaggerated energy saving claims.

Don't be fooled. Look for the U.S. Department of Energy's ENERGY STAR logo for guaranteed color quality over time, steady light output over the lifetime, high efficiency, and a warranty.

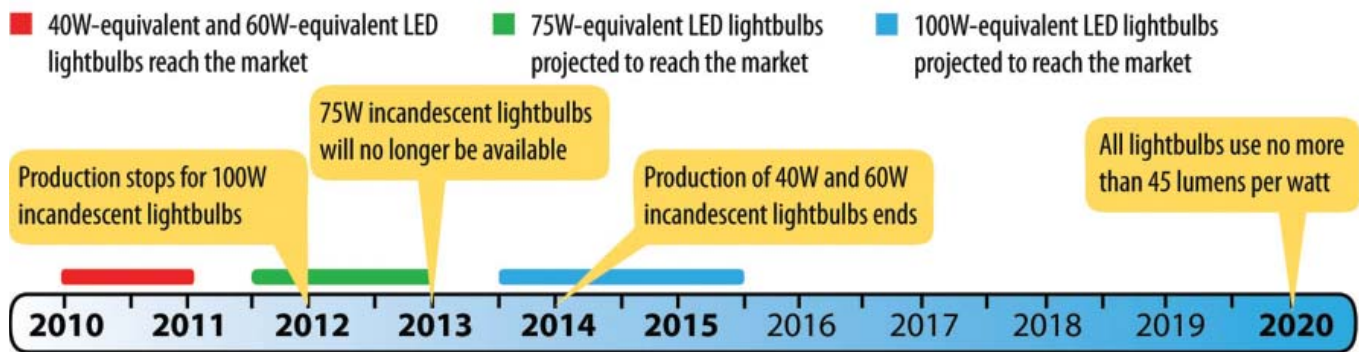
You can also look for an LED Lighting Facts label. The label

Person installing LED bulb in light fixture

Photo by Osram Sylvania

LEDs: A Decade of Change

By 2014, lightbulbs using between 40W to 100W must consume at least 28 percent less energy than traditional incandescents, saving Americans an estimated \$6 billion to \$10 billion in lighting costs annually. The federal Energy Independence and Security Act of 2007 also mandates that lightbulbs become 70 percent more efficient by 2020. Light-emitting diodes (LEDs) are quickly evolving to meet this challenge. Learn more: EnergySavers.gov/Lighting



Source: U.S. Department of Energy Lighting Facts Product Snapshot: LED Replacement Lamps 2011

helps consumers compare products to manufacturer claims and similar products with a quick summary of performance in five areas:

Lumens: Measures light output. The higher the number, the more light is emitted.

Lumens per watt (lm/W): Measures efficiency. The higher the number, the more efficient the product.

Watts: Measures the energy required to light the product. The lower the wattage, the less energy is used.

Correlated Color Temperature (CCT): Measures light color. “Cool” colors have higher Kelvin temperatures (3,600–5,500 K); “warm” colors have lower color temperatures (2,700–3,000 K).

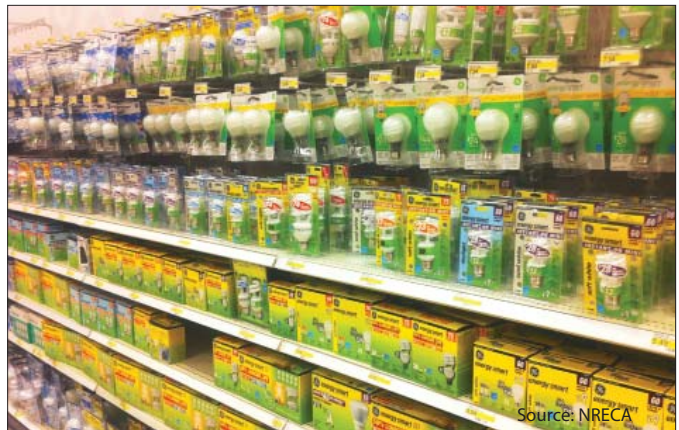
Cool white light is usually better for visual tasks. Warm white light is usually better for living spaces because it casts a warmer light on skin and clothing. Color temperatures of 2,700 to 3600 K are recommended for most general indoor and task lighting.

Color Rendering Index (CRI): Measures the effect of the lamp’s light spectrum on the color appearance of objects. The higher the number, the truer the appearance of the light. Incandescent lighting is 100 on the CRI.

Shedding Light on LEDs

More lighting efficiency changes are coming. Congress’ measure mandates lightbulbs become 70 percent more efficient by 2020. Curious to know if LEDs are right for you? Learn how to shop using LED labels at www.lightingfacts.com/content/consumers.

Homeowners can visit www.energysavers.gov/lighting to



Source: NRECA

compare LEDs to new energy-efficient incandescent bulbs and CFLs. ■

Sources: *The Association of Electrical Equipment and Medical Imaging Manufacturers, U.S. Department of Energy, Cooperative Research Network*

