

LED light bulbs yield big savings in energy

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LED Lamp with E27 Edison screw. Image: Wikipedia.

One way the United States could slash its electricity use, dependence on fossil fuels and emissions of heat-trapping gases is really quite simple: better light bulbs.

The Department of Energy is backing research and development aimed at getting light-emitting diodes into common use in homes and businesses at a price that saves money. Hurdles remain: Costs are still high, the quality of what's on the market varies and not all the technical issues have been worked out. Energy experts are confident, however, that this new lighting is the future and that energy savings will be enormous.

Lighting consumes 22 percent of electricity in the United States. The DOE predicts that solid-state lighting -- which uses semiconducting materials to convert electricity into [light](#), and includes LEDs -- has the

potential to reduce energy use for lighting by one-third by 2030. That's the equivalent of saving the output of 40 large (1,000-megawatt) power plants, the [greenhouse gas emissions](#) of 47 million cars and \$30 billion.

LEDs already light universities from Miami to Anchorage, Alaska, streets in many cities and an increasing number of businesses that need lights on all the time.

"In your home, lighting may be 10 percent of your bill. But in an office building it's probably 40 percent, and so if you reduce your lighting [energy consumption](#) by a large fraction, the savings will be huge," said James Brodrick, who leads the DOE's solid-state lighting program.

A fact sheet from Brodrick's office says this about LEDs: "In the coming decade, they will become a key to affordable net-zero energy buildings, buildings that produce at least as much energy annually as they use from the grid."

The technology is advancing quickly, and costs will continue to drop, Brodrick said. The DOE tests LEDs and sets performance and efficiency guidelines under its Energy Star program.

LEDs are directional lights, used in recessed lighting and under-counter lights, for example. They're not yet available as bulbs that cast light all around and fit in ordinary sockets.

"There's an enormous and exciting potential, but we have a long way to go before we see anything besides directional lighting," said Jeffrey P. Harris, the vice president for programs at the Alliance to Save Energy, a nonprofit group that promotes energy efficiency.

Even so, LEDs already are used to light offices, hotels, restaurants and other businesses.

The DOE predicts that LEDs will have better performance capability than fluorescent lighting in the next few years, and that they'll continue to improve after that. They're now comparable with fluorescent fixtures in efficiency, and the DOE says its Energy Star LEDs last two to five times longer.

Cost is the biggest reason that LEDs aren't used more widely, Brodrick said.

A common PAR 38 floodlight at Home Depot, for example, costs about \$35 online as an LED, about \$3.70 apiece in a pack of 15 as a halogen floodlight and about \$11 for a compact fluorescent.

Chuck Swoboda, the chairman and chief executive officer of Cree Inc. of Durham, N.C., a leading company in LED lighting, said that commercial use of LEDs would drive down costs, and that a lower initial cost plus the value of energy savings would make them attractive. "It's not that different from the argument of why you should put insulation in a home," he said.

LEDs have other advantages: They can be dimmed, don't emit heat, don't contain mercury -- unlike compact fluorescents -- and can produce warm-toned light.

Swoboda said that Cree was focusing on commercial sales now because that market was bigger than the residential market and commercial users got quicker paybacks from reduced energy and maintenance costs.

In April, Cree announced that it had a new LED PAR 38 bulb designed for stores and museums that uses 12 watts of power instead of 50 to 90 watts for a halogen bulb.

"What happens with LEDs is people think of them as things that go in

your cell phone or things you put in the car dashboard, but they don't think of it as truly a lighting product," Swoboda said. "And so this was the latest innovation to kind of go out and show people you can pretty much do anything you can do in an incandescent bulb technology or in fluorescents with LEDs."

Home Depot, the world's biggest retailer of [light bulbs](#), is starting to stock LED bulbs this summer and plans to have 10 kinds by September, said Jorge Fernandez, who's in charge of light bulb purchases for the company.

"There's definitely a lot of interest, but the price is high, and a lot of people say they're waiting to see when the price drops," he said.

Felicia Spagnoli, a spokeswoman for Philips Lighting Electronics North America, said commercial users could make up for the higher costs of LEDs in as little as a year or two.

"We can address environmental concerns at the same time we improve the quality and use of light," she said. "Many people when they think of doing good for the environment think it means going without or having lesser quality, but that's absolutely not the case with LEDs."

Philips is working on many kinds of LEDs, including one to replace a 40-watt incandescent bulb that's scheduled to be available next year, she said.

Derrick Hall of RE/Construct Inc. in Asheville, N.C., said that residential customers weren't asking for LEDs because of the high upfront cost. Still, he's hearing of some nonresidential customers who are looking into LEDs for the energy savings.

LEDs are much better than other lighting options, Hall said. The quality

of the light is "far superior," they offer big energy savings and there's no cost to society for dealing with mercury, he said. Mercury, a neurotoxin, is found in small amounts in compact fluorescent bulbs.

Swoboda said that some of the biggest commercial users for LEDs now were fast-food restaurants, because LEDs' light makes food look appealing.

A McDonald's that opened in July in Cary, N.C., is lit almost entirely with daylight and LED lights. Ric Richards, the franchise owner, said the restaurant used 78 percent less electricity than a traditional one.

And the quality of the light?

"Awesome," he said. "The restaurant has great ambience."

Richards estimated that the upfront costs of the lighting would be paid back in two to four years with lower electricity bills.

In Washington, the Pentagon is installing [LED](#) lights in a large renovation.

Mark Buffler, an official in charge of technology in the Office of the Secretary of Defense, said in a report that switching from conventional fluorescents to LEDs would conserve large amounts of energy _ 240,000 kilowatt hours annually _ and save money on maintenance and mercury disposal. Buffler also wrote that the project was meant to demonstrate the energy savings potential of LEDs for the rest of the federal government.

ON THE WEB

Department of Energy information on LEDs:

www1.eere.energy.gov/buildings/ssl/index.html

Energy Star information on LEDs: tinyurl.com/mlgeqq

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