

## HOMEWORK 5: HOUSEHOLD ENERGY AUDIT

CRP 470.004/570.004, Spring 2015

Due Wed 3/25

Total pts: 20

Over the next week, you will try to determine the primary energy sources in your household. These will include both electricity and natural gas. If you live in an apartment or building where you don't receive your energy bill, you won't be able to estimate your heating demand.

Complete the following table (5 pts). You will need to estimate the size of your house. Don't include non-living space (e.g., garage). Use last month's electric/heating bill. If you have multiple months, use an average.

Approximate Household Area.	Heating Bill <i>Ave Tmp:</i>	Electric Bill	Household energy intensity/mo	Household energy intensity/yr
Ft <sup>2</sup>	BTU/mo	BTU/mo	BTU/ft <sup>2</sup> /mo	BTU/ft <sup>2</sup>
M <sup>2</sup>	kWh/mo	kWh/mo	kWh/m <sup>2</sup> /mo	kWh/m <sup>2</sup>

After completing the energy audit (next page) answer the following questions (5 pts)

1. The average annual US household energy intensity in 2009 ranged from 40-70 BTU/ft<sup>2</sup> (0.13-0.22 kWh/m<sup>2</sup>) How does your energy consumption compare to the rest of the US?
2. Name 3 technology interventions that would lead to a decrease in your electricity/heating use
3. Name 3 behavior changes that would lead to a decrease in energy use
4. Name 3 policies that you think would cause you and others to change behavior and decrease your energy use.

Energy Audit Sheet: Choose the 6 appliances that you think result in the highest consumption per month. The second column is just an example. (10 pts)

1. Item Name	Light in kitchen <i>4, 60-watt bulbs</i>						
2. Watts used when on	240 watts <i>(4 bulbs x 60 watts)</i>						
3. Hours / Day (Average of hours/day "on" )	2 hrs/day						
4. Is it left on when no one is using it? (Yes/No)	Yes						
5. Does it still consume electricity when off?	No						
6. Standby power (watts)	0						
7. Time item is on in a month (Hrs/day x 30 days)	60 hrs <i>(2 hrs/day x 30 days)</i>						
8. Time item is not on (30 days x 24 hours) - (Row 7)	660 hrs <i>(720 hrs -60 hrs)</i>						
9. kWh/mo when on	14.400 kWh <i>(0.240 kW x 60 hrs)</i>						
10. kWh/mo when off	0 watt-hrs						
11. Total kWh/mo	14.400 kWh <i>(14.4kWh + 0 kWh)</i>						
13. Total cost of appliance per month (kWh/mo x 0.12 \$/kWh)	1.73 \$/mo <i>(14.4kWhx.12\$/kWh)</i>						
14. Rank of item's electricity use (1 is highest consumption)							
15. Item's relative importance (5 – very important, 3 – somewhat, 1 – don't need)	5						

(Adapted from energy audit activity from Clarkson University)

In order to determine the power of your appliances you should check their power rating. If there is no rating you may be able to find information online.

- The wattage of most appliances is usually stamped on the bottom or back of the appliance, or on its nameplate. The wattage listed is the maximum power drawn by the appliance. Many appliances have a range of settings, so the actual amount of power an appliance may consume depends on the setting being used. For example, a radio set at high volume uses more power than one set at low volume. A fan set at a higher speed uses more power than one set at a lower speed.
- If the wattage is not listed on the appliance, you can still estimate it by finding the electrical current draw (in amperes) and multiplying that by the voltage used by the appliance: Power (W) = Voltage (V) x Current (A). Most appliances in the United States use 120 volts. Larger appliances, such as clothes dryers and electric cooktops, use 240 volts. The amperes might be stamped on the unit in place of the wattage, or listed in the owner's manual or specification sheet.

You can find charts that show typical powers for standby loads. For example: <http://standby.lbl.gov/summary-chart.html>

For more information about how to implement heating/efficiency solutions, look at:

<http://www.seattle.gov/Documents/Departments/OSE/GreenHomeGuide-FY1energyaudit.pdf>

