GREAT ENERGY CHALLENGE

Separating Myth From Fact on CFL and LED Light Bulbs: Five Concerns Addressed

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A recent post on the U.S. phase-out of 40- and 60-watt low-efficiency incandescent light bulbs, which became official January 1, elicited a lot of response from readers. Many commenters were critical of the ban, dictated by legislation passed in 2007 by Congress and signed into law by then-President George W. Bush. (See related post: "U.S. Phase-Out of Incandescent Light Bulbs Continues in 2014 with 40-, 60-Watt Bulbs.")

While a recent poll showed that 65 percent of Americans plan to switch to electricity-saving lighting such as compact fluorescent (CFL), light-emitting diode (LED) or halogen bulbs rather than hoarding the old incandescent bulbs, many readers were deeply worried—and sometimes outright angry—about what they saw as safety risks, high cost and poor performance of the replacement technologies. (Take the quiz: "What You Don't Know About Energy-Efficient Lighting.")

We examine five of those concerns here.

1. The energy-saving replacements are too expensive. One reader complained that he had shopped for replacements for his 60-watt incandescent bulbs at Wal-Mart and was shocked by the price. "Forget it," he wrote. "I have stockpiled five dozen old bulbs." It is true that CFLS are often several times as expensive as old-style incandescent bulbs, which retailed for less than $1, and LEDs—though their prices have been dropping—remain more than 10 times as expensive. But sticking with old bulbs actually would cost consumers far more money over the long run. Noah Horowitz, an environmental engineer and director of the center for energy efficiency at the Natural Resources Defense Council, said in an email that because CFLs use far less electricity and last longer, someone who switches will save $30 to $50 on their electric bill over the bulb's six- to ten-year lifespan. (See related: "Light Bulb Savings Calculator.")

2. CFL bulbs are dangerous because of their mercury content. A number of readers were alarmed that CFL bulbs contained hazardous mercury, and were worried about being exposed to it if the bulbs broke. "I have six kids," one commenter noted. "I can't take the chance of having these hazards in my house!" But research indicates that while CFL bulbs do require more careful handling and disposal, the hazard may be blown out of proportion. According to a 2008 article on the issue in the scientific journal *Environmental Health Perspectives*, CFLs typically contain from three to five milligrams of mercury—about one hundredth of the mercury content of the older thermostats that may still be found in some homes. Researchers have found that only a tiny fraction of that is actually released when bulbs break. For example, in a study published in 2011 in the journal *Environmental Engineering Science*, Jackson State University researchers Yadong Li and Li Jin reported that even if left unattended for 24 hours, a broken bulb will release from 0.04 to 0.7 milligrams of mercury. The researchers found that it would take weeks for the amount of mercury vapor in the room to reach levels that would be hazardous to a child. That can be avoided by quickly following the U.S. Environmental Protection Agency's simple procedure for safe cleanup. Additionally, Horowitz suggests: "When your CFL stops working put it in a Ziploc bag and take it to Home Depot or Lowe's, who will recycle it for you for free." Another way to look at the mercury content of CFLs: reducing electricity consumption by using more efficient lights might help reduce the amount of mercury emitted into the atmosphere by coal-burning power plants, the biggest single source of mercury pollution in the air. (See related story: "Pro-Environment Light Bulb Labeling Turns Off Conservative Buyers, Study

Finds.")

3. CFL bulbs are dangerous because of ultraviolet radiation leakage. Two readers pointed with alarm to a 2012 study by Stony Brook University researchers, which found that most CFL bulbs have defects that allow UV radiation to leak at levels that could damage skin cells if a person is directly exposed at close range. The study's lead researcher, materials science and engineering professor Miriam Rafailovich, told National Geographic News that she believes the defects occur during manufacturing or shipping. "This is something that could be remedied," she said. In the meantime, she recommends that users shield the bulbs inside fixtures, stay one to two feet away from them, and avoid staring directly into the CFL bulb. That advice is basically consistent with the U.S. Food and Drug Administration's safety recommendations. A 2009 Canadian government study found that at distances of more than 11 inches, UV radiation from a CFL isn't any more than that of a conventional incandescent bulb. From the National Institutes of Health, here's an analysis of the Stony Brook study and other research on CFLs and UV radiation.

4. The new bulbs either can't be used with dimmer switches, or don't work efficiently with them. That is true of the regular CFL bulbs sold in stores, but most of the LED bulbs on the market today are, in fact, dimmable, according to Horowitz. He advised consumers to look for LEDs whose packaging indicates that they work with dimmer switches.

5. CFLs won't light up, or are too dim, in cold temperatures. Horowitz says this is a legitimate criticism of CFL, which have a hard time starting up in extremely cold climates. "If your bulb is located outdoors, say in your porch light, and you want an energy saving bulb, go with LEDs," he advised.

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