

Energy-Efficient Lighting

F. John Hay, Extension Educator — Energy
Lynn Chamberlin, Nebraska Energy Office

A publication to help homeowners reduce lighting costs by choosing the energy-efficient bulb that’s right for different locations within the home. Money-saving tips and a video are included.

Here’s an interesting energy fact: Only about 10 percent of the energy used by a regular incandescent light bulb goes toward producing light. The other 90 percent of the power is wasted as heat. In comparison, energy-efficient lights produce higher percentages of light than heat with the electricity they consume. As a result, they can provide the same amount of light as standard bulbs while using much less energy. Since lighting typically consumes about 25 percent of home’s baseload electricity use, it represents a big area for potential savings.

Compact Fluorescent Lights (CFLs)

CFLs offer great potential for energy savings. They use one-quarter to one-third the energy of incandescent bulbs and produce the same amount of light. They last 10 times longer than incandescent bulbs and screw into a standard light socket. This makes them a great option to use in hard-to-reach fixtures to save yourself some precarious trips up a ladder. CFLs can save you 60 percent or more on lighting costs, so they are most cost effective when used in the light fixtures used most often and for the longest time.

Though you may not notice a resemblance at first, they use the same technology as the long, white tube lights you’re used to seeing in offices and schools (*Figure 1*). Manufacturers



Figure 1. Compact fluorescent bulbs like the one on the right use a fraction of the energy of incandescent bulbs like the one on the left. Both bulbs shown here are 60 watt equivalent, yet the CFL uses only about 18 watts.



Learn more about energy-efficient lighting options in this short video.

https://www.youtube.com/watch?v=_ich-LjqdU

have developed multiple ways to shrink the energy benefits of fluorescent lighting into products that fit into conventional light sockets, hence the name “compact fluorescents.”

You do need to keep in mind that CFLs are not appropriate for all home lighting needs. Some bulbs are sensitive to temperature and humidity and should not be used in some environments, and not all CFLs can be used with dimmer or three-way switches. *Read carefully all of the characteristics of the bulb listed on the package prior to purchase.*

Standard Tube Fluorescent Lighting

Standard tube fluorescent lights have dramatically improved in the past 10 years. The newer, more efficient tubes have a smaller diameter than the old ones and produce a warmer, more natural color of light, in addition to being more efficient. The skinnier T-8 tubes fit in standard fixtures and can improve fluorescent lighting efficiency by about 15 percent. New T-8 tube-type fluorescent fixtures feature electronic ballasts, which eliminate flicker and increase efficiency beyond what a T-8 tube with a standard ballast will produce. Some electronic ballasts even allow dimming.

Many models of new T-8 fixtures and lamps provide a pleasing enough color of light to use in the living areas of a home. They are a great replacement option for the inefficient

multibulb fixtures found above many bathroom mirrors and in laundry or basement rooms. Installing a specially designed dimmer for the fixture is an extra-nice touch. Dimmable fluorescent fixtures also work well for indirect lighting, often installed in a wall-mounted valance that allows light to bounce off the ceiling.

Light Emitting Diode (LED) Lamps

LED lighting uses light-emitting diodes as their source for illumination. The LEDs are a semiconductor device that converts electricity to light by using the movement of electrons. LED bulbs are available that can be screwed into traditional lamps and light fixtures and consume much less energy than incandescent (80-90%) and CFL lamps (15-25%) (Figure 2). They have a very long life of about 50,000 hours, which equates to over 17 years with 8 hours of use a day.



Figure 2. LED bulbs are long lasting and safe but are sensitive to heat and unsteady electrical current.

LED lighting contains no mercury or other toxins, emits no UV light, doesn't attract bugs, and doesn't generate much heat. But they do have some disadvantages: Currently, they are more expensive than the other technologies, and they can be sensitive to heat and unsteady electrical current, which can reduce their lifespan.

Halogen Lighting

Halogen bulbs are actually incandescent bulbs with halogen gas inside the glass. The added gas results in about 30 percent more light for the same amount of electricity, and the light quality is brighter and whiter. These bulbs last 2,000 to 4,000 hours. Be aware of safety concerns with halogen lamps. Tests conducted by the Consumer Product Safety Commission showed that some halogen bulbs can start fires if they come in contact with or are too close to combustible materials. These bulbs can reach temperatures ranging from about 970°F to 1,200°F. In contrast, a 150 watt incandescent bulb operates at a temperature of about 340°F, and a 75 watt bulb operates at about 260°F. Some types of halogen bulbs do operate at lower temperatures.

Lighting Tips

No matter what type of light bulbs you choose, you'll be guaranteed to save energy if you put into practice these common sense tips:

- Turn lights off when you're not using them.
- Take advantage of natural light from windows whenever possible.
- Don't use more light than you need.
- Focus the light on where it is needed most.
- Regularly dust your light bulbs and fixtures to prevent dirt build-up.

This publication has been peer reviewed.

UNL Extension publications are available online at <http://extension.unl.edu/publications>.

**Index: Consumer Education
Energy Conservation**

Issued April 2014

Extension is a Division of the Institute of Agriculture and Natural Resources at the University of Nebraska–Lincoln cooperating with the Counties and the United States Department of Agriculture.

University of Nebraska–Lincoln Extension educational programs abide with the nondiscrimination policies of the University of Nebraska–Lincoln and the United States Department of Agriculture.

© 2014, The Board of Regents of the University of Nebraska on behalf of the University of Nebraska–Lincoln Extension. All rights reserved.