

Home Energy Audit

Due: Thursday, 22 January

Learning Objectives: You will learn about your personal use of electric energy.

Background Information: The accompanying sheet lists the power consumed by typical appliances.

Instructions:

1. Using the table on the reverse side, fill in the power consumption for active/charging (column b), idle/energy save mode (column e), and off (column h) for ten appliances where you live.
2. Write in the number of hours per week that the appliance is active/charging (column c), idle/energy save mode (column f), and off (column i). If the device is unplugged, do not include that in the “off” hours. There are a total of 168 hours in a week.
3. Calculate the energy consumed by every appliance for each of its states of operation during a week. (For example: multiply column b by column c to get column d; convert your answer to kWh).
4. Sum each of the energy columns:
 - (a) Add the total energy consumed by all appliances in their active state (column d).
 - (b) Add the total energy consumed by all appliances in their idle state (column g).
 - (c) Add the total energy consumed by all appliances in their off state (column j).
 - (d) Add the previous three totals to calculate the total energy consumed in all states (column k).
5. Energy consumed by appliances in their “off” state is wasted and could be eliminated by unplugging the appliance or by putting it on a power strip with an off-switch.
6. Calculate the cost of the energy used (column l) by multiplying column k by \$0.13/kWh (the cost of electricity in Richmond).
7. Calculate the fraction (as a percent) of the total energy consumed by your appliances that is wasted (see equation below the table).

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)
Appliance	Active (W)	On-time (hrs)	Energy (kWh)	Idle (W)	Idle Time (hrs)	Energy (kWh)	Off (W)	Off Time (hrs)	Energy (kWh)	Total (kWh)	Cost (\$)
Example Device	6	21	0.126	3	35	0.105	0.4	112	0.045	0.276	0.036
Total											

Fraction of energy lost due to vampire loads:

$$\text{Fraction Lost (\%)} = \frac{\text{Total "off" energy (kWh)}}{\text{Total Active (kWh)} + \text{Idle (kWh)} + \text{Off (kWh)}} \times 100\%$$