Water/Utilities report—November 2013

Cost of electricity is rising. Southern California Edison recommends that you think about the type of bulbs you are using and whether you can save money by replacing the bulbs you are currently using with **compact fluorescent lamps (CFL) or the even more efficient LED (light emitting diode) lamps. The question for the homeowner becomes one of cost—lifetime or up-front—and performance.**

Incandescent bulbs have been phased out. Most commonly now these bulbs are being replaced with CFL bulbs. These are fluorescent bulbs that have been designed to fit in standard lamp bases previously used for the incandescent bulbs. The advantages of CFLs include:

- These need only about 1/5 to 1/3 of the power as an incandescent bulb to give the same light. This means a reduction in emissions and waste to produce the lighting provided.
- These bulbs last eight to fifteen times longer than incandescent bulbs.

The common complaints from consumers and/or problems include:

- The light output does not have the same perceived color as the past incandescent lights.
- As time passes, the illumination from these drops off.
- It takes time for the bulbs to warm up to provide maximum output.
- The bulbs, similar to other fluorescent bulbs contain mercury vapor. The presence of this element requires special disposal. However, many of these bulbs do make their way into landfills. Mercury is toxic and even minor amounts can be problematic for waste disposal sites and incinerators. A broken bulb can temporarily expose those nearby with levels of mercury above U.S. federal guidelines for chronic exposure, impacts of short term, single exposures are not known. If a bulb is broken the EPA recommends that all pets and people leave the room and airing out a room for 5-10 minutes. Then gather up the pieces and preferably put them in a glass jar with a lid. A glass jar is recommended since plastic bags may not contain the vapors. Research has also shown that exposures in rugs, even though cleaned, can continue for weeks after initial break. All burned out fluorescent bulbs in CA are required to be recycled. One site that takes these bulbs locally is Lowe's. The recycle bin is placed just inside the front entrance.

LED bulbs are a second alternative to incandescent bulbs. The advantages of these bulbs include:

- A much longer life span than either incandescent or CFL bulbs. The life span is approximately 30,000 hours for an LED bulb. In comparison, CFLs last for about 8,000 hours and incandescent bulbs last for about 1,000 hours.
- These bulbs do not require a warm-up time as do fluorescents.

- For the same brightness (lumens) these require less energy than incandescent bulbs or CFLs
- The intensity remains about the same over the lifetime of the bulb.

Disadvantages of LED bulbs include:

- Higher initial cost than CFLs or incandescent bulbs.

Check the Southern California Edison website for good information and information on various bulb types.

Brightness in Lumens

	Incandescent	Halogen	CFL	LED
450 lm =	40W	29-50W	11-14W	7-9W
800 lm =	60W	39-60W	15-18W	10-18W
1100 lm =	75W	60-70W	19-23W	13-20W
1600 lm =	100W	70-120W	23-30W	20-23W

Color Temperature in Kelvin (K)

Bulb Fact — When replacing an Incandescent reflector lamp with an LED, it is important to select an LED with a color temperature of 2700K for best match. Also, when replacing a halogen lamp with an LED, look for products with a 3000K color temperature as a halogen lamp has a slightly whiter light appearance.

www.bulbs.com/sce?cm_mmc=SCE-_-SCE-_-Landingpage-_-SCE

Cost Comparison (U.S. electricity prices)

	Incandescent[22]	Halogen[23]	CFL[24]	LED (Generic)[25]	LED (Philips)[26]	LED (Philips L-Prize)
Purchase price	$0.36	$1.50	$4	$13	$16	$30
Power used (watts)	60	43	14	9.5	9.5	10
Lumens (mean)	860	750	685	800	806	940
Lumens/Watt	14.3	17.4	48.9	84.2	84.8	94
Color Temperature Kelvin	2700	2900	2700	2700	2700	2700
CRI	100	100	82	>75	>80	92
Lifespan (hours)	1,000	1,000	8,000	25,000	15,000	30,000
Bulb lifetime in years @ 6 hours/day	0.5	0.5	3.7	>11.4	6.8	>13.7
Energy cost over 10 years @ 15 cents/kWh	$197	$141	$46	$31	$31	$33
Total cost	$206	$173	$58	$44	$55	$63
Total cost per 860 lumens†	$206	$189	$61	$43	$57	$57

Comparison based on 6 hours use per day (21,900 hours over 10 yrs)

†LED prices adjusted for life in this row http://en.wikipedia.org/wiki/LED_lamp#Household_LED_lamps

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Comparison

	Incandescent	Halogen	Fluorescent	LED (Generic)	LED (Philips)	LED (Philips L Prize)[103]
Electricity usage	60 W	42 W	13 W	9 W	12.5 W	9.7 W
Lumens	860	570	660[104]	900	800	910
Lumens/Watt	14.3	13.6	50.8	100	64	93.4
Color Temperature Kelvin	2700	3100[105]	2700	3000	2700	2727
CRI	100	100	82	>75	85	93
Lifespan (hours)	2,000	3,500	8,000	25,000	25,000	30,000

http://en.wikipedia.org/wiki/Compact_fluorescent_lamp#Recycling

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