



LIGHTING THE WAY TO A GREENER ENVIRONMENT

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It's on every Top Ten list of things-to-do to save energy and help fight global climate change: Replace incandescent light bulbs with compact fluorescent lights (CFLs).

The benefits are compelling. CFLs use roughly one-quarter of the electricity of an incandescent bulb to produce the same amount of light. This means savings for consumers through reduced electric bills. And by reducing the demand for electricity, it means less global warming pollution from coal-fired power plants.

About one-third of global warming pollution in the United States is caused by coal plants generating electricity. And lighting accounts for 20 percent of the electricity used. For consumers whose electricity is produced from coal, replacing a single incandescent bulb with a CFL will keep over half a ton of carbon dioxide (CO₂) out of the atmosphere over the life of the bulb.

Those consumers whose electricity is supplied primarily by nuclear power can make an impact as well. Nuclear power plants typically sell their considerable excess base-load capacity to electrical distributors in nearby regions which otherwise depend on coal-fired power. Reducing demand for electricity in such cases, therefore, makes more emissions-free

nuclear power available to replace carbon-intensive coal-fired power elsewhere.

Is Mercury a Problem?

CFLs do contain a very small amount of mercury—about 5 milligrams, enough to cover the tip of a ballpoint pen. The mercury is safe while the bulb is intact or in use, and even if the CFL should break, it poses little risk.

Far more serious are the 50 tons of mercury emitted annually from coal-burning power plants in the United States. To generate the average 10,660 kilowatt hours (kWh) of electricity used by the typical household each year, a power plant will emit about 245 mg of mercury (roughly 0.023 mg of mercury/kWh of electricity produced). By using CFLs instead of incandescent bulbs, homeowners will reduce their electrical demand and cut mercury emissions as well.

Assessing the Impact

Let's compare a 23-watt CFL with an incandescent bulb that produces the same amount of light, namely a 100-watt bulb. Since ENERGY STAR-qualified CFLs last five to ten times longer than incandescent bulbs, this example compares one 23-watt CFL with five 100-watt incandescents, equivalent to the minimum expected lifetime of the one 23-watt CFL.

	1 23-watt CFL	5 100-watt incandescents
Cost of bulbs (Home Depot prices)	\$4.00	\$3.15
Lifespan of bulbs	5,000 hours	5 x 1,000 hours
Electricity used over bulbs' lifetime	115 kWh	500 kWh
Cost of electricity (at 10¢/kWh)	\$11.50	\$50.00
CO ₂ produced	230 lb	1,000 lb
Mercury (electrical generation)	2.6 mg	11.5 mg
Mercury (in the bulb) *	5.0 mg	0

* With proper disposal, the mercury in the CFL will not enter the environment.

Making the Switch

For those who haven't made the switch to CFLs yet or who were unhappy with fluorescent lights in the past, it's time to check out the nearest lighting display.

- CFLs now come in a variety of shapes and sizes—mini-spirals small enough to use in table lamps, sconces and ceiling fixtures; globes for bathroom vanity fixtures; chandelier bulbs; recessed downlights; and more.
- CFLs can replace incandescent bulbs in almost any fixture. Some are specifically designed for use with dimmers or in three-way fixtures.
- The amount of light that any bulb will put out is measured in lumens. A 100-watt incandescent bulb will put out about 1,600 lumens. Replacing that bulb with a 23-watt CFL will also produce 1,600 lumens, but it will require much less power.
- CFLs are available in a range of color temperatures. For a warm (yellowish) light, look for a CFL labeled *soft white*, with a color temperature of 2,700K (degrees Kelvin). CFLs labeled *bright white* and *daylight* will have a cooler (bluish) light and higher Kelvin numbers (e.g., 3,500K or 5,500K).

- Look for ENERGY STAR-qualified bulbs. These have been tested to meet stringent performance criteria; they will use 75 percent less energy than an incandescent bulb and last up to ten times longer.

Disposing of CFLs

Mercury is a potent neurotoxin, and proper disposal of CFLs is a must. The U.S. EPA is working with CFL manufacturers and major retailers to expand recycling and disposal options. Ikea, Home Depot and some hardware stores already accept used CFLs, and many states and municipalities sponsor regular household hazardous waste collection programs that include CFLs.

State and local recycling options can be found online at www.epa.gov/bulbrecycling/ and at www.earth911.org.

If a CFL should break, scoop up the glass fragments and fine particles with stiff paper or cardboard and put them in a plastic bag. Do not use a vacuum or broom. Wipe the area with a damp paper towel and place that in the bag, too. Seal the bag, place it in a second plastic bag, and dispose of it properly. If weather permits, open windows to allow the room to ventilate.

Online Resources for Additional Information

ENERGY STAR comprehensive CFL web page: www.energystar.gov/index.cfm?c=cfls.pr_cfls

Environmental Defense detailed guide to finding energy-saving light bulbs that work for you: www.environmentaldefense.org/page.cfm?tagid=632

Earth 911 Web site with extensive information about recycling: <http://earth911.org/recycling/>

State-by-state listing of disposal and recycling options: www.epa.gov/bulbrecycling/

U.S. EPA information on cleaning up mercury spills: www.epa.gov/mercury/spills/index.htm