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Plugging into the sun

Even on the coast of Maine, a house can be entirely solar powered

By Barbara Claire Kasselmann, Globe Correspondent, 5/1/2003

KENNEBUNKPORT - He calls himself "a real native," from just up the road at Saco. She's originally from Maryland, "`from away,' as they say up here," she explains. He was an ABC News executive and producer, she, a music teacher and social worker. Together, Bill and Debbi Lord have come to the Maine coast near Kennebunkport to retire, to live a good and full life in their beautiful dream home, and, in doing so, to drain Earth's natural resources as little as possible.

Even here, in the northernmost New England state, where the ocean water is bracing at best even in summer, the Lords have proven that an entire house can be fueled by solar power, heated in winter and cooled in summer. They never have to buy electricity.

Married 41 years, the Lords are thrilled to have achieved their 20-year dream of living in a solar home. They drive energy-efficient cars (a Toyota Prius hybrid and a diesel VW), use public transportation when possible, make compost for their vegetable garden, and recycle as much as they can.

"I'd highly recommend it," Debbi says of their energy-efficient lifestyle. "I think you walk softly on the Earth when you do this. It suits our needs, and it suits others' needs - and it's adaptable. You can do as much or as little as you want."

During a 31-year career at ABC News, Bill Lord was vice president and

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executive producer in the early days of "Nightline" with Ted Koppel, and, later, executive producer and vice president of "World News Tonight" with Peter Jennings. Five Emmy awards for TV documentaries sit atop a bookcase near his desk.

Now 64 and retired, he rides Amtrak to Boston three days a week to teach journalism at Boston University. He calls the six-hour commute a "social experience," giving him time to "eat, drink coffee, and chat with interesting people," some of whom become subjects of interviews for feature articles.

After years teaching music in public schools and private lessons, Debbi Lord earned a master's degree and became a social worker. A mental-health counselor in Boston's Home for Little Wanderers and, later, for homeless families through Head Start, at 65 she now does volunteer hospice work.

The Lords appear to have sacrificed nothing in terms of aesthetics, comfort, or convenience by living in a solar house. This contemporary New England saltbox-style home has a stepped facade of glass and cedar siding that takes maximum advantage of the terrain, the magnificent views to the East, and the sun's rays for electric power.

From their kitchen sink, their dining table, their bed, desk, and living room, the Lords can watch the sun and moon rise, the light flow and fade over the marshes, the ocean rise and fall.

Their 2.25 acres overlook Rachel Carson National Wildlife Refuge, a 5,000-acre preserve that is home to foxes, shore birds, and a wealth of other wildlife. The 2,900-square-foot house has extra bedrooms, a media room, a baby grand piano, and plenty of electric power for when their four children and eight grandchildren come to visit. It is filled with family heirlooms, cozy couches, the work of local artists, and orchids and cacti in windows.

"We basically live like everybody else," Debbi says, "but the sun is providing our energy. The home is very peaceful to come home to. It's quite a gift - inside and outside, it's a gift."

Two events coalesced to help the Lords' dream home take form: a $500 monthly heating bill for their Connecticut home on Long Island Sound, and a 1992 solar-powered exhibit at New York's Natural History Museum where Bill met solar designer Steven Strong.

Strong had founded Solar Design Associates in 1974 after working as an engineering consultant on the Alaska pipeline. The job, he says, led him to conclude that there had to be a better way than "going to the ends of the Earth to extract the last drop of fossil fuel."

Since then, he and his Harvard, Mass., firm of architects and engineers have designed dozens of solar-powered homes and businesses from California and New Mexico to Chicago, Buffalo, Canada, Massachusetts, and the Lords' house in Maine. They recently installed solar systems at the White House to

help provide thermal and electrical energy for hot water, a swimming pool, and to reduce demand on the utility. Strong and William G. Scheller are the authors of "The Solar Electric House: Energy for the Environmentally Responsive, Energy-Independent Home" (Sustainability Press).

Strong, 52, debunks the idea that solar-powered homes are inefficient or impossible in northern climes. The amount of sunlight and the way it's used are more important to the solar efficiency of a home than the temperature, he says.

"One we designed on the north shore of Lake Superior makes more energy than it needs," he says. Such is the case with the Lords' home, built by Tim Spang of Spang Builders in Biddeford, Maine.

