

### Incandescent vs. CFL Light Bulbs vs. LED's

Measuring Electricity – Electricity is measured in units of power called watts. The watt was named to honor James Watt, the inventor of the steam engine. One watt is a very small amount of power. It describes the rate at which electricity is being used at a specific moment. A kilowatt (kW) represents 1,000 watts. The amount of electricity a customer uses over a period of time is measured in kilowatt-hours (kWh). Kilowatt-hours are what you see on your electricity bill at home. Have your parents show you this when the next electricity bill arrives at your home.

For example, if you use a 60-watt bulb, 4 hours a day for 30 days, you have used 7.2 kW of electrical energy.

Sample Calculation: (60 watts) X (4 hours/day) X (30days) = 7200 watt-hours

7200 watt-hours/(1000 watts/kW) = 7.2 kW

**Calculating lifespan costs of life bulbs:** In comparing two choices in technology, lifespan costing is useful. (A bulb's lifespan is the time it produces light, before burning out). To do this, one must think of all the costs associated with the product and its use, from purchase to disposal.

Lifespan cost calculation for one light bulb = (Energy Cost in kWh) X (Lifespan of light bulb, in hrs) X (Bulb wattage, in kW) + Purchase price of light bulb

Assumptions:

Purchase price of incandescent bulb = \$0.75/bulb

Purchase price of CFL bulb = \$2.25/bulb

Purchase price of LED Bulb= \$6.00/bulb

Energy cost= \$0.085/kWh (8.5 cents per kWh)

Incandescent bulb lifespan= 1,000 hours

CFL lifespan= 10,000 hours

LED lifespan= 25,000 hours

Incandescent wattage= 60, CFL wattage= 13, LED wattage= 11

What would be the lifespan cost for an incandescent, CFL and a LED over 25,000 hours? (show work below)

1. Incandescent:

CFL:

LED:

2. How much will you save over the given time period with a CFL or a LED?

3. How much would you save if you replaced 15 of your light bulbs with cfl's over the given time period, how about LEDs?

### Calculating CO2 Air Pollution associated with a light bulb's energy needs

The carbon dioxide pollution produced when energy for one light bulb is generated = (1.37 lbs of CO2/kWh) x (bulb wattage in kW) x (hours of bulb life)

4. How much more CO2 is generated from an incandescent vs. a cfl over 25,000 hours? (show work below)

Incandescent:

CFL:

LED: