



Student Worksheet: Cost – Benefit Analysis

ENERGY STAR qualified CFLs provide the same amount of light (lumens) as standard incandescent bulbs, but have lower wattage ratings. This means they use less energy and cause less pollution. By comparing watts or energy use on the product packaging you can compare energy savings. For example, most 60-watt incandescent light bulbs provide around 800 lumens, 13-15 -watt CFLs also provide around 800 lumens.



Table 1 – Lumen equivalents

Incandescent light bulb	Compact Fluorescent Light Bulb Approximate equivalent	Approximate Lumens (both)
60 watt	14 watts	800
75 watt	18 watts	1200
100 watt	32 watts	1600

Average Bulb Prices – The price of light bulbs varies according to type, wattage, and quality. For this assignment assume the following: Incandescent light bulbs cost approximately \$0.75 / bulb regardless of wattage, compact fluorescent light bulbs cost approximately \$6.00/ bulb regardless of wattage.

Conversion factors – 1 short ton = 2000 lbs; 1 metric tonne = 1,000 kilograms = 2205 lbs. 1,000 Watt (W) = 1 kilowatts (kW); 1,000 kilowatts (kW) = 1 Mega watt (MW)

Table 2 - Average Electricity Emission Factors by state and region updated April 2002, represents a three year weighted average for 1998-2000.

Table 2	CO ₂ Emission Factors			CH ₄	N ₂ O
	lbs/kWh	short tons/MWh	metric tonnes/MWh	lbs/MWh	lbs/MWh
New England	0.98	0.491	0.446	0.0207	0.0146
Connecticut	0.94	0.471	0.427	0.0174	0.0120
U.S. Average	1.34	0.668	0.606	0.0111	0.0192

Source: <http://eia.doe.gov/oiaf/1605/e-factor.html>

Note: Connecticut figures vary from the region and nation because of our use of nuclear power. Coal fired power plants, more common nationally than in the New England region, are a larger contributor to air pollution.