

Compact Fluorescent Lamps (CFLs)

A Guide to Saving Money and Improving the Environment

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A compact fluorescent lamp (CFL) is a relatively new type of fluorescent lamp that has potential uses in all areas of the home. CFLs have features that make them both convenient and cost-effective. They have been available since the early 1980s and do not require the use of special fluorescent fixtures. These bulbs can be installed in many existing household light fixtures without modifications.

Household lighting has changed little since electricity first came into Kentucky homes. Just as in the 1930s, incandescent bulbs are still the primary source of light in most homes. They operate by passing an electrical current through a tungsten filament, heating it so that it glows and generates visible light.

Only in the kitchen has there been much departure from the use of incandescent lighting. Fluorescent light fixtures came into general kitchen use in home construction about 50 years ago and they are now considered to be the standard for lighting American kitchens. Fluorescent lights are also now installed in residential bathrooms, laundry rooms, and closets.

Traditional fluorescent lights such as those used in offices, factories, stores, and home kitchens utilize a special fixture with a ballast and starter and usually have replaceable curved or straight bulbs.

In the simplest sense, compact fluorescent lamps are a cross between an incandescent bulb and a fluorescent lamp. They generate light using fluorescent technology, but they are sized and shaped so that they will fit fixtures made for incandescent bulbs. They have standard “Edison-type” screw bases as regular light bulbs do, and most have a starter, ballast, and bulb combined in a single unit that is not much larger than a traditional incandescent bulb. They have the high-energy efficiency and long bulb life characteristics of fluorescent lights.

CFLs have improved significantly since their early years. Early CFLs had large starter/ballast assemblies, and the light tubes often resembled those found in standard fluorescent ceiling fixtures. Many CFLs now mimic the shape of the incandescent bulbs that they are designed to replace, and some (such as CFL floodlight bulbs) are exactly the same shape and size as their incandescent counterparts.

Compact fluorescent lamps are available in a variety of shapes, sizes, and wattages that fit many home uses. Several kinds can be used to replace ordinary 25-watt to 100-watt incandescent bulbs in lamps and fixtures. Others can be used to replace globe bulbs, flood bulbs, and decorator bulbs.

Important Considerations for CFLs

Compact fluorescent lamps deserve homeowner consideration because:

1. CFLs offer solutions for a variety of lighting needs.
2. CFLs are more energy efficient than incandescent bulbs and can save money for homeowners.
3. CFLs save energy; therefore, they provide environmental benefits. Their use reduces the need to burn fossil fuels for electrical generation, resulting in less air pollution.

CFLs are more energy efficient than incandescent bulbs because they don't generate as much waste heat as incandescent bulbs. Most CFLs operate at around 100° F. In contrast, the tungsten filament of an incandescent bulb heats to over 4500° F, and the surface of a bulb can reach over 300° F. As a result, traditional incandescent light bulbs waste the majority of their energy input (typically 92 to 95 percent wasted) as heat. During the summer months, the heat generated by incandescent bulbs adds to the difficulty and expense of trying to cool the home.

An Energy Efficiency Comparison

A soft white incandescent light bulb generating 840 lumens of light uses 60 watts of electricity and has a lumens per watt efficiency rating of 14. A compact fluorescent light bulb generating 800 lumens of light uses 14 watts of electricity and has a lumens per watt efficiency rating of over 57. The compact fluorescent bulb is more than four times more efficient than the incandescent bulb at producing usable light.

Table 1. Typical CFL lamp replacements (shown with incandescent bulbs of similar light output).

Incandescent Bulb	CFL Lamp
40 watts	7 to 9 watts
60 watts	13 to 16 watts
75 watts	18 to 20 watts
100 watts	26 to 27 watts

Money Saved by Use of CFLs

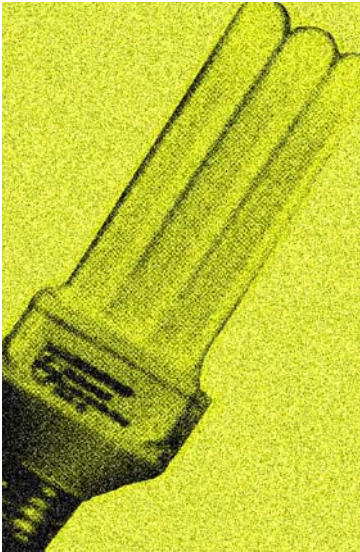
Your savings will depend upon what you pay for the bulb(s) and the rate you pay for electricity. For example, a good figure to use for the cost of electricity for Pennyriple RECC residential customers in Kentucky would be about 8.0¢ per kilowatt-hour.

Using Pennyriple RECC rates, replacing a 60-watt incandescent bulb with a \$9, 14-watt CFL with a 6,000 hour estimated life will generate a net savings of about \$15 over the life of the bulb. Making the same replacement with a 14-watt, 8,000 hour CFL costing \$10 will save about \$22.

Replacing a 100-watt incandescent bulb with a \$10, 25-watt CFL with a 10,000 hour estimated life will generate a net savings of more than \$50 over the life of the bulb.

CFLs Are Good For the Environment

According to the U.S. Department of Energy’s ENERGY STAR® Web site, “If every household in the U.S. replaced one light bulb with an ENERGY STAR qualified compact fluorescent light bulb (CFL), it would prevent enough pollution to equal removing one million cars from the road.”



