

QRMS Project 2

Due February 26, 2008

Environmentalists list numerous ways in which we can change our daily habits to save (what they claim are) large amounts of energy. In this project, you will investigate these claims by calculating how much energy you are using and how much this costs per month (see below), as well as how much you could save by implementing some of the changes suggested (see below). (Or, if you already do these things, how much you are saving compared to what your energy usage otherwise would be.) Also express your savings as a percentage of your total energy bill. In addition to this, be sure to discuss what your largest energy-drains are, whether anything can be done about them, and which of the suggestions are worth implementing. (Note that it is up to you to come up with a definition of “worth” for analyzing this; for example, two possibilities would be to look at your personal savings or to look at national savings if 300 million people in the United States were to participate. In any case, you should explain why your chosen method is a reasonable one.) You may (if you choose) work in a group of up to three, in which case you may do the above for only one of the group members, of your choice. You should write a typed paper of around 2-4 pages, along with an appendix of all calculations made (which may be hand-written, if you prefer).

You may use other methods of structuring your paper if you wish, but one way that might work well is:

- I. **Introduction:** Explain what you’re doing and summarize your overall results.
- II. **Methodology:** Explain how you got the numbers used in your computations, how your computations were done, and why this will give a correct answer. If you cite any sources other than information from manufacturers, briefly explain why it is credible.
- III. **Data:** Summarize all data you collected. Doing this in a chart or figure rather than prose is strongly recommended. Then, provide a final answer to how much energy you are using and how much you could potentially save (or vice versa).
- IV. **Interpretation:** Discuss what the data says (for example, by answering the questions above on whether these are worthwhile, etc.). What do the data and your final answer mean? Should we care? Why or why not?
- V. **Conclusion:** Any final thoughts relevant to the topic? Personal reflections are acceptable here (but not required), if you want to talk about what you did or didn’t learn or enjoy about this, what you will or won’t change as a result, etc.

Of course, you need not explicitly identify these sections within your paper. See the grading rubric for more specific information on what I’m looking for in each of these areas and make sure you address these points.

You are free to decide which energy suggestions you wish to consider; many websites and other sources have lists of them. Some, such as the effects of installing energy-efficient windows are probably too difficult to work with. Some ideas definitely worth looking at include: replacing regular light bulbs with energy-efficient CFL bulbs, unplugging electronic devices (such as cell phone chargers) when not in use, lowering your thermostat, turning lights off when not in use, enabling energy saving modes on your computer(s), and using cold water to wash clothes. I understand that not all of these will apply to every person and that some of them may be too difficult to measure due to your particular circumstances and so will not require any specific claims, so long as you make a good effort to analyze the claims that you can.

Note that although your energy may come from multiple sources, most can be expressed in watts. Most electronic devices have a label giving the maximum wattage that they use. For most devices, this is a good figure for the wattage used when the device is on, although some devices such as refrigerators, washing machines, and computers, will use a varying amount of energy depending on how they are being used or on other conditions (for example, refrigerators use less energy when the compressor is not active.) For such devices, you might check the manual, manufacturer's website, or other source with a list for common devices (such as <http://michaelbluejay.com/electricity/howmuch.html>). If a device only lists its power in amps, multiply by 120 to get watts (in the U.S.). Note that a device may continue to draw energy even when it is off. In particular, anything that uses an adapter (like a cell-phone charger, for example) will draw full power whenever plugged in. Heating and water-heating are probably the most difficult to measure; do the best you can with these and use (cited) figures from others if necessary.

Helpful Hints and Other Notes:

- (1) Spell-check. Grammar-check. Proof-read. If you have more than one page, staple them—don't just do origami with the corner; it won't work. Outline your argument before you begin if you think it would help you organize your thoughts. Give your essay a title. This is all standard stuff that applies to all writing.
- (2) Remember, this is a piece of formal writing, not a letter to the editor in the newspaper. Avoid colloquialisms and informal arguments. Try to write at a level so that your peers in your class could understand what you're doing: include the information you think they'd need and leave the rest out.
- (3) Look at the grading rubric. It's what I'm using to grade this, so make sure you address each point.
- (4) Needless to say, you'll want to do all of the measurements, etc., before you begin writing.
- (5) Look at your textbook for examples. 2A and 2B are about units and 3A is about percentages.
- (6) Using other sources is permissible (but not necessary). In particular, if you're looking for claims to investigate, there are numerous lists online, and if you're looking for the energy usage of a device which you are unable to measure directly, you may be able to find an approximation online (but do this only as a last resort). In all cases, be sure to cite any resources you use.
- (7) You will almost certainly have to look up at least some things online or in print sources. Don't worry too much about this, especially in regards to heating, water-heating, and computers. I understand that these are very difficult to measure directly in many cases. In particular, your computer likely doesn't have a label giving its wattage, and if it does, the label is probably wrong.
- (8) Don't forget that devices may consume energy when off. In particular, anything which displays the time, plugs into the wall with an adapter, or is in a "sleep state" is using some energy.
- (9) Don't wait until the last minute; some parts of this may take longer than you anticipate.
- (10) You can also bounce ideas off of other people or ask them to read a draft, but your final product should be exclusively your own work.
- (11) Have fun with this. Mathematics is supposed to be fun.