

## Try these simple ways to get started in solar hot water

By Don Fallick

If you're looking for a cheap, easy, quick, and permanent way to secure hot water for your home, all year long, or even all day long, this article is not the place to look. In dealing with solar heat, those qualities are mutually contradictory. There are ways to have some of them, though, if you don't mind doing without the others, or figuring out some other way to get them.

The following solar water heating systems are good only for the months of spring, summer, and fall, and only provide really *hot* water when exposed to direct sunlight. Some work better than others, but all of them do work. I have used them myself and seen them in use in the homes of friends and neighbors.

### Quick and easy

Ever leave a length of black "poly" pipe in the sun for a couple of hours? The water gets hot! The simplest way to build a solar water heater is to leave a coil of one-inch-diameter, black irrigation pipe in the sun. A 300-foot coil of pipe holds about 15 gallons of water. By mid to late afternoon, you'll have enough scalding hot water for two or three showers or a wringer washer load of laundry. On really bright summer days, you can even get two batches. You won't have to cut any firewood to heat it, pay the propane dealer, or even give any thought to it. Hot water "just happens" every time the sun shines.

Of course, there are disadvantages. The pipe cools off faster than it heats up, so if you want those showers *hot*, you'll have to take 'em when the water's hottest, between 2:30 and 4:30 in the afternoon. So it's not necessari-

ly as convenient as most of us would like. (This problem can be eased if you connect the coil to a tank. If the tank is above the coil, you'll get thermosiphon circulation.)

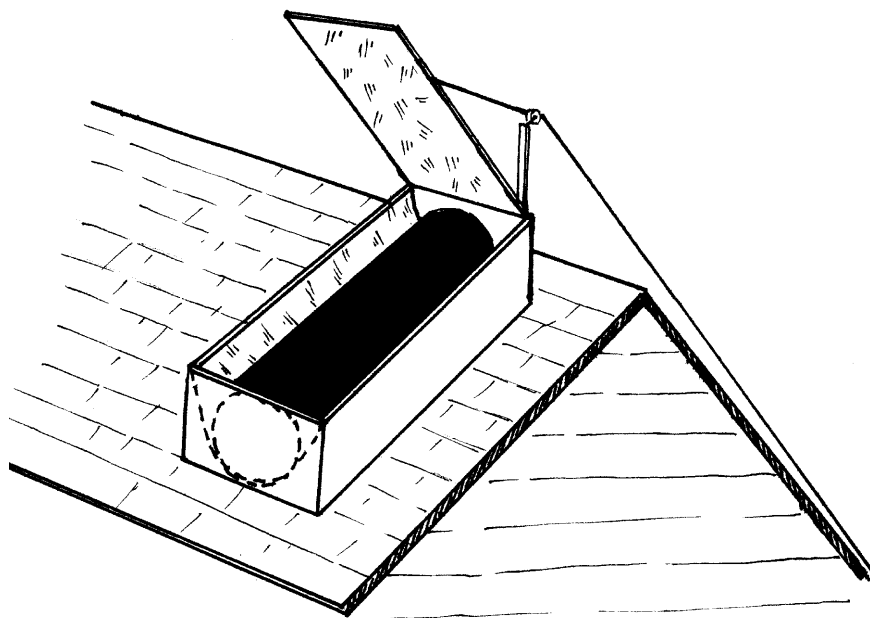
Nor is it exactly cheap. A 300-foot length of one-inch poly pipe will cost around \$65 to \$80. Worse, the pipe will have to be repaired annually and replaced every few years. Admittedly, this is still much cheaper than even a small propane water heater, and there's no expense for fuel. But considering the disadvantages in convenience, you may not think it worthwhile, except as a temporary expedient. Faced with a choice between building a house and cutting the extra firewood needed to heat water on the wood stove all summer, I installed a temporary "pipeline" heater. The savings in time and energy outweighed the inconvenience and added expense, and I eventually reused the pipe for irrigation.

### Black tank

More convenient, and even cheaper, is a water heater made from the inner tank of a regular gas or electric water heater. A 30-gallon tank is about the biggest you want for this, unless you live somewhere with lots and lots of sunshine. As tank size increases, the relative area of the tank, compared to its volume, decreases. A solar-heated water tank absorbs at a rate proportional to half its surface area. The bigger the tank, the less heat is absorbed per unit of volume. A tank bigger than 40 gallons may not absorb enough heat in a whole day to get more than warm.

Strip the outer sheet metal and insulation from an old water heater, paint it black, plumb it into your hot water line, and you're in business. Not elegant, but it does work. Gas heater tanks have a fire-plate at the bottom, and a flue through the middle of the tank. This makes it easy to convert the tank into a wood-fired water heater for wintertime use.

A gas-fired water heater may be your best bet for another reason. Most folks keep electric water heaters until



Jeff Moore's rooftop solar water heater

the tank springs a leak, so you may have to haul home, check out, and haul away several before finding one that's intact. But gas heaters are rendered inefficient by calcification or silt in the bottom, which keeps the gas heat from reaching the water. A little sand in the bottom of a solar tank makes no difference at all, since that's the one part of a tank's surface that never receives any sunlight.

A solar water tank takes longer to heat up than a pipeline heater, so you may get only one batch per day. But even without insulation, it will retain heat much longer than a pipeline heater due to its much higher relative volume. Unfortunately, a solar water tank can only absorb heat on the side facing the sun, but loses its entire surface. So it loses heat twice as fast at night as it gains it during the day.

Earth is a much better conductor of heat than air is, so it's important that the tank not be in direct contact with the ground. The usual way to accomplish this is to stand the tank up on its end, as it was designed to do. Just remember that water weighs eight pounds per gallon, so a full 30-gallon tank weighs close to 300 pounds. Be sure tank supports and bracing are up to their job.

### The ultimate

If there were only some way to insulate a solar water tank, it would sure work a lot better. Fortunately, there is. My friend Jeff Moore painted a 30-gallon tank with black stove paint and mounted it on the south side of his roof, inside an insulated plywood box. There's a curved reflector behind the tank, made of thin paneling covered

with aluminum foil, and a sheet of glass over the open top of the box. Jeff made an insulated cover for the glass by gluing a two-inch thick foam board to another sheet of paneling, and covering the inside surface with more aluminum foil. The cover is hinged at the top, and is arranged so it functions as an additional reflector in its open position. A clothesline, some braces, and a couple of pulleys allow Jeff to open and close the cover from the ground, and secure it in any position. It's so light that his seven-year-old daughter has no trouble opening it.

In its final form, Jeff's homemade solar water heater requires very little maintenance. It takes about two minutes every morning and evening to open and close the lid. And every now and then, Jeff directs a spray of water from his garden hose at the glass to clean off any accumulated dust. Every couple of years the aluminum foil gets dull from corrosion and has to be replaced. This costs about \$5.00.

In its original form, though, the collector did have one near disaster. No, it didn't come through the ceiling. Jeff knows how heavy water is, and he made sure the roof was properly braced before filling the tank. But he had no idea how *hot* the water would get. He originally used black poly pipe to connect the tank's output to his house plumbing system. The first sunny day, the poly pipe melted, and all his hot water ran off the roof. Now he uses ABS Type II pipe, designed for hot water, and has no problems. Δ

#### *Fishing with Dave*

*The sun's going down,  
The clouds are high,  
We're fishing,  
Drinking rum and Coke.  
There are no broads  
And the bugs aren't biting.  
We need a few of these times  
Before the black sack of eternity  
Is slipped over our heads.*

(Reprinted from the book, *Sex and Sins in the Cemetery*, by John Silveira, available from Backwoods Home Magazine.)