Home Energy Audit Part 2

LIGHTING

A lighting system is just that - a system. It is important to consider the impact of the different elements on the whole. Its many elements are interrelated just as the lighting system itself is interrelated with other systems in the building. While energy can be conserved by properly removing lamps (light bulbs) and light fixtures, such action should be taken only after the impacts on the complete system have been considered to be sure the changes will not cause a problem. While conservation of energy is important it must be achieved without the loss of safety, productivity, visual comfort, aesthetics and compliance with federal, state, and local laws and ordinances.

An excellent initial step to save money through more efficient lighting is to reduce lighting levels consistent with the current use of the different spaces as identified during the building audit. In other words, how is the area being used and how much light is needed in the space for that use?

Audit Questions:

1. **What kinds of lighting are used in the home? Outside the home? (CFLS, Incandescent, Fluorescent, mixtures of both?)**

2. **Are lights and fixtures kept clean? This is more for exterior lights because of spider webs, dirt etc. If not, can you propose a "cleaning schedule".**

3. **Can lights be controlled with dimmer switches? In which areas or rooms? Where would it be a good idea put dimmers in other rooms of the house?**

4. **Do the household member make use of skylights (if available) and natural lighting? If so please note how. If not, please make a suggestion, who could and where.**

5. **Are there automatic timers for any of the lights? If so where? If not where should there be?**

6. **What are the lighting levels of rooms in your house? Are they over-lit? At a time you normally would turn the light on use your light meter to find out. Record your findings in the chart below.**

Room Name	Measured Foot Candles	Time of Day and Date Measured
Kitchen		
Living Room		
Bedroom		
Bathroom		

Bulb Types:
As you have already learned, traditional incandescent lighting is being replaced with CFL bulbs. It is said that LED light bulbs will eventually be what we use to replace incandescent bulbs – CFLs are a temporary solution to energy-efficient lighting. The reason LEDs have not yet displaced CFLs from the market are twofold: the first generation LED bulbs had a narrow and focused light beam, and the cost of the LED bulbs is still high. Study the comparison chart below taken from www.eartheasy.com.

Cost Comparison between LEDs, CFLs and Incandescent light bulbs

	LED	CFL	Incandescent
Light bulb projected lifespan	50,000 hours	10,000 hours	1,200 hours
Watts per bulb (equiv. 60 watts)	6	14	60
Cost per bulb	$35.95	$3.95	$1.25
KWh of electricity used over 50,000 hours	300	700	3000
Cost of electricity (@ 0.20per KWh)	$60	$140	$600
Bulbs needed for 50k hours of use	1	5	42
Equivalent 50k hours bulb expense	$35.95	$19.75	$52.50
Total cost for 50k hours	$95.95	$159.75	$652.50

Energy Savings over 50,000 hours, assuming 25 bulbs per household:

Total cost for 30 bulbs	$2398.75	$3993.75	$16,312.50
Savings to household by switching from incandescent bulbs	$13,913.75	$12,318.75	0

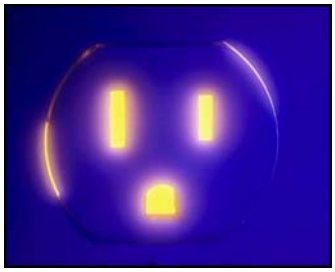
Notes:
- Cost of electricity will vary. The figures used above are for comparison only, and are not exact.
- The cost per bulb for LEDs may vary. We used the figure of $35.95 (for a 6 watt LED) as an average among lighting retailers.

Eartheasy's retail price for a 7 watt LED is $39.95.
- Estimates of bulb lifespan are projected, since it would take about 6 years of continuous lighting to test. Some manufacturers claim the new LED bulbs will last up to 25 years under normal household use, but this is not proven.
- Bulb breakage and bulb replacement costs have not been factored into this comparison chart. Incandescent bulbs and CFL bulbs are more easily broken than LEDs, which increases their cost of use.
- Most LEDs come with a minimum 2-year guarantee. Any defective LED bulb will usually fail within this time.

