



HOW

TO...

IMPROVE LIGHTING EFFICIENCY



SUSTAINABILITY OPPORTUNITY

In summer 2014, the Office of Sustainability conducted a Plug Load Equipment Inventory, which revealed that of the nearly 14,000 desk lamps on campus, 2,000 still contain incandescent light bulbs. The Department of Sustainability and Energy Management has made it a priority to help replace these bulbs with LEDs, which are approximately 90% more energy efficient than a standard incandescent bulb. If all 2,000 incandescent bulbs on campus were replaced with LEDs, the university could save \$40,000 per year in electricity costs. Additionally, LED light bulbs last about 20 years, so they require much less maintenance. Now that LED light bulbs can be purchased for as low as \$5 each, upgrading to LEDs is an easy and inexpensive option.

HERE'S HOW:

1) Determine the number of bulbs to replace

Contact the Office of Sustainability for data on how many incandescent bulbs are in your building or department. If desired, Office of Sustainability staff/interns can also conduct an audit through the [Cardinal Green Office Program](#) to help you determine other sustainability opportunities for your building.

2) Purchase LEDs

LED and CFL light bulbs should be purchased through Grainger. You can find these items in the "BLSP Energy Saving Equipment" shared favorites folder in SmartMart. Follow these steps to access the SmartMart folder:

- From SmartMart Home, click "Favorites."
- On the left side, under "Shared," click "BLSP Energy Saving Equipment."
- Choose the LED light bulb (or the CFL if you prefer) and click "Order from Supplier."
- On the new page, enter the number of bulbs you'd like to order and click "Add to Cart."

3) Install LEDs

Installation of new bulbs is a quick and easy process. Simply unscrew your old incandescent bulb by twisting counter-clockwise, and screw in your new LED bulb by twisting clockwise.

4) Promote the new bulbs

Encourage your peers in other buildings and departments to improve their lighting efficiency as well. Switch out your bulbs at home too! You'll notice the savings on your electric bill.

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CONTINUED

QUICK TIPS:

Light bulbs are evaluated based on three metrics: energy use (watts), brightness (lumens) and color temperature (degrees Kelvin).

Energy Use

About 75% of the electricity drawn by incandescent bulbs is wasted as heat—that's why you never should touch an incandescent bulb when it's turned on. In contrast, CFLs and LEDs produce much less waste heat, so their energy consumption is lower. CFLs use about 75% less energy than standard incandescents and LEDs use about 90% less.

Brightness

The brightness of a light bulb varies based on the amount of lumens it produces. A standard incandescent bulb produces about 800 lumens. When purchasing a new light bulb, look for the number of lumens on the package. Purchase 800 lumen bulbs if you like the standard brightness, or go with higher lumens if you like brighter bulbs or lower lumens if you like dimmer bulbs. Be aware that your energy use will likely fluctuate as your lumens do—so be sure to look at the wattage of each bulb as well!

Color Temperature

Many people are accustomed to the warm yellow color of typical incandescent bulbs. A common myth is that CFLs and LEDs don't produce that same color. However, both CFLs and LEDs come in many colors—you just have to make sure to find a bulb with the color temperature that you prefer. Color temperature is measured in degrees Kelvin, and the warm yellow color of a standard incandescent bulb measures about 2700° K. A higher color temperature (around



LED light bulbs use 90% less energy than standard incandescent bulbs.

3500° K) will produce bluer light (also known as daylight), and a ° K will produce yellower light. Look on the package for the color temperature of your new CFL or LED to make sure it's the color you like!

Disposal

Different types of light bulbs need to be disposed of in different ways. Incandescent light bulbs can be put in standard trash bins. LED and CFL light bulbs can be placed in green electronic waste bins around campus. For more information on this program or to find the bin nearest you, visit: <http://electronicwaste.stanford.edu>. Be especially careful about CFL bulbs, which contain trace amounts of mercury. The mercury is exposed when the bulb breaks, and it is harmful to the environment to have that exposed mercury in a landfill. If you accidentally break a CFL bulb, leave the exposed area for about 15 minutes. When you return, sweep the bulb into double plastic bags and tie up the bags to sequester any remaining mercury. Then place the double-bagged CFL in the nearest green electronic waste bin. Visit http://web.stanford.edu/dept/EHS/prod/enviro/cfl_recycling.html for more information.

MORE INFORMATION

CARDINAL GREEN OFFICE PROGRAM

<http://sustainable.stanford.edu/cardinal-green/campaign/cardinal-green-office-program>

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