The secret, according to Strong, is to integrate the design with the energy systems and processes, taking into consideration the sun's path and the placement of the home. He calls this "whole building design," and he lectures tirelessly and conducts workshops to explain its concepts to architects, engineers, and others.

Most energy-efficient features of the Lord home are not obvious. Though quite thin, sliding glass doors and windows are composed of four layers - two of plastic film, two of glass. Because plastic is thinner than glass, it lets in more sunlight and makes the doors and windows lighter and easier to handle, Strong says. Also, the four layers create three discrete air spaces between them, blocking heat flow out of the house.

Because heat loss is reduced, the design can include large expanses of glass, allowing in even more sunlight to help heat the house. Most glass faces the sun in the east and south to take maximum advantage of its penetration in winter.

Living spaces, what Strong calls "prime real estate," are open to sunlight, while the garage, pantry, and closets have few windows and are mostly on the north side of the house. "Swing" spaces, or vestibules, like that between the garage and house, have gasket-sealed doors at each entry point to prevent air leakage, which the designer says causes half the heat loss in most houses.

A cherry-finish designer refrigerator and a tumble-drum clothes washer, though somewhat more expensive than a conventional appliance, each use about 25 percent of the energy consumed by conventional appliances. The refrigerator's advanced-energy design includes better insulation and a more efficient motor/compressor combination than most refrigerators, Strong says. In the washer, horizontal-access tumbling lets gravity do the work, and high-speed spinning action uses centrifugal force to spin more water out in less time, leaving less work for the dryer, also.

Luxury bonuses come in the master bedroom and bath, where radiant heat beneath the floors and in shower walls, coupled with heat from the rising sun, mean warm floors and showers on cold winter mornings. Even in mid-winter,

the Lords open windows at night to cool the bedroom, and an open window or two during the day helps stabilize temperatures.

The house is connected to the Central Maine Power grid on a "net metering" system, for a charge to the Lords of $7.55 a month. Systems vary from state to state, but net metering is common.

"If I generate more power than I use," Bill explains, "the excess gets exported to the grid and metered. At night, we get from them; when the sun is out, we give to them.

"I store energy with them (the power company) in terms of credit; I have a certain number of kilowatt hours in the bank."

At the end of the year, if the Lords are behind, they pay; if they produce more than they need, the utility keeps the extra for other users. That's the way the law works.

"In eight years," Bill says, "I have never paid for power."

Glass photovoltaic (PV) panels cover half the south-facing roof, collecting and sending in direct current, which is converted to alternating current for the home's solar electric system. Solar thermal collector panels cover the other half of the roof, providing thermal energy for hot water and radiant space heat. In the basement, two 500-gallon tanks wrapped in 8-inch silver insulation store hot water.

A solar home, according to Bill Lord, costs about 15 percent more to build than a standard home of the same size, no matter the size or cost of the house. Will he ever recover that extra cost? "No," he replies, but says that is not the issue. It is a lifestyle decision.

Lord likes solar power because it's "practical," he says, and "also, I like the idea of minimally impacting the environment."

He also likes spreading the word, through speeches, "a lot of TV coverage," and on his website (www.solarhouse.com).

Another way to power a home by the sun is what's called a "stand-alone" house, which operates on a bank of batteries and is not hooked into the utility company power grid at all. "It's an option if you live in the woods, or don't want to work with the grid," Lord says.

Also, by retrofitting older homes, or for those who don't wish to have a totally solar-designed home, partial use of solar energy is an option.

Throughout New England, more than 100 homes have solar electric systems that provide some part of their electricity, often for hot water and appliances, according to Warren Leon, executive director of the Northeast Sustainable Energy Association. Dozens of homes in the region, he says, are independent

of electric power grids, most as "stand-alone" or "off-grid" houses. Totally solar electric homes like the Lords' are relatively new, but becoming more common, he adds.

As Debbi Lord says, "You can do as much or as little as you want." For about $3,000, solar thermal panels for domestic hot water are a good place to start, according to Strong.

Recycling and composting also help. "Our garbage is very small," Debbi says. "We fill about a quarter of a regular garbage can once a week for the two of us. The rest is recycled."

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