

## Case Study Electrical Efficiency

May 30, 2006

### **Our light bulbs are burning our budget!**

Lea exclaimed, "This electrical bill is outrageous! It is only early June and our electrical use is going to consume our household budget! There must be some way to reduce our electrical costs without having to completely withdraw from the modern world. What should we do?" All of us will likely be confronted with this dilemma at some point particularly as energy resources become more expensive and the risks of our carbon fuel economy become more threatening. What would you advise Lea? How could you reduce your own electrical energy use?

All of us use electrical lights in our where we live and where we work. Electrical lights are used at all time of the year and in all climates, so electric lights might be a potential target for reducing electrical costs. In our laboratory, you can evaluate two types of screw base electric light bulbs: incandescent (I) and compact fluorescent (CF). What should you evaluate to determine which type of light bulb would best help you reduce your electric bill? What happens to the electrical energy in a light bulb? Is all the energy converted to light energy?

Electricity use computers, "Watts-Up" meters, are available for your use. Read the Watts-Up manual before connecting them to a power source and a light bulb. Light sensors and meters are available to measure the light output of different bulbs, and laser thermometers are available to compare the heat output of different bulbs.

Are compact fluorescent bulbs are reasonable means of reducing your electric bill? What prevents people from using this alternative to regular incandescent light bulbs? Is the purchase price of these bulbs an issue? How could you determine whether the greater purchase price of CF bulbs would be worth the extra expense? Create a STELLA model to evaluate the time required for a CF bulb to be worth the extra initial expense. How does the cost of electricity (cost per kilowatt hour) influence the time required for this break-even point to be reached?

Prepare your findings in poster format so you can present your findings.