The Task Force to Study Lighting Efficiency & Light Pollution in Maryland reports that replacing a 60-watt incandescent bulb with a CFL bulb will eliminate the emission of 1,300 pounds of carbon dioxide and 26 pounds sulfur dioxide from a coal fired plant producing electricity.

Disadvantages of Using CFLs

1. There is a high initial purchase price for the bulb.
2. They are not readily available in all stores.
3. CFL bulbs won’t fit in some light fixtures.
4. It may be difficult to find a CFL bulb that exactly suits a particular application.
5. Most are available only for fixtures made for medium-base (E-26 medium screw) bulbs.
6. Most CFLs can’t be used with a dimmer switch.

Many CFLs exhibit low light output at initial startup (they have to warm up to produce their full light potential).

Details on Compact Fluorescent Lamp Disadvantages

1. The biggest obstacle to the use of CFLs is the high initial purchase price. Most CFL bulbs will cost in the range of \$7 to \$10 each (fall 2003 prices). Compare this to the cost of 25 cents to 50 cents for standard incandescent A-type bulbs and \$1 to \$4 for “special” incandescent bulbs, such as vanity (globes) and flood bulbs. However, CFLs make up for their high initial cost with their long life and high energy efficiency. (Some lower wattage CFL bulbs may be priced as low as \$3 to \$4 in multipacks. A few special purpose CFL bulbs may cost as much as \$15.)
2. CFLs are not available in all stores. Although they are available at most hardware stores, discount stores (such as Wal-Mart, K-Mart, and Target), and home improvement warehouses (Lowe’s and Home Depot), some stores don’t have a large selection. Check with the retailers and encourage them to carry a wider variety of bulbs.
3. CFL bulbs won’t fit in some fixtures. For fixtures that have limited bulb space, such as bedroom ceiling fixtures and some lamps, there are CFL minibulbs that may fit for these applications.
4. It may be difficult to find a bulb that exactly suits a particular application, particularly where a “strong,” or powerful, bulb is needed. For example, most readily available CFL flood bulbs have a relatively low light output (perhaps equal to a 75-watt or 90-watt incandescent bulb), whereas common incandescent flood bulbs are often rated at 120 watts to 150 watts. However, additional styles of bulbs are continuously being introduced into the marketplace. If a bulb that you need is not available at this time, it might be in the near future.
5. Most are available only for fixtures utilizing standard medium-base bulbs. Example: Most stores in the Hopkinsville, Kentucky/Clarksville, Tennessee, area have only medium-base CFLs. However, candelabra-base CFL bulbs are now available from some Internet merchandisers.
6. The majority of CFLs cannot be dimmed with a dimmer switch. However, a few CFL bulbs now have that capability. These bulbs are available on Internet sites and in many stores. If they are not stocked by your local store, talk to your retailer to find out when they will be available.

7. After the high purchase price, low light output at initial startup may be the next most important disadvantage to CFLs. Most people expect the instantaneous full light output given by incandescent lamps and may not like the gradual warmup of a CFL. Although the EPA considers CFLs to reach full brightness within one minute of being switched on, some bulbs seem to require more time to actually reach 100 percent brightness. Most users adjust to this warmup period within a short time.

Advantages of Using CFLs

1. Lower energy consumption saves money for the homeowner.
2. Lower energy consumption benefits the environment by reducing air pollution.
3. Less waste heat is produced, which in turn reduces the cooling load on home air conditioners.
4. Longer bulb life means less bulb changing. This is an important consideration for hard-to-reach and less accessible lighting.
5. They give an even, high-quality light output with little glare.
6. CFLs are less of a fire hazard than halogen or incandescent bulbs that burn hotter.
7. They provide more light from lamps and fixtures that have low maximum wattage ratings.
8. CFLs come in a wide range of wattages, shapes, and sizes applicable for most types of home use.

Check the Label!

Most CFL package labels provide important information about the bulbs. Look on the label and consider the following information when making a purchase:

1. The wattage rating of the CFL compared to the incandescent bulb that it replaces.
2. The estimated bulb life in years.
3. The type of light emitted, such as “cool white” or “warm white.”
4. The type of bulb, such as a globe bulb or a “bug” bulb.
5. The light output in lumens.
6. The energy consumption of the bulb in watts.
7. The expected bulb life (in hours).
8. An estimate of money to be saved over the life of the bulb.
9. Examples of applications for which the bulb may be used.
10. Other information such as “instant on” or “not dimmable.”

Deciding Where to Use CFLs

Compact fluorescent lamps are not always the best bulb for every home lighting application. Regular incandescent bulbs are better than CFLs for use in fixtures where the light will rarely be turned on for more than a few minutes at a time (15 minutes or less), and the light is used less than 1.5 hours total each day.

“Frequently switching them (CFLs) on and off will shorten the life of the product. If the life of the lamp is shortened significantly, you will not reap the financial benefits (including energy and life of lamp) that are common to CFL lamps.”



ENERGY STAR

Look for the ENERGY STAR symbol on CFL packages.

Not all CFLs meet the ENERGY STAR qualifications, but any CFL should save significant amounts of electricity. ENERGY STAR qualified CFLs must operate at less than 100° F and use at least 66 percent less energy than a standard incandescent bulb.

Try it and Save!

Why don't you try a compact fluorescent lamp in your home?

It's as easy as changing a light bulb!

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