Energy Audit

INTRODUCTION

As you should now recognize, physics involves the study of different forms of energy. Since our modern lives depend on the availability of various energy resources that we can "consume" as needed, it is appropriate to examine these energy resources in more detail. In this lab you will analyze your average daily energy "consumption" and investigate ways that you could make changes to help make a more sustainable future.

PROCEDURE

Start by listing at least 15 significant ways that you "consume" energy over the course of a year. Your list should include things like: electricity used for various purposes (list individually), transportation for different activities, food you eat, etc. Compare your list with that of other students to ensure that you have not overlooked any major expenditures of energy.

Your goal is to now rank these energy expenditures by calculating your personal energy usage for each item on a daily basis (i.e. MJ/day), averaged over the course of a year for seasonal or occasional items. Sources of information for this analysis should include: empirical data using the power meters and appliances available in the lab room, figures and data provided in your textbook, monthly electric bills (if available), and relevant data from the internet (especially the Energy Information Administration[1]). Use a spreadsheet to analyze and report your findings. Be sure to show how you calculated each value.

Download this template[2] to use with your audit.

Answer the following questions after you have completed your analysis.

1 How much energy do you use each day? How does your daily energy consumption compare with other students?

2 What is the energy consumption for a typical American? Compare your daily consumption to this figure.

3 Rank the top ten ways that you "consume" energy, and report the relative (percentage) contribution that each makes to your total energy consumption.

4 Identify five changes you could make to your lifestyle to reduce your energy consumption. How much energy would this save (both in terms of absolute value and percentage of daily rate)? If every American would make similar changes, what impact would it have on the environment?

5 When you measured the power used by various appliances, did the watt meter readings agree with the power ratings provided by the manufacturers of these devices? If not, can you explain why there is a discrepancy?

[1] http://www.eia.gov/

6 How do devices like a microwave oven and electric skillet operate on their "medium" power setting? Is the power output constant or does it vary over time? What evidence do you have to support your answer?

7 Do any electrical devices you use consume energy while they are plugged in but not being used? Approximately how much power is used in this "sleep" mode?

8 What other insights did you discover from this energy audit?

