

Fridges move forward

1 Retro cool

Elmira Stove Works' Northstar 1952 refrigerator.



2 Pot filler

Whirlpool's rotating dispenser fills big pots twice as fast.

3 Hidden hinges

Thermador's Freedom Hinge lets doors sit flush with cabinetry.

4 Light touch

Kenmore's Elite features exterior LED controls.

5 Another level

GE's pull-down shelf increases usable space.

6 Double depth

GE Profile's armoire-style fridge improves on the popular French-door concept with two freezer drawers (detail below).



Once upon a time, the kitchen was a place to cook, and the refrigerator was a place to keep food cold and reasonably fresh until you cooked it. But just as we demand more of our kitchens—not only for food preparation, but also for entertaining guests and organizing our lives—we're demanding a lot more from our refrigerators.

With features ranging from LED lighting to advanced temperature-control systems and easy-access designs, today's refrigerators bring food storage to a new level. Fridges have an average life expectancy of about 15 years, so chances are a lot of these changes have occurred since you last bought one.

Above all, the refrigerator you buy today is far more energy efficient than the old model in your kitchen. According to Energy Star (www.energystar.gov), the federal program whose label identifies the most-efficient appliances on the market, today's Energy Star-qualified refrigerators use half the electricity of those manufactured before 1993, and 65% less than those built before 1980. Replace a model made in 1990, Energy Star says, and

New Frontiers

They come in more shapes and sizes than ever, and do



you'll save the equivalent of what it costs to light an average home for four months.

Watching the watts

Last April, Energy Star nudged the bar a bit higher. Until then, full-size fridges that used 15% less energy than the federal minimum qualified for the sticker; in April, that margin increased to 20%. Refrigerators manufactured under the old standard can still be sold with the Energy Star label, but they can't be promoted as Energy Star-rated appliances.

It's not a big difference—this year's Energy Star model will save you less than \$10 annually over last year's—but on a national scale, the savings are impressive, estimated at \$23.5 million a year. Still, a bigger priority for the folks at Energy Star is persuading Americans to unplug and recycle the 47 million refrigerators out there that are more than 10 years old and costing a collective \$5 billion a year to keep on the grid (see sidebar, p. 54).

To meet the new criteria, manufacturers say they've added more-efficient compressors, better insulation, and more-precise temperature controls. European brands like Liebherr,



for Refrigerators

their job with less energy and greater precision

BY DEBRA JUDGE SILBER

New focus on old fridges

Refrigerators become incrementally more energy-efficient every few years, but the big savings, both energy- and dollar-wise, come from switching off appliances that are more than 10 years old. This year, Energy Star (a joint program of the U.S. Department of Energy and the Environmental Protection Agency) launched a campaign focused on convincing consumers that they should unplug their old fridges and recycle them.

The program's Web site, www.RecycleMyOldFridge.com, offers a calculator that compares the cost of operating your current refrigerator to that of a new one. It also features a database of manufacturers' rebates for qualified appliances and links to state and local refrigerator-recycling programs.

Before you buy a new fridge, be sure to check with your utility company for rebate programs. Some offer a cash incentive for recycling the old one; others offer rebates on the purchase of a new Energy Star model. Although many dealers remove an old fridge when they deliver a new one, not all are committed to recycling. Many municipalities will also pick up your old refrigerator or freezer and are required by law to dispose of refrigerants and other environmental contaminants properly. Contact them directly for more information.

Bright idea. Interior LED lighting saves space and provides better illumination. (Shown: Bosch Linea 800 Series with CoolGlow interior LED lights)

Siemens, Bosch, and Vestfrost, whose North American products are targeted at high-end consumers, employ some of the most sophisticated energy-saving technologies and, in a few cases, can boast of slightly higher energy savings. But you can buy an Energy Star-rated fridge at almost any price point. A no-frills, \$800 top-freezer unit might lack the fancy gizmos of a French-door, LED-lit, variable-speed compressor-equipped luxury model, but still match it on the energy-use scale.

Compressors account for 83% of the energy used by refrigerators, so more efficient com-

pressors generally translate to more efficient refrigerators. Variable-speed compressors save energy by operating at low speed during low-usage periods (such as overnight) and then compensate by running faster during periods of high usage—for example, when the door is repeatedly opened and shut as a family prepares breakfast. Still mostly limited to European brands and professional-style built-ins, variable-speed compressors are now showing up in some GE Profile and GE Monogram products, as well as Whirlpool's high-end built-in lines. Officials at Energy Star say more manufacturers have indicated they might follow suit.

