

Evolution of the Incandescent Lamp

The Energy Independence and Security Act of 2007 created new efficiency standards for 40–100-watt (W) incandescent general-service lamps. The popular belief is that the government is banning the bulb and forcing people to use compact fluorescent lamps (CFLs). In fact, the incandescent lamp has not been banned. It simply has to become more efficient. This ALG Connections piece recaps an article about the new efficiency standards for incandescent lamps published in Electrical Contractor Magazine. A link to the full story is provided at the end of this article.

As of the first of this year, 100W incandescent lamps are required to be 30 percent more efficient, or they are prohibited from manufacture or import. Jan. 1, 2013 is the deadline for 75W lamps; and Jan. 1, 2014 targets 40 and 60W lamps. Fortunately most major manufacturers have been preparing for this since 2007 and are meeting the deadlines with new higher efficiency products. That said, as of today Congress is not funding the enforcement of this regulation, so law-abiding American manufacturers may find it difficult to compete with other manufacturers that do not comply with the law.

Proactive manufacturers are responding with products that provide nearly equivalent performance but with higher efficiency, which is good for consumers and the environment. As a result of the new efficiency standards, consumers will have more choices of good lighting, and education and labeling will help them make informed choices.

Once the Energy Act was passed, manufacturers began to fill the gap left by non-compliant incandescent with halogen screw-in lamps and self-ballasted compact fluorescents (CFLs). To increase the adoption of CFLs, some manufacturers are working on producing products with more incandescent-like performance, size and features. GE's Energy Smart 15W CFL, for example, offers the same shape, size and aesthetic as an incandescent A19 or A21 lamp. The GE Reveal All Glass CFL features an all-glass outer bulb, incorporating a phosphor that enhances red and green. Another GE hybrid bulb consists of a halogen capsule surrounded by a fluorescent swirl and enclosed in an envelope with an incandescent shape. The halogen lamp turns on instantly and then off once the CFL reaches full brightness.

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Many manufacturers are looking beyond CFLs to light-emitting diodes (LEDs). New innovations have provided the consumer with LED replacements for the full range of 40–100W incandescents.

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In Department of Energy (DOE) CALiPER product testing, omnidirectional LED replacement lamps have demonstrated viable alternatives to incandescents up to 40W. In 2011 Philips Lighting won the Department of Energy L-Prize with their 10W LED light bulb designed to replace most standard 60W incandescent light bulbs in virtually any application. As indicated by the prize, the lamp is an excellent replacement for incandescent, with a warm tone and a smooth dimming capability. The LED A-lamp replacement is now proven technology that is finding traction with the help of utility incentives that greatly reduce the price to the consumer. Currently 60W incandescent replacements are available from a range of manufacturers, including Philips Lighting, Sylvania, Cree, Lighting Science Group, and Switch Lighting. Philips Lighting, GE Energy Smart and Switch Lighting are also offering 75W replacements. 100W replacements are now available through Switch Lighting and Sylvania.

As LED is still a young technology, not all lamps are created equal. Consumers should test products in the intended application before a major commitment, and look for LED and CFL products carrying the Energy Star mark, which ensures equivalent performance with a higher efficacy. Additionally, the Federal Trade Commission is implementing new packaging labeling rules, intended to help consumers compare and make lighting buying decisions using light output as the primary metric.

While halogen is currently a convenient alternative to the incandescent lamp, it may be short lived. The 2009 version of the International Energy Conservation Code (IECC), adopted as a residential energy code in 19 states at the time of writing, requires at least 50 percent of lamps in permanently installed lighting fixtures to be high efficacy. That means 60 lumens per watt (LPW) for lamps larger than 40W; no incandescent/halogen lamp complies. What's more, the Energy Act of



Philips 10W LED, winner of the Department of Energy L-Prize. Courtesy Philips Lighting North America.

2007 states that, if Congress does not increase efficacy requirements for incandescents above 45 LPW by 2020, that restriction automatically becomes law by default.

For more details on the new efficiency standards and alternatives to incandescent lamps, read the full article written by ALG author Craig DiLouie, published September 2011 by Electrical Contractor Magazine.

<http://www.ecmag.com/index.cfm?fa=article&articleID=13082>