

ENERGY CONSUMPTION GAME

We all consume energy. Our bodies consume energy in order for us to live. This exercise looks at our energy use beyond that which our physical bodies consume and to ask if other choices exist about consuming that energy.

For example, if you drove home tonight that requires energy. Energy is not just in the gasoline consumed but in making the car itself. We could calculate that energy usage.

We could also choose to reduce that level of consumption. If you rode with someone else you could cut your energy usage value by 50%, three people by 66% and so forth. Or you could use another form of transportation that required less energy consumption.

So . . . how do we play the game? For the next 48 hours list 'each energy consumption activity' you perform and then assign an 'value estimate' for energy usage (see next paragraph). Third, write some choices of conservation alternatives. Do not concern yourself with whether you would actually make those choices. When/if your list reaches 25 items before the 48 hours then you can stop the game.

Calculating energy values: Someone should write a computer program for this part of the exercise but until they do just use a rough estimate on the worksheet. The goal is to assign a 'relative value' which represents an estimate of energy consumption.

My suggestion is to use a monetary value since we are most familiar with prices as it relates to materials and activities. One energy unit equals one energy coupon valued at \$1.00. Here are some formulas and figures that will help you derive energy units.

Gas powered automobiles: If you drive 20 miles to home by yourself you could multiply $20 \times .44/\text{mile} = \8.80 energy units. You could calculate the total costs of the car (capital and operating costs) but it would be easier to use the IRS cost unit.

Electrical energy: using the list of some typical appliances listed below calculate the energy usage based on how long you used the appliance/energy using device. If you use your refrigerator 48 hours during the audit you would multiply $(.114 \text{ cents per kWh (rate)} \times 48\text{hr (time used)} \times 125 \text{ watts (energy use/M)}) + .006/\text{hr}(\text{capital cost}) \times 48 \text{ hrs}$. This translates to .68 in operating costs and .28 in capital costs or a total energy estimate of .96 units.

Formula for Operating Costs = rate X time X energy amount

Formula for Capital Costs of the equipment = cost divided by life expectancy in days or hours.

Here are some common activities where the cost research has been done for you. Others will require you to do some of the digging.

Refrigerator	Operating Energy Est. 125 watts/1000 (.34/day)	Capital Cost Est. \$800/15 yrs = .14/day or .006 /hr.
Clothes dryer	\$.15 per load gas heat \$.30 per load elec heat	\$300/12 yrs= .082/day
Washer (Clothes)	huge diff based on type Say .20 per load	\$600/12 yrs = .14/day
Dishwasher	.17 per load (elec hot water) .14 per load (gas hot water)	\$300/10 yrs = .08 day
Microwave	700watt/1000	\$400/12yrs=.09 day
TV - small screen	182 w // .02 per hour	
- large screen	310 w // .035 per hour	
- HD large screen	455 w // .052 per hour	

Light bulb (incandescent) 100 watt/1000 (.011/ hr) \$.80/2000hrs=.0004/hr

Other energy: There is a helpful web site that talks about energy calculations put together by some middle school students. The site can help you estimate costs based on energy estimate

http://ed.fnal.gov/ntep/f98/projects/nrel_energy_2/measurement.html
(or search the net looking for operating costs of a specific item.)

When using the table below the categories include the **consumption activity** (e.g. refrigerator running during you whole time or running a microwave to cook a bag of popcorn or driving to work). **List the amount of time** in the second column. The third column is the place to enter you calculation of the energy unit required for that activity. The fourth column is to think creatively about alternatives to that activity. The range of alternatives will vary per activity. Remember the alternatives list does not necessarily mean it is a realistic alternative for you – just explore the options.

The first two activities are just examples.

Energy Consumption

Consumption Activity	Amount of Time	Energy Unit	Alternatives
Refrigerator	48 hrs	.96	Trade for more efficient unit; share a frig; open less times;
Drive to store for gallon of milk	10 min 5 miles	5 mi x .44 = 2.20	Ride bike; wait til tomorrow to combine with drive to work; order on line.

Energy Consumption

[illegible]