

WHICH SOLAR HEATER? 2 J

Now you've learned about all kinds of solar heating systems. Active water-heating systems have pumps that transport hot water and heat from a solar collector; heat is stored in a water tank. Active air-heating systems have fans that force air through ducts in the collectors and transport the heat to a rockbed heat store. In passive water-heating systems, the sun heats water without the use of pumps. For example, the Skytherm method uses movable insulation to prevent nighttime heat loss from solar-heated bags of water. Passive air-heating systems use the sun's energy to heat a house without using fans. The Trombe wall system is typical: thermosyphon action transports heat to the house by day, and a masonry wall delivers heat to the house at night.

Which of these systems is best? Which is best suited for the cold Northeast? for the sunny Southwest? While many factors are involved, perhaps the most important factor is economic: how much a certain method costs versus how much money it delivers. As you learned in Chapter 1, you pay an initial cost (sometimes called first cost) for a solar heater when it is installed, and you hope it **will** pay for itself, or even make money for you.

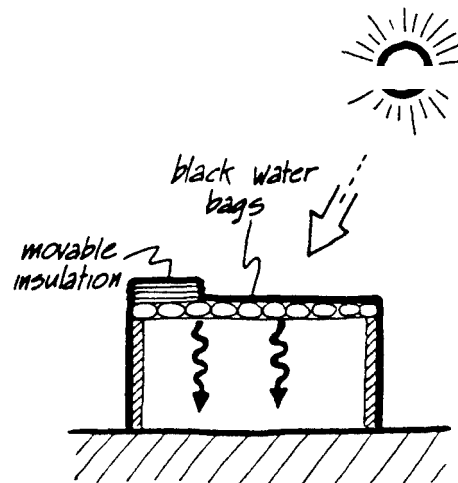
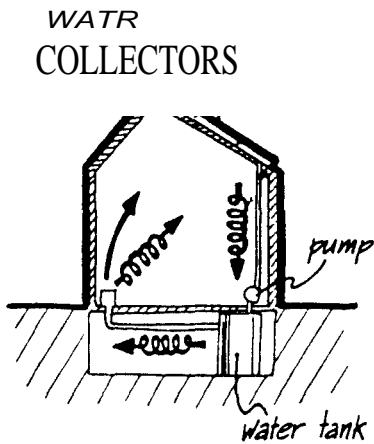
Imagine two empty jars on a balance scale. When you pay the initial cost of a solar heating system, it is like filling up one of the jars. The water in the jar represents your initial investment. You'd add water to represent the cost of the solar heater itself and the cost of installation (usually one-third of the total). Then you would take out the amount that represented the tax credits your state and federal governments give you to "go solar" (one-fourth or more of the total). At this point, you've invested a lot of money in a solar heater, and you've gotten no benefit from it at all.

Classification of Solar House Heating

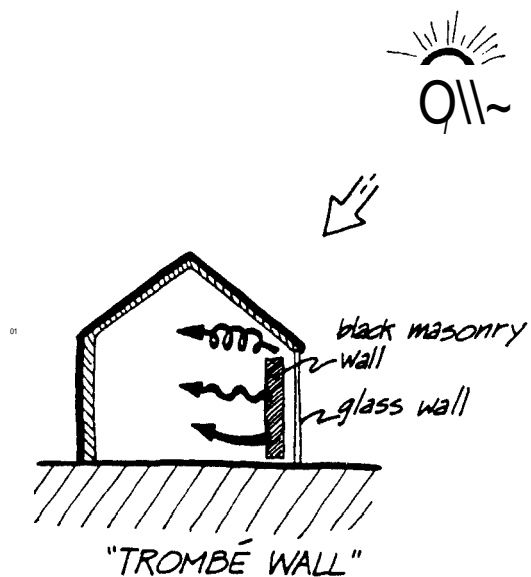
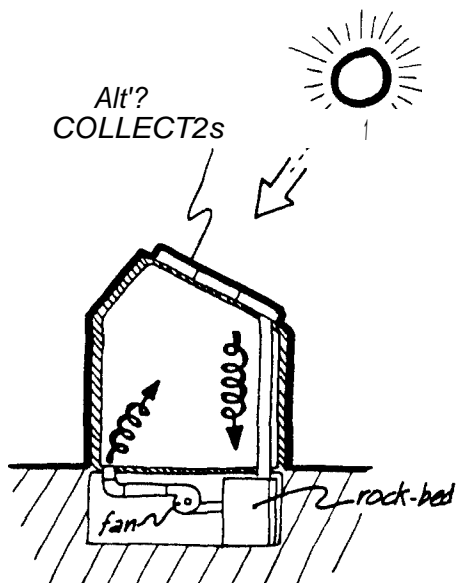
ACTIVE

