

3.4) INSTRUCTOR’S GUIDE TO HOUSEHOLD ENERGY CONSUMPTION

Overview: Each student should have the opportunity to take home a wattmeter for about a week so that he or she can evaluate at least four different appliances. Measurements where the wattage does not fluctuate (such as light bulbs) can be taken in class because there is no need to wait an hour or two to read watt hours. All you need to do is read the watts displayed and assume this is how many watts will be consumed after an hour of use.

◇	A	B	C	D	E	F	G
1	Item	Total kWh	Total hours	kW per hr	Cost /kWh	Hours per year	Cost per year (\$)
2	Sleeping flat-screen computer	0.08	24	0.003	0.18	6570 ¹	4
3	Sleeping bulky-screen computer	0.10	12	0.0083	0.18	6570 ¹	9.8
4	Power strip with turned- off TV, DVD, & VCR	0.14	22	0.0064	0.18	6570 ¹	7.5
5	Power strip without appliances	0.03	24	0.001	0.18	6570 ¹	2
6	16-inch fan	0.17	3	0.057	0.18	2160 ²	22
7	Air conditioner	2.78	3.5	0.794	0.18	2160 ²	309
8	18-watt compact fluorescent	N/A ³	N/A ³	0.018	0.18	1460 ⁴	4.8
9	100-watt incandescent	N/A ³	N/A ³	0.10	0.18	1460 ⁴	26

1. Based on 18 hours a day and 365 days per year.
2. Based on 24 hours a day and 90 days per year.
3. These readings can be taken instantly in class because the watts do not fluctuate significantly. You just read the watts on the display. You need not read the Watt hours.
4. Based on 4 hours a day and 365 days per year.

Answers to Questions: 1) 3600 Joules per watt-hour (this is based on number of seconds in an hour) 2) 36 Watts divided by 120 Volts = 0.3 Amps. 3) Answers may vary. Likely items include air conditioners (window units), refrigerators, space heaters, etc. 4) Answers may vary. In most climates the most likely answer will be the heat pump. 5) Answers may vary. 6) Answers may vary. Likely items include heat pump (central heating and air conditioning) and clothes dryer (due to the nature of the plug). 7) One strategy is to unplug all items in the house, then read the electric meter outside the house while only this appliance is in use.

Logistics: This activity is done entirely at home, so class time is needed only for discussion. If there is only one meter you need to start early in the semester so all students get a chance to use it.

Degree of Difficulty: 1—This activity does not require any form of rehearsal.

Materials: A plug-in wattmeter