



# Facts of Light

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Ten years ago, we used a lot of energy in the form of electricity to make light to be able to see. Thirty percent of the electricity schools used was for lighting, and homes used about 14 percent of their electricity consumption for lighting. That's because homes, schools, and other commercial buildings used a lot of incandescent lighting. These inefficient bulbs were perfected by Thomas Edison in 1879 and didn't change much for the next 125 or more years! These bulbs were surprisingly inefficient, converting up to 90 percent of the electricity they consumed into heat.

The Energy Independence and Security Act of 2007 changed the standards for the efficiency of light bulbs used most often. As of 2014, most general use bulbs must be 30 percent more efficient than traditional, inefficient incandescent bulbs. What do the new standards mean for consumers? The purpose of the new efficiency standards is to give people the same amount of light by using less energy. Most incandescent light bulbs have since been phased out and are no longer available for sale. This has resulted in significant energy savings for homes and schools. Newer, efficient lighting now accounts for 17 percent of the electricity used in schools, and 5 percent used in homes.

There are several lighting choices on the market that meet the new efficiency standards. Energy-saving incandescent, or halogen, bulbs

are different than traditional, inefficient incandescent bulbs because they have a capsule around the filament (the wire inside the bulb) filled with halogen gas. This allows the bulbs to last three times longer and use 25 percent less energy.

Compact fluorescent light bulbs (CFLs) provide the same amount of light as incandescent bulbs, but use up to 75 percent less energy and last ten times longer. CFLs produce very little heat. Using CFLs can help cut lighting costs and reduce environmental impacts. Today's CFL bulbs fit almost any socket, produce a warm glow and, unlike earlier models, no longer flicker and dim. CFLs have a small amount of mercury inside and should always be recycled rather than thrown away. Many retailers recycle CFLs for free.

Light emitting diodes, better known as LEDs, are gaining in popularity. Once used mainly for exit signs and power on/off indicators, improved technology and lower prices are enabling LEDs to be used in place of incandescents and CFLs. LEDs are one of the most energy-efficient lighting choices available today. LEDs use 75 percent less energy than traditional incandescents, and have an average lifespan of at least 25,000 hours. The cost of LEDs has dropped in the last five years and may continue to drop. They use even less energy than CFLs, save more electricity, and produce fewer carbon dioxide emissions. The U.S. Department of Energy estimates that widespread adoption of LED lighting by 2027 would reduce lighting electricity demand by 33 percent. This would avoid construction of 40 new power plants.

## Cost of 25,000 Hours of Light

All bulbs provide about 850 lumens of light.



COST OF BULB	INCANDESCENT BULB	HALOGEN	COMPACT FLUORESCENT (CFL)	LIGHT EMITTING DIODE (LED)
Life of bulb (how long it will light)	1,000 hours	3,000 hours	10,000 hours	25,000 hours
Number of bulbs to get 25,000 hours	25 bulbs	8.3 bulbs	2.5 bulbs	1 bulb
<b>x</b> Price per bulb	\$0.50	\$1.50	\$1.50	\$1.33
<b>=</b> Cost of bulbs for 25,000 hours of light	<b>\$12.50</b>	<b>\$12.45</b>	<b>\$3.75</b>	<b>\$1.33</b>

COST OF ELECTRICITY	INCANDESCENT BULB	HALOGEN	COMPACT FLUORESCENT (CFL)	LIGHT EMITTING DIODE (LED)
Total Hours	25,000 hours	25,000 hours	25,000 hours	25,000 hours
<b>x</b> Wattage	60 watts = 0.060 kW	43 watts = 0.043 kW	13 watts = 0.013 kW	12 watts = 0.012 kW
<b>=</b> Total kWh consumption	1,500 kWh	1075 kWh	325 kWh	300 kWh
<b>x</b> Price of electricity per kWh	\$0.13	\$0.13	\$0.13	\$0.13
<b>=</b> Cost of Electricity	<b>\$195.60</b>	<b>\$140.18</b>	<b>\$42.38</b>	<b>\$39.12</b>

LIFE CYCLE COST	INCANDESCENT BULB	HALOGEN	COMPACT FLUORESCENT (CFL)	LIGHT EMITTING DIODE (LED)
Cost of bulbs	\$12.50	\$12.45	\$3.75	\$1.33
<b>+</b> Cost of electricity	\$195.60	\$140.18	\$42.38	\$39.12
<b>=</b> Life cycle cost	<b>\$208.10</b>	<b>\$152.63</b>	<b>\$46.13</b>	<b>\$40.45</b>

ENVIRONMENTAL IMPACT	INCANDESCENT BULB	HALOGEN	COMPACT FLUORESCENT (CFL)	LIGHT EMITTING DIODE (LED)
Total kWh consumption	1500 kWh	1075 kWh	325 kWh	300 kWh
<b>x</b> Pounds (lbs) of carbon dioxide per kWh	1.6 lb/kWh	1.6 lb/kWh	1.6 lb/kWh	1.6 lb/kWh
<b>=</b> Pounds of carbon dioxide produced	<b>2,400 lbs carbon dioxide</b>	<b>1,720 lbs carbon dioxide</b>	<b>520 lbs carbon dioxide</b>	<b>480 lbs carbon dioxide</b>