PASSIVE

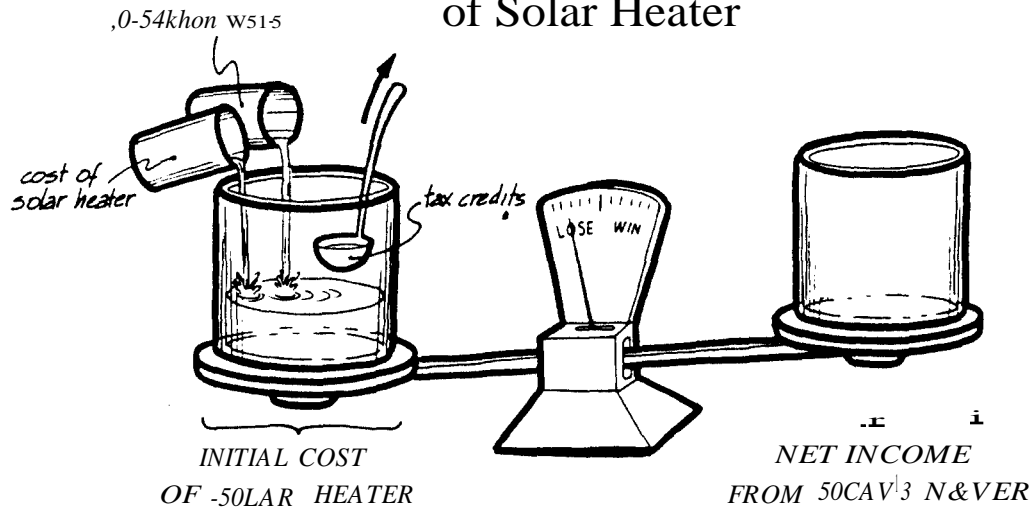
**WATER
HEATING**



**AIR
HEATING**



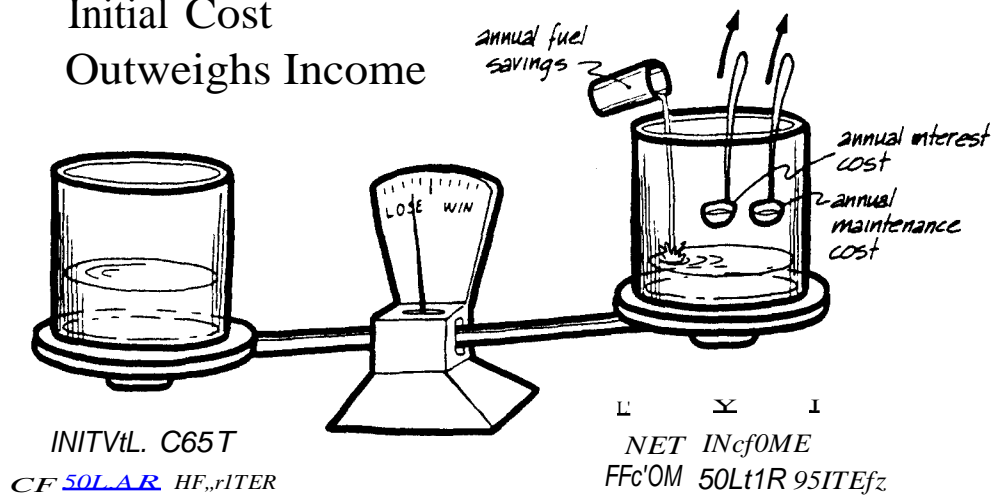
Large Initial Cost of Solar Heater



Over the next few years, however, you will save some money each year on your heating bills. The auxiliary unit won't be running all the time because some part of the heat you use will be solar heat. But you will also be paying out some money each year to maintain the solar heater in good operating condition, and possibly to pay interest on a loan you took out to buy it in the first place. We can add some water to the other jar each year to represent the net income from the solar heater: savings in fuel minus interest and cost of maintenance.

