

## PASSIVE SOLAR HEATING

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The energy crunch has fostered many concepts for utilization of solar energy. Greenhouses are great passive solar energy collectors. They are so efficient that we must exhaust more heat per hour on a bright summer day than is necessary to warm a greenhouse on the coldest winter night unless measures are taken to reduce radiation or, in the winter, heat loss.

To utilize this feature, solar collectors are in wide usage. Rooftop solar panels are efficient for domestic water heating and have a payback period of only a few years (and decreasing as energy costs rise).

Larger collectors have been built to test the efficiency of such units in heating greenhouses. Two such units in the northeast were built with the assistance of government grants. They cost in the vicinity of a half million dollars each. At best they might trap enough solar energy to replace 50,000 gallons of oil per year.

This means that, at \$1.00 per gallon for oil, they would return less than the interest on investment. Operating costs result in a further loss. But don't give up hope. The information gained from these experimental installations may lead to more efficient systems that will be profitable, especially if oil reaches \$2.00 per gallon.

These elaborate installations aren't the only experiments under way. The New Jersey concept of storing warm water under porous concrete is reported to be more efficient. The Pennsylvania use of eutectic salts in stainless steel cartridges reduces the size of the heat storage facility. The Ohio test using stratified brine in a large tank to store summer heat sounds good but hasn't worked too well. Another system in Massachusetts may store summer heat in water pumped into the ground. One of these systems may prove to be practical.

One system that sounds good is building a stone storage under the greenhouse or even under benches. The greenhouse is cooled during the day by blowing the warm air over the rocks. When the greenhouse temperature drops in the evening, the fan stops. When the greenhouse needs heat, the fan starts again, bringing heat from the stones. So far, the energy required for the air movement costs about as much as the heat saved. But it sounds good.

The one system that seems to work on a profitable basis provides very little heat. It is simply allowing the daytime temperature to rise an extra 5 to 15°F, depending upon the crop, and utilizing the interior of the greenhouse for solar heat storage. It only works on sunny, cold days. It can only be done when CO<sub>2</sub> is used for atmospheric fertilization. It is discussed in another article in this issue.

Passive solar heat collection for greenhouse heating is in its infancy. Many articles are being written on the subject. Before you become too enthusiastic about saving energy money, investigate the claims thoroughly and then get the government to pay for it.