

# Appliances

## Reducing Plug Loads



### SKILL SET

Be sure you have the experience needed for these maintenance tasks. If you are in doubt, hire a contractor.

### SAFETY

Exercise common sense when working with electricity. Follow manufacturers instructions when installing appliances.

### MATERIALS

"Smart" power strip for small electronics

### COST BENEFIT

Knowing payback benefits of energy efficient appliances can help consumers make wise choices that save money

#### PRIORITY LEVEL



#### SKILL LEVEL



## The Impact of Appliances

The first step in the process of reducing energy consumption in homes is to understand where the majority of the energy is being used. In most homes, in all climates, heating, cooling and water heating are the top three energy consumers, usually using over 50%. Beyond those, electric appliances and miscellaneous electric loads are the next largest group.

Average annual operating cost:

- electric clothes dryer (\$100/year)
- clothes washer (\$85/year)
- refrigerator/freezer (\$60/year)
- pool pump (\$75/year)

When planning efficiency upgrades, it is smart to look at these appliances first in order to realize the greatest benefits.

## Clothes Washers and Dryers

While ENERGY STAR™ does not label clothes dryers because most of them use a similar amount of energy, purchasing an ENERGY STAR labeled clothes washer will save approximately 20% on energy and 35% on water use compared to regular washers. They are available in both front-loading and top-loading designs, and have greater tub capacity, allowing for fewer loads to wash the same amount of laundry. These high efficiency washers also use less detergent, are gentler on clothes and dry them better during the spin cycle, reducing drying time. Of course, air-drying clothes on a clothesline with free solar energy saves the most money.

## Refrigerator/Freezer

ENERGY STAR labeled refrigerators use 20% less energy than required under current federal standards and 40% less than a conventional model sold in 2001. Selecting an appropriately sized new refrigerator is also important as larger appliances use more energy. Top freezer models are more energy efficient than side-by-side models. Added features such as ice makers and water dispensers, especially through the door, generally use more energy.

Homes with an old, second refrigerator in the garage or basement for extra items should consider recycling it. It is likely that the cost of operating the appliance is more than any savings gained from buying in bulk or keeping extra items on hand. Check with the local utility for available recycling and incentive programs to remove old refrigerators.

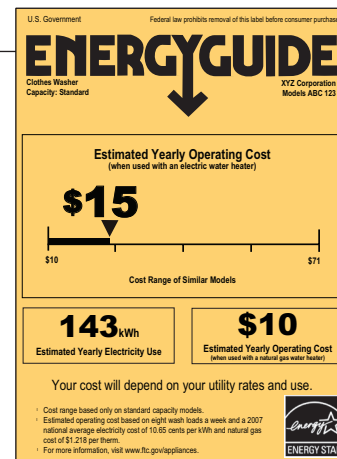
## Pool Pumps

With over 5 million in-ground pools in America and over 150,000 new pools installed annually, swimming pool pumps represent a significant opportunity for increasing energy efficiency. Save energy and maintain the pool by installing an ENERGY STAR pump and by operating the pump less. Try reducing the filtration time to 6 hours per day. If the water doesn't appear clean, increase the time in ½-hour increments until it does. Keep the intake gate clear of debris in order to minimize flow resistance through the pump.

Energy efficient pumps and solar powered pumps for fountains, ponds and other water features can also significantly reduce energy bills.

ENERGY STAR certified pool pumps will:

- Save more than a thousand dollars over their lifetime.
- Usually pay for themselves in less than 2 years
- Run quieter and prolong the life of the pool's filtering system.



### Energy Guide Label

Federal law requires a bright yellow EnergyGuide label to be placed on many types of home appliances, including refrigerators, freezers, dishwashers, and clothes washers.

This label allows the consumer to estimate how much a particular appliance will cost to operate each year and to compare this cost among similar appliances. The comparison scale on the EnergyGuide shows the least and most energy used by comparable models. The labeled model is represented by an arrow pointing to its relative position on that scale. Choose a model that is more energy-efficient and has a lower operating cost than the least efficient model of the product class.

## Miscellaneous Appliances

Although laundry and refrigeration are the largest appliance energy consumers in most homes, the remaining electrical loads from televisions, cable boxes and DVR's; computers and monitors; and microwaves and other kitchen appliances can all add up to impact energy bills. Again, reduce these costs by choosing more efficient appliances and by being smart about appliance and electronics usage. Particularly for small electronics with transformers, unplug or switch off these chargers when not in use.