First Few Years:

Initial Cost Outweighs Income



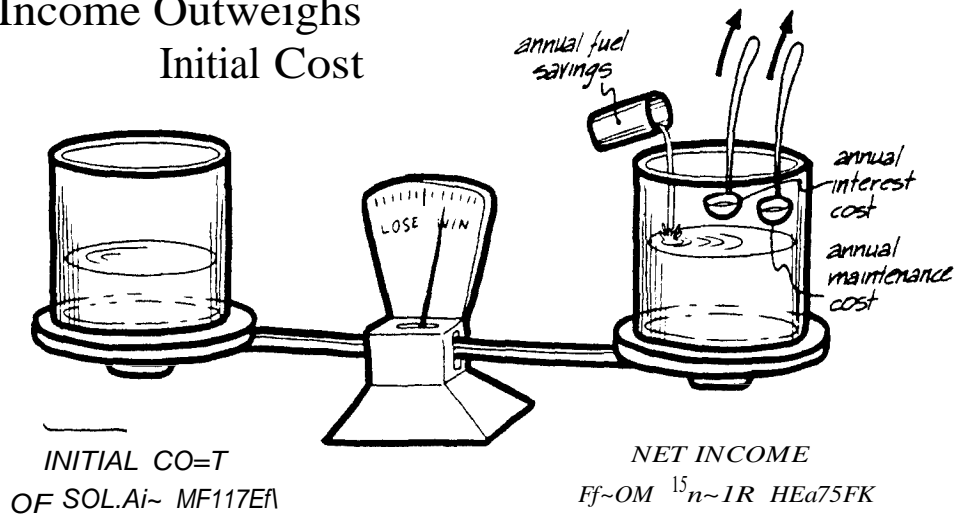
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If the cost of fuel went up-as it seems to do each year-then each year your net income would be more. If the solar heater had a major malfunction and all the solar collectors had to be replaced, the net income would be much less. Either way the solar heater would be a loss, since the income over the last few years still wouldn't equal the initial cost.

After a few more years your solar heater would start making money. Each year you would add water to the net-income jar until the net-income jar outweighed the initial-cost jar. Thereafter you'd make money on your solar heater.

Several Years' Later:

Income Outweighs
Initial Cost



Trying to trade off these factors-solar heater cost, installation cost, maintenance cost, and fuel savings-is usually a very difficult process. And although cost alone is an important factor, it is not the only important one. Others are risk (will a solar heater last?), appearance (will it look ugly?), and convenience (will the house be cold in the morning?).

To understand how all these factors combine, think of conventional heating systems. In the United States, most houses are heated by natural gas, oil, or electric heaters. Electric heating is by far the most expensive "fuel"; the same amount of heat produced by electricity costs twice as much as heat produced by oil. Oil and natural gas heat cost about the same, although gas heat is still a little cheaper than oil heat. But

in spite of the high operating cost of electricity, It is very cheap to install, requires virtually no maintenance, and is very convenient (allowing individual room thermostats, for example). Oil or gas heating, while yielding significant fuel savings compared with electric heating, have a higher initial cost, are difficult to install (there are lots of water pipe,, or air ducts), require more maintenance, probably won't last as long, and aren't as convenient. You might be surprised to know that despite the fuel savings of natural gas and oil, about half of the housing units being built today are electrically heated.

The decision as to which kind of solar heater to buy is similar to the decision as to which kind of conventional heater to buy. There are similar trade-offs between fuel savings, installation cost, maintenance cost, and the cost of the heating system itself. Just as no single conventional heating system is best, perhaps no single solar heater is best. Each type of system must find its own niche: a climate, a building style, or even a lifestyle that makes one system more suitable for you than another.

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