



Going Graphic! Teacher Notes

About this activity: The May 16, 2011 raw data set was created by downloading the measurements taken from a home electricity monitoring device (a TED: The Energy Detective) using the device's Footprints software ([www. http://ted5000/Footprints.html](http://ted5000/Footprints.html)). The Google PowerMeter display of this data set is included here for comparison as well as tips for preparing data for students to use from a different TED home energy monitor.

When students create a graphical representation of a data set, it provides them with first-hand experience in considering how best to represent the data that conveys a clear picture of the pattern of electricity use in this household for a particular time period. Having students examine and work with the raw data also helps them develop a sense of how the home monitor reports the data. It allows them to consider how to represent the data so that it is clear and useful to the end user, just as the developers of the monitors (e.g. Google PowerMeter, TED) had to consider. As students compare and critique the different ways this data is displayed graphically, take this opportunity to discuss with them the idea that decisions made about what and how to display data are dependent on numerous factors. Step 5, Option B of the Investigation Guide outlines additional facilitation tips and discussion points for this activity.

Downloading and preparing data for student use from a TED

The most straightforward way to prepare a raw data set for student use from a TED home energy monitor is to use the Footprints software that resides online at <http://ted5000/Footprints.html>. This is the same software homeowners with a TED uses to set up and calibrate their devices. A TED's raw data can also be downloaded from the Google PowerMeter site, but since data points are recorded over 10-minute increments, they are reported as 10/60ths of a kWh.

Under the Export tab of the Footprints dashboard (see screen shot on next page) there are several time period options for downloading the raw data: second, minute, hourly, daily and monthly. For the purpose of this exercise, downloading the minute time period is recommended because from this file sample data points can be selected to mirror the

10-minute intervals displayed by Google PowerMeter. The file downloads as .historyexport.csv.



Notice the resulting file contains the power measurement for each minute over the last 48 hours in reverse chronological order (see table, right).

To make the raw data set more manageable and similar to the 10-minute samples reported by Google PowerMeter, create a table listing the time in chronological order and kWh used at each 10 minute mark. For example, the data in the table at the right would be simplified to:

Time	Usage in kW
7:30 PM	1.004
7:40 PM	0.985
and so on...	

mtu	date	power	cost	volts
0	5/16/11 19:43	1.204	0.08	123.1
0	5/16/11 19:42	1.08	0.07	122.9
0	5/16/11 19:41	0.979	0.06	123
0	5/16/11 19:40	0.985	0.06	123
0	5/16/11 19:39	0.986	0.06	123.1
0	5/16/11 19:38	1.078	0.07	123
0	5/16/11 19:37	1.225	0.08	123.1
0	5/16/11 19:36	1.223	0.08	123
0	5/16/11 19:35	1.212	0.08	122.9
0	5/16/11 19:34	1.217	0.08	123.2
0	5/16/11 19:33	1.001	0.06	123.1
0	5/16/11 19:32	1.004	0.06	123.2
0	5/16/11 19:31	1.003	0.06	123.4
0	5/16/11 19:30	1.004	0.06	123.7

While these sample points will not match exactly the data points displayed by Google PowerMeter, if graphed they will generate an electricity use pattern that is quite similar. Below is a graph generated using the raw data set that was prepared for student use following the process outlined above. Compare this graph of May 16, 2011 electricity use to the one generated by Google PowerMeter (refer to handout Real-Time Electricity Use Display for Addison Fox Household May 16, 2011) for this same day:

