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Green Guide 121 | July/August 2007

Repair or Replace?

by Amanda MacMillan

As long as you've got electronics and appliances in your home, you're inevitably going to be faced with a choice: Something breaks. Now what?

According to a 2005 *Consumer Reports* survey, Americans are repairing 16 percent fewer products—including high-cost items like television sets and refrigerators—than in 1997. The number of appliance-repairs shops has declined roughly 37 percent in 15 years while the number of electronics-repair shops has plummeted by 64 percent. So-called "e-waste"—computer monitors, televisions and other electronic waste—is the fastest growing portion of the U.S. waste stream. In 2005, electronics accounted for 2.63 million tons of waste—only 12.5 percent of which was recycled.

If you're lucky enough to find a repair shop, it may seem that the best environmental option would be to hang on to old appliances and electronics for as long as possible. Along with the environmental impact of new-product production, there's another concern: Many electronics contain heavy metals (such as lead and mercury), flame retardants and other toxic chemicals that can wash into waterways and pollute groundwater if sent to a landfill. But older products can be a big drain of household energy. "You need to consider buying a new product—which must be manufactured—or fixing your existing product, which may not be up to the latest energy standards," says Greg Keoleian, Ph.D., co-director of the Center for Sustainable Systems at the University of Michigan.

From a price perspective, if the cost to repair a household appliance is more than half the price of a new product, advances in energy efficiency will generally make buying a newer model the cheaper choice. Based on these numbers and considering today's more environmentally friendly technologies, here's a guide to when you should repair or replace.

Washers

- * Replace all top loaders.

When Keoleian and his colleagues compared the average lifecycle of a washing machine (14 years) with the amount of water and emissions that could be saved by a newer model, they determined that even replacing a 2005 machine could have water-saving benefits. The reason: Water- and energy-saving technology continues to evolve as companies push beyond standards. It's most important to replace top loaders with Energy Star-labeled new front loaders as soon as possible; although they're generally more expensive, these models circulate clothes in a shallower pool of water, using less water and heat, and saving money in the long run. (Getting rid of a pre-1994 washer, for example, can save a family \$110 a year on utility bills.) For models, see our **Washing Machine Product Report**.

Clothes Dryer

- * Repair if possible, but line dry clothing whenever you can.

As long as your dryer has a moisture sensor (nearly all models in operation today should), it functions at about the same efficiency as current models, according to the American Council for an Energy-Efficient Economy. A dryer's average life cycle is about 13 years, so if it's possible to fix it during this time, try that first. When it *is* time to buy a new dryer, look for one with the sensor in the drum, as opposed to in the exhaust vent; it will shut off a little sooner and save slightly more energy. However, since dryers consume large amounts of energy, line drying or hanging your clothes on a rack is a better option. For dryers and drying racks, see **Virtuous Cycles**.

Refrigerators

- * Replace all models manufactured before 2001.

New refrigerators consume 75 percent less energy than those produced in the late 1970s, and are even more efficient than models just six years old, Keoleian's research has found. The newest federal standards went into effect in 2001—so if you need to make repairs on an older fridge, it's worth getting a new one instead. When replacing your refrigerator, opt for a top-freezer configuration rather than a side-by-side, and make sure it's Energy Star-certified. A new refrigerator should then last you about 14 years. And resist the urge to hold on to your old fridge or give it away, since inefficient old models can cost over \$100 a year to run. Most communities have specific requirements for disposing of refrigerators and other large appliances; visit **www.earth911.org** for information in your area. For models, see our **Refrigerator Product Report**.

Dishwasher

- * Replace non-Energy Star models.

Newer, more efficient dishwashers use less hot water, have energy-efficient motors and use sensors to determine the length of the wash cycle—making Energy Star models 25 percent more efficient than the minimum federal standards. This can mean a savings of \$25 a year if you replace a pre-1994 machine. When shopping for a new dishwasher, choose one with a "light

wash" or "energy saving" cycle—and expect to hang onto it for about 9 years, suggests the National Association of Home Builders. And remember that handwashing dishes is an inefficient alternative, generally wasting more water than dishwashers. For models, see our **Dishwasher Product Report**.

Air conditioners

* Replace window units older than 10 years and central-air systems older than 10, but consider alternative cooling methods.

Upgrading your window units to a more efficient model can cut energy bills by an average of \$14 a year, estimates the Energy Star program. The most efficient room air conditioners have higher-efficiency compressors, fan motors and heat-transfer surfaces than previous models. Central ACs are rated according to their seasonal energy efficiency ratio (SEER)—for which most 1992 to 2005 models score about a 10; older ACs have ratings of only 6 or 7. New minimum standards set in 2006 require current central-air units to have a SEER of at least 13. Because of the coolants used, old room-AC units need to be disposed of in hazardous waste facilities; old central units are usually disposed of by the contractor hired to install the new unit, but always ask ahead of time to ensure proper disposal.

