The CFL Cost Savings Myth

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There are three kinds of lies: lies, damned lies, and statistics. Whether this statement is properly attributed to Mark Twain, the English Prime Minister Benjamin Disraeli, or to someone else, one thing we know for sure is that statistics are often used to sway public opinion. Such is, unfortunately the case for statistics associated with compact fluorescent lights (CFL).

If you measure CFL and incandescent light electrical consumption side-by-side you will find that the CFL uses 75-80% less energy for bulbs putting out a comparable amount of light. Studies in Southern California documented significant savings when CFLs were used in place of incandescent bulbs. This experience has had an important impact across the country, and CFLs are now widely hyped and subsidized by electric companies. The problem is that most of us don't live in Southern California.

Your electric bill is not broken down into cost for heating, cooling, lights, hot water, etc. You get only one number for the total amount of energy you use. If you replace a porch light with a CFL you will receive the 75-80% savings in electricity from the difference in efficiency of the two bulbs. If, however, you replace an incandescent light in your kitchen with a CFL the amount of savings you realize depends on where you live. The reason is related to the way your house uses energy.

The 75-80% difference in energy usage between incandescent and CFL bulbs is almost totally related to the amount of heat generated. Incandescent bulbs get hot. When you heat your house it takes a certain amount of energy to maintain the temperature you set on your thermostat. Most of that energy comes from your heating system. However, some of it comes from your stove, refrigerator, water heater, and even your light bulbs. If you replace all of your incandescent lights with CFLs, your light bulbs will generate less heat and your central heating system will have to work harder to make up the difference – one part of your electric bill goes down (the part the PR people bombard you with) and one part of your electric bill goes up.

If, however, you happen to live in southern California where air conditioning is used extensively, you will probably save more than the 75-80% difference by switching to CFLs. The reason is that by using CFLs you save not only the direct energy for energizing the light bulb, but you save the need for the air conditioner to remove the heat generated by incandescent bulbs.

I live in Snohomish, WA, about 30 miles north of Seattle. My heat is on at least long enough to remove the morning chill about 10 months a year. Air conditioning from my heat pump is used maybe 2 or 3 afternoons a year. Air conditioning is used during long summer days when lights are rarely on. My guess is that more than 95% of our total light usage is when the heater is on.

The data for me to model the effect of a change to CFLs is not readily available to me; however, I believe that in my region of the country the switch to CFLs will save very little – possibly nothing if you remove the subsidy. I for one would not vote to spend public or PUD funds to subsidize CFLs. In addition, there is the disposal problem because CFLs contain mercury. We are told to dispose of CFLs properly; however, in the State of Washington proper disposal is not readily available and most will probably end up in land fills where they are not supposed to go. If you break one, you are not supposed to sweep it up. You are supposed to pick up the glass then use a wet rag to clean the floor then dispose of the rag and broken glass properly. Balancing the environmental hazard of mercury against what I believe are trivial savings in energy, I opt to stick with incandescent bulbs. If you live in Southern California, by all means, switch.

In the world of Six Sigma we collect a lot of data and use a lot of statistics. This post is an example of misapplying good information. A common example of misapplying good information is using a

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regression equation outside of the range over which data was collected. Another example is to collect operational information at one plant and blindly apply it to another. Deming was fond of saying *to copy is disaster, you must understand the theory.* In the case of the CFLs, failure to understand household energy budgets has sent the whole country down a path which, I believe, many will find doesn't result in forecast savings.

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