Like better compressors, improved insulation helps refrigerators to run more efficiently and more quietly. Most manufacturers use foam, but at least one, KitchenAid, uses vacuum insulation panels.

Improvements to software that governs cooling and defrosting, as well as additional temperature sensors, also help fridges to boost efficiency.

Custom cooling means fresher food

These days, most mid- to high-end refrigerators come with automatic or user-adjustable controls that manipulate temperatures in specific areas of the refrigerator or freezer, enabling it to cool warm leftovers quickly or freeze items rapidly after they are home from the supermarket. Bosch's Integra and Linea models, for example, offer SuperFreeze and SuperCool functions that sense the presence of warm food and automatically drop the interior temperature to the lowest-possible setting, returning to the original setting once the food has chilled. Others, such as the Cus-

Seemingly seamless. Specialty hinges opening to 115° allow newer built-in models (such as this one from Liebherr) to be installed flush with surrounding cabinetry.



Fresh air means fresh food. High-end brands offer air filtering as well as filtered water. (Shown at left: Liebherr model CS2062)



tomCool drawer on GE's Profile line, allow consumers to activate temperature features at will. Activating its Express Thaw function, for example, turns on a heater that quickly defrosts items, then switches to cooling to keep food from spoiling.

Better temperature sensors and improved airflow, manufacturers say, are the keys to precise temperature control. GE, Bosch, and Thermador all point to their airflow systems as fundamental to performance; Thermador claims the FreeFlow air system in its Freedom Collection refrigerators keeps the interior temperature consistent to within 1.5°F. Airflow is also used to keep specific areas of the refrigerator compartment colder than others. In-door beverage centers on some GE Profile, Whirlpool, and Amana models channel air from the freezer to keep milk or soda in these compartments 2°F to 3°F colder than the rest of the fridge.

Promising precise temperatures is one thing; delivering them is another. Maryland-based kitchen designer Steven Bullock says that units that let the user set temperatures, rather than adjust automatically, deliver fresher results.

A breakthrough in refrigerator lighting

Flat-panel LED lighting is a new feature that's changing the way we look at refrigerators. Mounted on the sides, top, or back of the cabinet, or in some cases within drawers, LEDs provide sharper illumination while using less energy and giving off less heat than incandescents. Despite their watt-saving reputation, though, LEDs don't figure into energy ratings: Government efficiency tests are done with the refrigerator door closed. And since the lights come on only when the fridge is opened, their contribution to energy savings is negligible. Instead, manufacturers promote LED lighting as a space saver that also aids in organization and food preservation. The better you see the back of the fridge, the less likely you are to miss something growing there.

Healthy fridge, healthy food

Consumer interest in healthy eating has not been lost on refrigerator manufacturers. Along with smart temperature controls and



Improved by degrees. Fisher & Paykel's 36-in. CoolDrawer has a wide range of temperature settings, from deep freeze to merely cool.

better lighting, most mid- to high-end appliances offer water filtration (in those units equipped with ice and water dispensers), and some add air filtration to minimize transfer of odors from refrigerator to freezer. Refrigerator water filters typically consist of carbon filters that reduce chlorine and sediment, though some do more. Sub-Zero's advanced water filtration, for example, is designed to remove chemical pollutants, viruses, and bacteria. Forgetful about filter changing? Manufacturers have added indicator lights to remind you.

High-end refrigerators also filter the air. Sub-Zero's redesigned built-in line uses a process borrowed from commercial refrigeration in which the entire volume of air in the refrigerator is "scrubbed" once every 20 minutes to eliminate odors, viruses, and bacteria as well as the ethylene gases that promote food spoilage.

Not to be outdone, Kenmore this year unveiled refrigerator crisper drawers infused with Microban. This antimicrobial additive won't stop forgotten fruit from sprouting fuzz, but it inhibits bacterial growth on the drawers themselves and purportedly lasts the lifetime of the refrigerator (\$1099 to \$1399, depending on the color and model).

Styling opens new doors

There's still a lot to be said for the standard top-freezer, single-door refrigerator models: They're the cheapest to buy, they require the fewest repairs (those through-the-door ice maker/water dispensers are notoriously glitchy), and they perform the best energy-wise. So if

Corralling the brands

Don't be surprised if the features on competing refrigerator brands sound familiar. Although there are dozens of brands, there are but a handful of large manufacturers in the residential-refrigerator business. With multiple brands under single ownership and competitors regularly building specific models marketed under each other's brand names, the lines are blurry

and constantly in flux. Add in the manufacturers' tendency to play down the connections, and it's almost impossible for a consumer to keep track.