Before you buy, however, consider alternatives such as ceiling fans, evaporative coolers (if you live in a dry climate), whole-house fans and landscaping or decorating changes, all of which can keep your home comfortable for a fraction of the cost (see **Keep Your Cool With Less AC**). For models, see our **Air Conditioner Product Report**.

Water heaters

* Replace all electric heaters, and any gas heaters older than 10 years.

If you have an electric heating system, you can achieve a 50 percent energy savings used by switching to a high-efficiency gas model. Gas heating systems can last for about 25 years but will operate for years at very low efficiency before they finally fail [but do they operate at low efficiency because of something that can be repaired?]; if yours is more than 10 years old, it probably operates at less than 50 percent efficiency and deserves to be replaced. Consider a "demand," or tankless, system, in which water is circulated through a large coil and heated only when needed. Although EnergyStar doesn't certify these models, the government estimates that they can save between 45 and 60 percent of water heating energy and up to \$1,800 a year when compared to standard, minimum-efficiency heaters.

Computers

* Repair as long as you can.

"The manufacture of brand new computer models uses more than four times the energy and resources it would take to extend the life of an older machine for another few years, says Sheila Davis, executive director of the Silicon Valley Toxics Coalition—so it's best to always repair it yours if possible. Memory can be added to slow computers (1-gig will run about \$100 and you can install it yourself). But it's important to consider the repair process, says Davis: Name brand

computers often have proprietary parts and need to be shipped back to the manufacturer—or sometimes even overseas—to be fixed. "White box" computers, that is, generic models without name brand parts, can easily be upgraded at local computer stores, but warranties for them can be tricky. They come without software, and finding technical support may be difficult. White box models are available online or at large computer chains.

If you prefer a name-brand item, choose one with a strong takeback program that will guarantee your computer won't end up in a landfill. Dell takes back all branded products for free; others accept new models or charge a small fee. Visit

www.computertakeback.com/docUploads/Using_takeback_programsv7a.pdf for a comparison of most popular brands. As far as desktops versus laptops, it's a toss-up: "Even though laptops are smaller, they often have just as many chemicals to dispose of," says Davis. If you still have a large cathode-ray tube (CRT) monitor, replace it with a flat-panel liquid crystal display: A 15-inch LCD screen uses about 18 watts of energy, as opposed to about 200 for CRT's. For models, see our Computers Product Report.

Smaller electronics

* Replace, but recycle.

It's probably not financially practical to repair electronics such as printers, televisions, and digital cameras, but it's best to keep them out of landfills. Before ditching them, always consult the instruction manual and consider contacting the manufacturer; sometimes they'll provide repairs for a small fee. When they do need to be disposed of, visit www.greenerchoices.org for recycling options that won't put toxic chemicals back into the environment. Cell phones, for example, are often reprogrammed and donated to women facing domestic violence (as a 911 lifeline), and chains such as Best Buy and Staples often sponsor collection drives for other broken electronics (see also www.eco-cell.org). Apple will take back iPods (as well as cellphones), offering a 10 percent discount towards your next purchase.

Resources

To recycling appliances, check with your local sanitation department or visit www.Earth911.org.

Repair Clinic: www.repairclinic.com

Point and Click Appliance Repair: www.pcappliancerepair.com

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PRODUCT REPORT

Refrigerators

The Problems

Environmental

Refrigerators are the largest power-guzzlers in the typical household. If you bought yours before 1993, chances are it's using two to three times as much energy as current models. In fact, the fridge may account for as much as one-fifth of your annual electricity costs, according to *Consumer Reports*.

So many refrigerators using so much energy put pressure upon the energy production infrastructure. More energy consumption requires more coal-fired power plants and the devastation caused by coal extraction. It also means more demands for hydroelectric dams and for nuclear power plants, with attendant hazards to surrounding areas and difficulties in disposing of radioactive fuel rods. And it means more emissions of soot and other air pollutants into the atmosphere by power plants burning coal and other fossil fuels to supply power. Among these emissions are mercury - a brain-damaging metal that can cause learning disabilities - and carbon dioxide (CO₂), a greenhouse gas that is a primary culprit in global climate change. For every kilowatt-hour of electricity used in a home or elsewhere, power plants release an average of 1.34 pounds of CO₂ into the environment! All in all, reducing energy consumption is key to a healthier planet.

The Solutions

What to look for

Any new model will be much more efficient than the one you currently own, and will save you a considerable amount of money in power bills. New energy efficiency standards for refrigerators went into effect in July 2001, requiring models to use 30% less energy than previous (1993) standards. Buying a model that qualifies for the EPA's Energy Star label, which indicates that its power consumption exceeds standards by at least 10%, can save you

even more.