With over 160 million set-top boxes installed in U.S. homes as of 2011, there is a significant opportunity for energy savings in upgrades to these cable boxes, DVR's, and streaming devices. ENERGY STAR set-top boxes are an overall 45% more efficient than conventional models. Streaming devices and standard-definition receivers consume much less power than high definition (HD) receivers and HD DVRs. Most consumers receive their cable boxes and DVR's directly from their service providers, and must specifically request an ENERGY STAR qualified model.

There is also large variation in energy consumption of televisions, with LED being the most energy efficient and plasma models consuming the most energy. Look for ENERGY STAR qualified televisions, and check the Energy Guide label of the models under consideration when making a purchasing decision for estimated annual energy costs.

## Shopping For Appliances

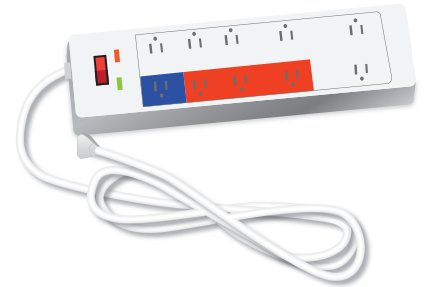
Look for ENERGY STAR labeled appliances in order to identify models that are much more efficient than industry averages and meet performance standards. Additionally, refer to the Energy Guide for specific information regarding average annual energy consumption (kWh) and energy costs (\$). There are ENERGY STAR labeled products in categories from computer displays to dishwashers to cordless drills, so be sure to check [www.energystar.gov](http://www.energystar.gov) for product information.

Appliances actually come with two costs: the purchase price and the operating price. Think of the purchase price as the down payment and the utility bills as the monthly installments that must be paid over the life of the appliance. Refrigerators, for example, typically last for 11 years, so operating expenses can reach \$500 or more.

## Smart Appliance Usage

Reducing the time that an appliance or piece of electronic equipment is using electricity is an important way to reduce overall energy consumption. Many devices continue to draw power even when they are switched off. These "vampire" loads can really add up.

- Enable the sleep mode or power management feature on computers and "smart" electronics
- When practical, unplug appliances, such as televisions, when not in use
- Plug electronics into a smart power strip which will shut down peripheral devices, such as printers or DVD players, when the master device, computer or television is turned off



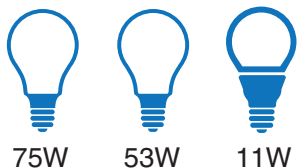
## Smart Appliances

Some manufacturers are now offering "smart" appliances which connect to smart electric meters or home energy management systems to shift electric use to off-peak hours, such as the middle of the night. Air conditioners, refrigerators, dishwashers and other appliances are available as smart appliances. These appliances use subtle ways of decreasing usage during times of high overall demand, when electric rates may be the highest. Local utilities can provide more information about smart appliances and time-based electricity rates and how to benefit from them.

For further motivation, remember that much appliance energy translates into waste heat which affects space heating and cooling. Since the waste heat is essentially electric resistance, it is the least efficient way to heat the space in the winter, but, more importantly, causes additional air conditioning load in the summer. In summary, the strategy should be to determine which products are using the most energy, then figure out ways to use them less, turn them totally off when not in use or replace them with energy efficient products when warranted.

## Doing The Math!

Calculating appliance operating cost is actually quite easy once the utility rate (cents per kilowatt-hour) and the appliance operating wattage (W) is known. The electric rate can be determined from the utility but understand that there are often other base or meter fees as well as taxes. One quick way to estimate the rate is to simply take one (or several) month's utility bill and divide the total dollar cost by the total kilowatt-hours (kWh). Once the rate and appliance wattage is known, simply multiply appliance wattage by the hours of operation and divide by 1,000 (to obtain kWh) and then multiply by the rate to determine the cost to run that appliance.



**For example, an old 75W incandescent porch lamp burns out.** Consider that a 53-Watt halogen incandescent that operates 10 hours each night means 0.53 kWh daily electricity usage (53 Watts x 10 hours divided by 1000 Watts/kW = 0.53 kWh) and would cost \$23.21 annually (0.53 kWh/day x 365 days/year x \$0.12/kWh). If replaced with an 11W LED bulb it would cost only \$4.82 a year to operate and would save \$18.39 in the first year alone. If the LED bulb cost was \$14, the payback would be less than one year. Plus, the LED bulb will last up to 25 times longer than the incandescent (nearly 7 years at this rate).