

# Physics and Mathematics of Sustainable Energy

## Kill-A-Watt Meter Explorations

College of the Atlantic

Due Monday, September 17, 2018

### Goals

- Gain experience and comfort working with kW and kWh.
- Learn how to use the basic functions of a Kill-A-Watt meter.
- Gain a sense of the relative power draws of different appliances and devices.

### Guidelines

- Please work in pairs and hand in only one writeup.
- There is no need to do a formal write-up. Handwritten and informal is fine. (But do be clear.) This is most definitely not a Lab Report.

### Kill-A-Watt meters

- I'll show you how to use the meters. There are lots of features to them; we'll just use them to measure Watts.
- Please do not measure the energy use of refrigerators, as sometimes doing so leads to the meter blowing a fuse.
- Please do not measure the power draw of anything rated above 1800 Watts (or 1.8 kW). Most appliances should be fine, but be careful with large electric heaters.
- Please do not electrocute yourself or others.

### Measurements

Take a bunch of measurements of different appliances, machines, devices, etc. For devices that have different modes (e.g., waking and sleeping), measure all modes. See if you can find “phantom power,” also known as standby power. Explore 6 or so devices.

Here are some things to think about measuring.

- Hair dryer
- Computer
- Charging your phone and/or laptop
- Air conditioner (there's one in the Turrets copy room)

- Various lights
- Electric heater
- Toaster
- Vacuum cleaner
- Fans

## Write-up

Please hand in a writeup with the following information

1. Record the power draw for each thing you measured. Include information about the thing (e.g. what type of light or phone or whatever) and if the power draw depended on operating conditions. Be detailed but not compulsive.
2. For at least two the items you measured, determine the following:
  - (a) How much energy they would use in one year in a typical setting. State any assumptions you need to make.
  - (b) How much electricity this would cost.
  - (c) How much CO<sub>2e</sub> would be emitted as a result of using this electricity