

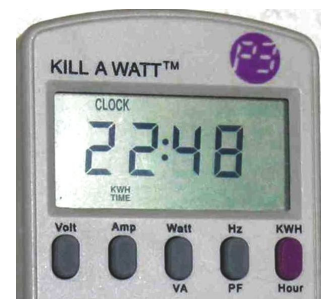
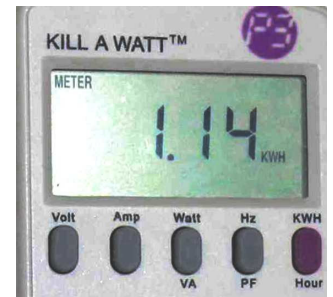
## Measuring the Energy Performance of Appliances

As energy costs increase, it is useful to know how much appliances consume in deciding to adjust or replace them to save energy. **Savings follows waste**, so measuring the extent of waste is a wise first step in conserving energy. Further, just as the bathroom scale is helpful in tracking progress in losing weight, measuring consumption helps track progress in saving energy.

In the past, measuring electric energy use has required quite expensive instruments. However, a meter is now available that is both inexpensive and simple to operate. Called the “Kill A Watt™,” the device plugs into a wall socket, then the appliance to be measured is plugged into it. Buttons may be pushed to display a good deal of useful information:



- Button 1: Line voltage in volts
- Button 2: Current in amperes
- Button 3: Power in true watts or volt amperes (button toggles)
- Button 4: Frequency of the line voltage in Hertz and power factor (button toggles)
- Button 5: Electrical energy used in kilowatt hours (kWh) and the time over which the electrical energy has been consumed in hours and minutes (button toggles)



### Refrigerators and Freezers

Refrigerators and freezers represent a substantial portion of the electric bill in many homes, nationally about 12%. Since many older units use 1,000 kWh/year or more—and new ENERGY STAR-rated units well less than 500 kWh/year—it is useful to measure their consumption.

Compressors run about 1/3 of the time, and it is best to wait until the compressor has stopped running before unplugging the refrigerator or freezer, then plugging it in the Kill A Watt.

The longer the meter is plugged in, the more accurate are estimates of annual consumption. A 24 hour period is best. (Be sure to avoid unplugging the meter before you take the readings, for data will be lost.)

Take both of the readings associated with Button 5, the colored one at the far right. Write down kWh and time. To estimate annual use, divide the number of hours in an average year (8766) by

the monitoring time in hours and minutes expressed as a decimal, then multiply by the kWh used. The result is an estimate of energy the unit will consume over a year.

In the case illustrated, divide 48 minutes by 60 to express minutes as a decimal, then add 22 hours. Divide 8766 by the time (22.8) and multiply the result by 1.14 kWh. The result is 436 kWh/year, a good estimate of annual energy performance.

If the reading had been 3 kWh, for example, the result would have been 1153 kWh. In this case, a new refrigerator rated at (say) 375 kWh per year would save 778 kWh per year, or about \$78 (at ten cents per kWh.) Depending on the cost of a new unit, this would represent a tax-free return on investment of 15 to 20%, much better than the stock market is doing these days.

### **Measuring other loads**

The meter can also be used to measure the energy use of such appliances as TV sets, washers, and the like that use 120 volts. The upper limit on current is 15 amps, but that's not normally a limitation in assessing household appliances.

For appliances that are sometimes on and sometimes off and use the same amount of energy when operating—TV sets are like this, though they draw a bit more when the screen is bright—just measure the watts consumed (Button 3) and multiply times your best estimate of the number of hours used per month or per year. For devices like washers which have several modes of operation that draw different current, just measure the consumption in kWh (Button 5) over a cycle and multiply times your best estimate of the number of loads of washing per month or year. The US EPA's web site on ENERGY STAR-rated appliances is a good place to compare your consumption with that of efficient appliances. See [www.energystar.gov](http://www.energystar.gov) under products.

Finally, the Kill A Watt is useful in measuring the extent of standby losses, sometimes called "phantom loads," caused by electronic devices that draw current even when switched off. Nationally, the sum of these losses equals the output of six 500 megawatt power stations. Many printers, TV sets, VCRs, and the like draw 5 to 10 watts or so even switched off. In addition, some battery chargers use electric energy even when they aren't charging batteries. Use the watts function (Button 3) on the Kill A Watt to check these out.

What's the solution? Unplug when not needed! Some people hook up their TV and VCRs to a power strip they can switch off when viewing is over.

The Kill A Watt meter may be purchased from a number of sources, but the least expensive is:

Teledynamics LLP  
2200 Wheless Lane  
Austin, TX 78723  
Toll free: 1-800-847-5629  
Email: [info@teledynamics.com](mailto:info@teledynamics.com)  
[www.teledynamics.com](http://www.teledynamics.com)  
Kill A Watt electric energy meter (P3-P4400)  
Cost: \$17.75

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303-449-7941