Look for top-freezer models, which are the most energy efficient and repair-free of the configurations offered. On January 1, 2004, the ENERGY STAR criteria for refrigerators changed for all full-size refrigerators. All refrigerators greater than 7.75 cubic feet must be at least 15% more efficient than the federal standard.

What to look out for

Side-by-side refrigerator/freezers are not only less energy efficient (particularly if they include water or ice dispensers), but also are more likely to need repair. The Rocky Mountain Institute determined that these models use roughly 7-13% more energy than similar top-freezer models. Automatic ice-makers increase energy use by 14-20%. Given that these features also add to the sticker price, consumers would be better off using ice trays and skipping such models altogether.

Also, avoid the temptation to buy a new unit while keeping the old one running in a basement or garage. Considering that a typical 1990 model refrigerator costs about \$75 per year to run, and releases over 1,200 pounds of CO2 each year, it's much more economical and ecological to be sure your new model is a sufficient size to hold all your perishables.

Product Comparisons

To help you choose which refrigerator is best for your wallet and for the environment, here is a list of some of the most energy-efficient models of each size and configuration available.

Model	Price	Annual Energy Use in Kw-Hrs	Annual CO2 Emissions*	Energy Star?	Annual Energy Cost**
Top-Freezer					
18-22 cu. ft.					
Fridgidaire FRT21HC5D	\$ 549	432	579 lbs	Y	37
Maytag MTB1953	\$ 619	413	553 lbs	Y	36
Whirlpool ET9FHTXM	\$ 609	417	559 lbs	Y	36
Kenmore 64173	\$ 679	432	579 lbs	Y	37
Kenmore 73932	\$ 899	392	525 lbs	Y	34
Kitchen Aid KTLA22EM	\$ 1,329	448	600 lbs	Y	39
Sun-Frost R-16	\$2,807	254	340.36	Y	22
Bottom-Freezer					
18-22 cu. ft.					
Kenmore 6523	\$ 899	488	654 lbs	Y	42
Amana	\$ 899	488	654 lbs	Y	42

ABB2224DE

Maytag	\$	488	654 lbs	Y	42
MBF2254HE		1,329			

Liebherr CS1350	\$3,199	439	588 lbs	Y	38
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Side-by-side**20-27 cu. ft.**

Whirlpool	\$879	572	766 lbs	Y	49
ED2FHEXN					

Kenmore 4455	\$	562	753 lbs	Y	46
		1,063			

GE GSH22VGR	\$	571	765 lbs	Y	49
		1,129			

Kenmore 4432	\$	539	722 lbs	Y	446
		2,329			

* CO2 emissions calculated using 1999 U.S. Department of Energy average power plant emission rate of 1.34 lbs./kWh

** Based on 2001 U.S. Government national average cost of 8.60 cents per kWh of electricity.

Note: Electricity rates vary by region.

Manufacturer Contact Information:

Amana, www.amana.com, 800/843-0304

Frigidaire, www.frigidaire.com, 877/808-4195

General Electric, www.ge.com, 800/626-2000

Kenmore, www.kenmore.com, 800/349-4358

Maytag, www.maytag.com, 800/688-9900

Whirlpool, www.whirlpool.com, 800/253-1301

Tips and Alternatives

There are several methods to both increase the energy efficiency of the model you currently own and to maintain that of a new one.

1. Don't keep your fridge too cold. Refrigerators should be kept between 37 and 40 degrees and freezers at 5 degrees. Colder temperatures waste energy. To test the temperature, leave an appliance thermometer in a glass of water in the middle shelf for 24 hours. In the freezer,

place a thermometer among packs of frozen food.

2. Clean the coils annually. Your refrigerator will run for shorter periods.
3. Cover food and drink to avoid evaporation in the fridge, which can force the compressor to work harder.
4. Keep your freezer filled. Frozen blocks of food keep freezer temperatures more stable.
5. Don't clutter the fridge top; it can hamper the compressor's proper air circulation.
6. Don't put your refrigerator in direct sunlight or next to an oven or dishwasher.
7. Check the door seals. They should be able to hold a piece of paper in place.
8. Defrost the freezer regularly and avoid frost build-ups of more than a quarter-inch.
9. And as always, don't leave the fridge door open.

Resources and References

Resources

See *Consumer Reports'* refrigerator ratings at www.ConsumerReports.org.

To find Energy Star models, see www.energystar.gov/products/

"Home Energy Brief #3: Refrigerators and Freezers." Rocky Mountain Institute. www.rmi.org

"Making Your Fridge More Efficient." *Real Money*, July/August 2001.

The Most Energy-Efficient Appliances 2001. The American Council for an Energy-Efficient Economy. For copies, call 202/429-8873 or see www.aceee.org.

Wilson, Alex et al. *The Consumer Guide to Home Energy Savings.* American Council for an Energy-Efficient Economy, 1999.

- By P.W. McRandle
June 30, 2002

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