Beyond the energy costs associated with selection of equipment such as lighting, there are also maintenance costs. For example, if you use incandescent lamps in your home with an average of 1,000 hours *(yes, the chart says 1,200 but we are making it easy here)* you will replace ten bulbs for every compact fluorescent lamp (CFL) bulb. If the change takes as little as six minutes you will have invested an hour of labor in "bulb changing". What if you have bulbs in hard to reach places such as in cathedral ceilings or outdoor soffit lights? Consider the labor hours that are saved by recommending equipment, especially lighting, that have longer life spans and therefore do not need to be changed out as often.

BEST RECOMMENDATION: Turn off lights when not needed

ENERGY "VAMPIRES"



Lights aren't the only devices that use electricity. Take a look around the classroom. In addition to classroom lights, what else is using electricity? Are there any computers, projectors or DVD/VCR players? Appliances suck up energy even when they are not being used – which is why they are sometimes referred to as "energy vampires." Vampires include devices with digital clocks (like DVD players) or internal remote control sensors (like some televisions), which draw energy just from being plugged in. Reducing vampire loads is as easy as plugging the appliance into a power strip and then turning off the power strip when not in use. Because computers and other electronics are usually put to good use when they actually are being used, vampire's focuses only on what happens to electronic equipment ***afterwards*** when they are just sitting there not being used. In a house, vampire or "phantom" loads can account for up to 10% of the energy use of a house.

COMMON OPERATING MODES FOR ELECTRIC DEVICES

MODE	
"Active"	Device is on and serving its primary function. (Example: a DVD player playing a movie, or a computer running a program.)
"Sleep/Standby"	Device is in low-power mode. (Example: DVD player is on but not playing a disc; computer is on but in power-save/sleep mode.)
"Off"	Device is turned off but still plugged in and ready for action. (Example: DVD player is turned off but could be activated by remote. Digital displays will be visible.)
"Power strip/ Unplugged"	Device is plugged into a power strip, which is turned off at the end of the day. Or - the electronic device is unplugged. (Example: DVD player is receiving NO power. Digital display is NOT on and cannot be activated by remote.)

Many of your household appliances and electrical equipment are very useful and we rely or enjoy having them. Nonetheless, you want to know how much energy they consume during non-active use. Use a kill-a-watt device that you plug the appliance into. Take a reading while the device is running: this is the actual amount of current being used at that instant. Then take a reading while it is not being used yet turned on.

Some common home energy vampires are, tvs, dvd players, video game consoles, printers, stereos, coffee makers with clocks, laptops, cell-phone chargers.

Audit Questions:

1. Find something in your house which uses energy even when you are not using it. Plug it into the Kill-A-Watt and let it read for at least <u>24 hours.</u> Some appliances many draw a small amount of electricity when "not in use" that it may not register on the meter, however when you check after some time you will notice that some electricity has been used.

Appliance: _____

Watts used while in "use".	Amount of time item in "use"	Watts used while "not in use".	Amount of time item "not in use"	Total amount of Watts used	Total time item was plugged in Kill-A-Watt

2. Use the Kill-A-Watt somewhere else in your house, for either the same type of recording above, or out of curiosity for something else. For example, find out how many watts the blow dryer uses when you dry your hair in the morning, or how many watts your circa. 1984 garage refrigerator uses.

Appliance _____
"Just let it sit" reading

Total amount of Watts Used	Total time item was plugged in Kill-A-Watt

Appliance: _____
"Let's see what this thing needs to run!" reading

Highest Watt reading amount	The "action" or setting of the item

3. Go around your house and write down all of the appliances/ electrical equipment that are acting as "Energy Vampires" and where they are in your house. *(Example: Plugged in cell phone chargers without phones= kitchen)*