

January 6, 2007

The Land of Rising Conservation

By [MARTIN FACKLER](#)

TOKYO, Jan. 5 — In many countries, higher oil prices have hurt pocketbooks and led to worries about economic slowdowns. But here in [Japan](#), Kiminobu Kimura, an architect, says he has not felt the pinch. In fact, his monthly energy bill is lower than a year ago.

A reason is his new home fuel cell, a machine as large and quiet as a filing cabinet that sits in front of his house and turns hydrogen into electricity and cold water into hot — at a fraction of regular utility costs. But even with the futuristic device, which is available for now only in Japan, Mr. Kimura has not let up on the other shortcuts that leave him unscathed by last year's oil squeeze.

Energy-efficient appliances abound in the many corners of his cramped home. There is the refrigerator that beeps when left open and the dishwasher that is compact enough to sit on the kitchen counter. In some homes, room heaters have a sensor that directs heat only toward occupants; there are “energy navigators” that track a home's energy use.

And then Mr. Kimura, 48, says there are the little things that his family of four does to squeeze fuel bills, like reusing warm bath water to wash laundry and bicycling to buy groceries.

“It's not just technology, it's a whole mind-set,” said Hitoshi Ikuma, a specialist in energy issues at the Japan Research Institute. “Energy conservation is almost an obsession here among government, companies, regular citizens, everyone.”

Japan is the most energy-efficient developed country on earth, according to most specialists, who say it is much better prepared than the United States to prosper in an era of higher global energy prices. And if there is any lesson that Japan can offer to Americans, they say, it is that there is no one fix-all solution to living with oil above \$50 a barrel.

Rather, as Mr. Kimura shows, it is a combination of many things, from the most advanced technologies to the simplest frugality in everyday life — and an obsession with saving energy that keeps his family huddled in a single heated room during winter.

Japan tops most global comparisons of energy efficiency in wealthy nations. Its population and economy are each about 40 percent as large as that of the United States, yet in 2004 it consumed less than a quarter as much energy as America did, according to the International Energy Agency, which is based in Paris.

Japan's obsession with conservation stems from an acute sense of insecurity in a resource-poor nation that imports most its energy from the volatile Middle East, a fact driven home here by the 1970s shocks. The guiding hand of government has also played a role, forcing households and companies to conserve by raising

the cost of gasoline and electricity far above global levels. Taxes and price controls make a gallon of gasoline in Japan currently cost about \$5.20, twice America's more market-based prices.

The government in turn has used these tax revenues to help Japan seize the lead in renewable energies like solar power, and more recently home fuel cells. One way has been a subsidy of about \$51,000 for each home fuel cell. This allowed Mr. Kimura to buy his cell last year for about \$9,000, far below production cost. His cell, which generates one kilowatt per hour, provides just under half of his household's electricity, and has cut his electricity bill by the same amount, he said.

The device works by converting natural gas into hydrogen, which the fuel cell then uses to generate electricity. Heat released by the process is used to warm water.

The first two fuel cells were installed in the prime minister's residence in April 2005. Since then, some 1,300 have been sold, according to the trade ministry. The ministry forecasts that as sales pick up, production cost will fall to about \$5,000 by decade's end. Experts say that Japan is far more willing to embrace new technologies than the United States, where opposition to hydrogen storage tanks in Tarrytown, N.Y., forced [General Motors](#) to scrap an experimental filling station for fuel-cell cars last year.

Higher energy prices have also created strong domestic demand in Japan for more conventional and new energy-saving products of all sorts. That has spurred the invention and development of things like low-energy washing machines and televisions and high-mileage cars and hybrid vehicles, experts say. Japanese factories also learned how to cut energy use and become among the most efficient in the world.

Companies like [Mitsubishi Heavy Industries](#) are now reaping the benefits in booming overseas sales of their highly efficient electric turbines, steel blast furnaces and other industrial machinery, particularly in the United States. The environment ministry forecasts that exports will help turn energy conservation into a \$7.9 billion industry in Japan by 2020, about 10 times its size in 2000.

"Japan has taught itself how to survive with energy prices that are twice as high as everywhere else," said Kouichi Iwama, an economics professor at Wako University who advises the Japanese Parliament on energy policy.

But with a few exceptions like cars, many of Japan's efficient consumer products have yet to make their way overseas, according to corporate executives. Partly, that is because while more energy-efficient, they are also more expensive. But another reason is that many appliances here are designed for Japan's conservation-conscious lifestyle, which includes things like smaller homes and a lack of central heating.

Mr. Kimura says he, his wife, and two teenage children all take turns bathing in the same water, a common practice here. Afterward, the still-warm water is sucked through a rubber tube into the nearby washing machine to clean clothes. Wet laundry is hung outside to dry or under a heat lamp in the bathroom.

"In Japan, it's natural to think about saving energy," Mr. Kimura explains. "We learned not to waste from our parents, who had learned it from the hardship of the war and after," he said.

The different approach is also apparent in the layout of Mr. Kimura's home, which at 1,188 square feet is

about the average size of a house in Japan but only about half as big as the average American one. The rooms are also small, making them easier to heat or cool. The largest is the living room, which is about the size of an American bedroom.

During winter, the entire family, including the miniature dachshund, gathers here, which is often the only room heated. Like most Japanese homes, Mr. Kimura's does not have central heating. The hallways, stairwell and bathrooms are left cold. The three bedrooms have wall-mounted heaters, which are used only when the rooms are occupied, and switched off at night.

The living room is kept toasty by hot water running through pipes under the floor. Mr. Kimura says such ambient heat saves money. He says the energy bill for his home is about 20,000 yen (\$168) a month. Central heating alone would easily double or triple his energy bill, he says.

"Central heating is just too extravagant," says Mr. Kimura, who is solidly middle class.

The government has tried to foster a culture of conservation with regular campaigns like this winter's Warm Biz, a call to businesspeople to don sweaters and long johns under their gray suits so that office thermostats could be set lower. It has also encouraged development of energy-saving appliances with its Top Runner program, which has set goals for reducing energy use.

Products that meet the goals are awarded a green sticker, while those that fail get an orange sticker. Japan's trade and industry ministry says consumers heed the stickers, pushing manufacturers to raise the energy efficiency. The average air-conditioner now uses two-thirds less electricity than in 1997, and the average freezer 23 percent less, the ministry said.

The savings add up. The average household here used 4,177 kilowatt-hours of electricity in 2001, the most recent figure, according to the Jyukankyo Research Institute in Tokyo. In the same year, the average American household consumed more than twice that, or 10,655 kilowatt hours, according to the Energy Department.

"The Japanese use less energy, there's no doubt about that," said Alan K. Meier, a scientist specializing in energy efficiency at Lawrence Berkeley National Laboratory in California. "Some of it is more efficient appliances, but these are only part of a different lifestyle and one that's more energy-conscious."

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