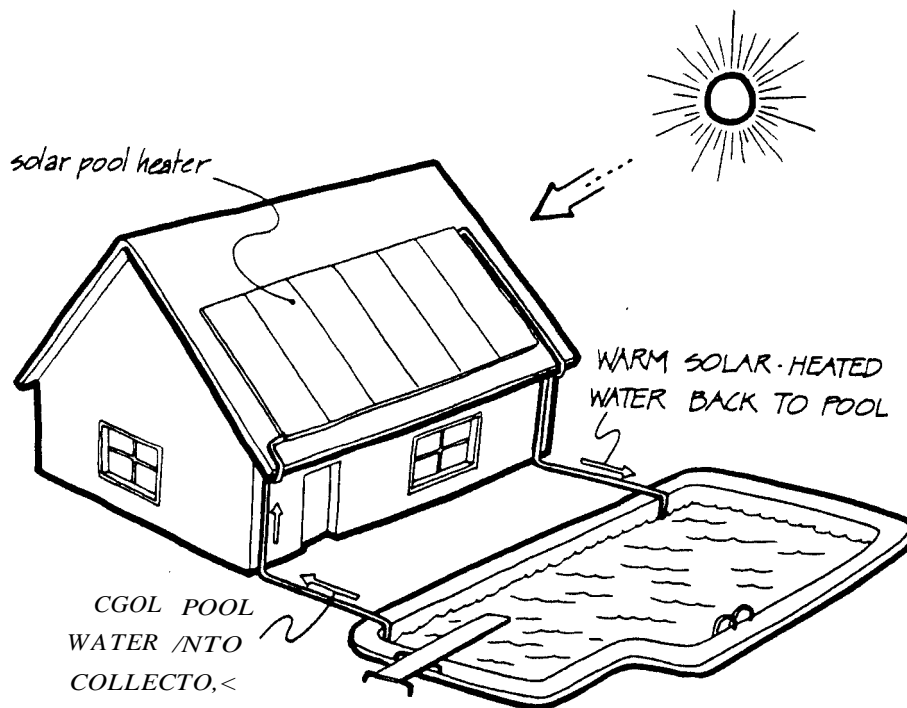


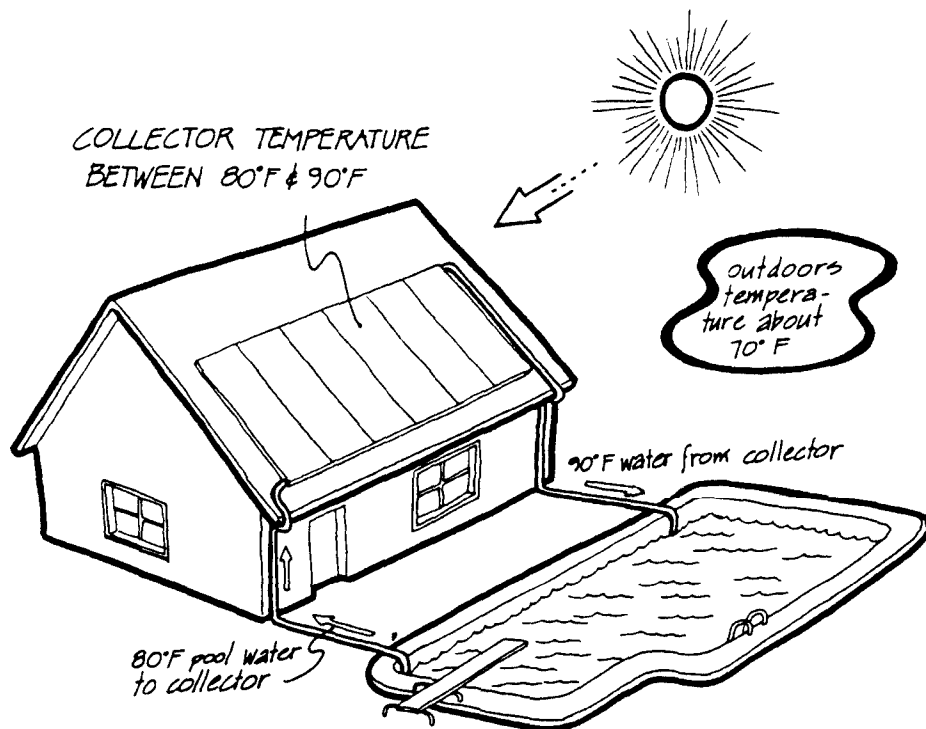
# SOLAR HEATING APPLICATIONS 1

Efficiency, as we've just learned, depends on the collector's temperature. A collector that stays cool loses little heat to the outdoors; one that's hot leaks a lot of heat. Consider a solar swimming-pool heater. Collectors on the roof, quite similar to the ones just described in Chapter 12, absorb solar radiation and heat the water being pumped through them. But, instead of using a storage tank, the pool itself stores the solar-heated water.