LG, Liebherr, and Samsung are three manufacturers that make their own brands. Others manage several brands under one corporate umbrella.

Whirlpool Corporation, for example, developed the Whirlpool and KitchenAid

brands, but also owns Admiral, Amana, Jenn-Air, and Maytag. General Electric sells its appliances under five brand names along a wide range of price points: Hotpoint, GE, GE Café, GE Profile, and GE Monogram.

German company BSH Home Appliances owns the Thermador, Gaggenau, Siemens, and Bosch brands. But Bosch's side-by-side refrigerators have

been made by Korean manufacturer Daewoo Electronics, and a number of Thermador refrigerators have been manufactured by Whirlpool.

Kenmore, the Sears brand that ranks second in U.S. sales after GE, doesn't make any of its appliances. Kenmore-branded fridges are built to the company's specifications by Whirlpool, LG, Electrolux, and other manufacturers.

What you get for . . .

\$799

Maytag

Top mount

Capacity:
18 cu. ft.



Features: Spill-proof glass shelves, up-front controls, vegetable crispers with humidity control, automatic ice maker with bin, wire freezer shelf, gallon door bins

\$2000

Kenmore Elite

Side-by-side

Capacity:
23.1 cu. ft.



Features: Energy Star rating, counter-depth dimension, enhanced water filtration, advanced ice production, door beverage chiller

\$9000

Sub-Zero

48-in.
Side-by-side
built-in

Capacity:
28.3 cu. ft.



Features: Dual refrigeration, air and water filtration, flush hinges (optional), automatic ice maker, easy-access condenser

economy and reliability matter, they're a good choice, and they still account for half of all refrigerator sales.

Refrigerators with bottom-mount freezers, however, are the current favorite, with sales increasing 330% industry-wide, from 360,000 in 2000 to 1.5 million last year, according to GE spokeswoman Allison Eckelkamp. "It's what people want now," she says, adding that the company has added bottom-mounts to its lower-priced GE brand.

French-door models—with a freezer drawer below two refrigerator doors—make up the most rapidly growing category. But already it's been improved upon by GE Profile, LG, and Liebherr, all of whom offer French-door models with not one but two freezer drawers. Prices range from \$2300 to \$5000.

Stainless steel still reigns as the most popular finish among fridge buyers. But buyers concerned with smudging can choose among several brands that offer coated stainless or laminate surfaces, many of which can hold magnets (unlike plain stainless steel).

If you'd rather ditch the magnets but still value your refrigerator door as a communication hub, GE offers the Family Media Center, an LCD screen that serves up preloaded nutrition facts, recipe substitutions, and metric conversions along with family photos. If your tastes (and budget) are more low-tech, check out Amana's Jot Dry-Erase refrigerator (\$649), with its whiteboardlike surface.

Among built-in models, a significant design element emerged recently with the introduction of heavy-duty specialty hinges that allow the units to sit flush with kitchen cabinetry. They appear under various names on models such as Siemens avantGarde (accessHinge; \$6439–\$6739), Bosch Integra (Optiflex; \$2749–\$6749), and Thermador Freedom series (Freedom Hinge; \$3099–\$7449).

Expect more specialized refrigerators in the future

Those three lines, along with Northland, exemplify a continuing trend among high-end brands toward the decentralization of food storage by distributing refrigerators and freezers throughout the kitchen—and even throughout the house in master-suite "morning bars" and indoor "grottoes" designed for wine storage and serving.

Separate built-in components have long been a staple in pro-style kitchens, but new "tower" components (some as narrow as 18 in.) make it easier to put refrigeration where it's most convenient. They're also useful in urban apartments where access is limited, or in small kitchens where a single unit can be overwhelming.

Refrigerator drawers, like tower-style components, put fresh food where it's convenient. But on a dollar-per-cubic-foot basis, they are also very expensive. Like new refrigerators, new drawers offer more temperature control and more-adaptable configurations. Fisher & Paykel's 36-in.-wide CoolDrawer offers refrigerator/freezer settings ranging from -13°F (deep freeze) to 59°F (for serving red wine). In April, KitchenAid unveiled a 24-in.-wide double-drawer refrigerator/freezer that's tall enough to store 2-liter bottles. Jenn-Air also offers a combination drawer unit, with a pantry mode that keeps vegetables and fruits at a cool-but-not-cold 40°F to 60°F. And for very small spaces, Perlick makes a drawer that's just 15 in. wide. □

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Photos courtesy of the manufacturers.

SOURCES

Refrigerator brands mentioned in this article include:

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