Swimming Pool Stores Solar Heat

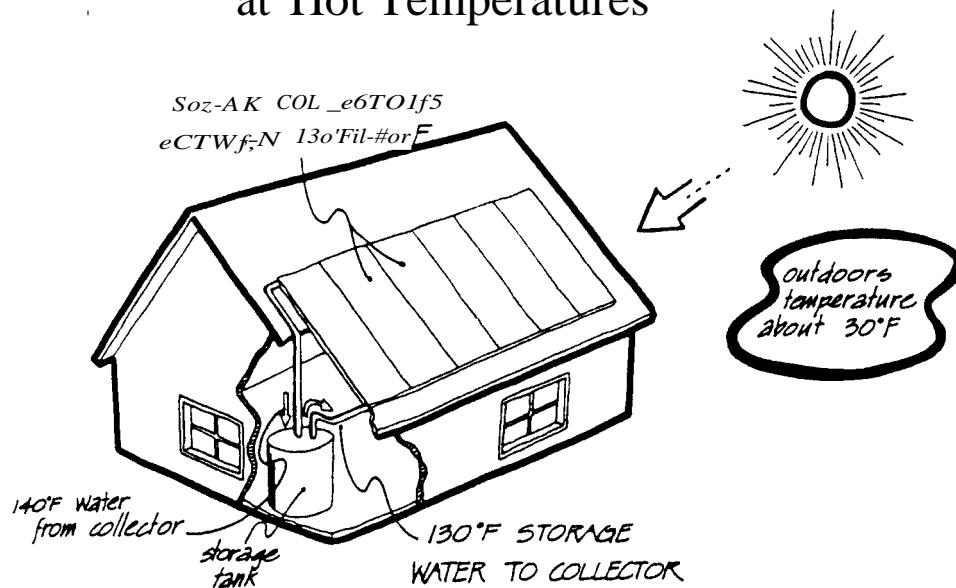
A swimming-pool solar collector gets very high efficiency because it uses heat only at relatively low temperatures. The water pumped into the collector is cool water from the pool. The water going into the collectors might be 80° F and the water coming out might be 90° F, so on the average the collector stays fairly cool. Solar pool heaters are used mostly in the late spring and early fall, so the daytime temperature (when all the solar collecting is going on) is perhaps 60° to 80° F. Since heat loss is due to temperature difference, the small temperature difference (maybe 20° F) between the collector and the outdoors means little heat will be lost from a solar swimming-pool collector. Low heat loss, of course, means high efficiency. Even the simplest solar swimming-pool collectors can get efficiencies of 75 percent or more. Three-quarters of the solar radiation striking the collector ends up heating the pool water; only one-quarter of the heat is lost.



### Swimming Pool Heater Operates at Cool Temperatures

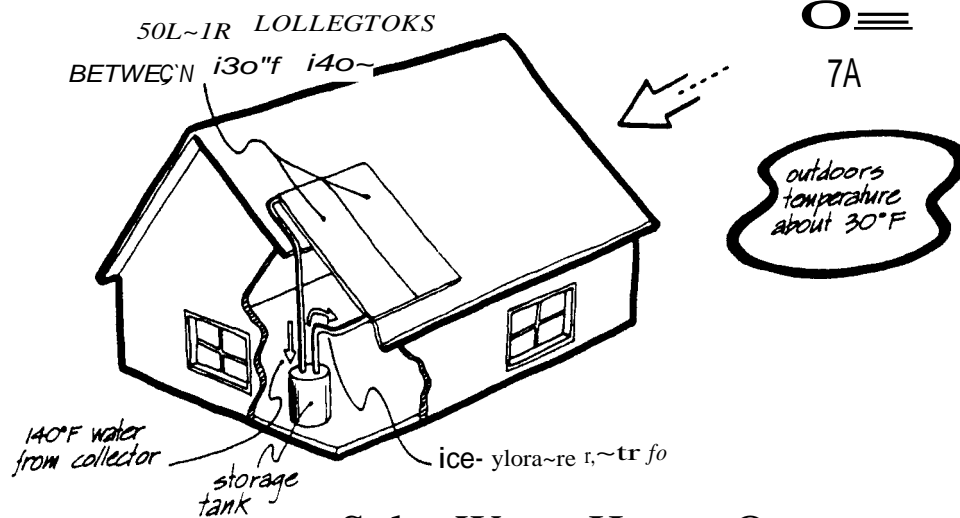
For most other applications of solar heating—notably home heating and hot-water heating—conditions are not so favorable for high efficiency. For example, in solar heating your home, the temperature on a cold winter day might be 30° F outdoors at the same time the storage tank temperature is 130° F. A 100° F temperature difference between the collector and the outdoors means you would lose about five times the heat of a solar pool heater when the temperature difference was only 20° F. With losses this high, efficiency would be very low.

## Solar House Heater Operates at Hot Temperatures



In heating water the problem is similar to house heating: it's cold outside and you want hot water. Lukewarm water coming from a solar water heater isn't good enough. As in house heating, the daytime temperature in winter might be about 30° F outdoors while the stored heat might be at 130° F. Again, a 100°F temperature difference between the collector and outdoors means that lots of heat is lost and efficiency is low.

Note that in the solar hot-water heater, the storage tank and the collectors are much smaller than those used for house heating. Since in most parts of the country more heat is needed to heat a house than to heat water for the same house, a solar hot-water heater is usually quite small compared with a solar space-heating system.



## Solar Water Heater Operates at Hot Temperatures

For either house heating or hot-water heating a simple solar collector such as the one we've discussed so far won't work too well. What's appropriate for swimming-pool heating is too inefficient for house and hot-water heating.