

Builder: Suncatcher Construction, Shelton, CT Designer:
Wormser Scientific Corporation, Stamford, CT

Solar Designer: Wormser Scientific Corporation Price:
\$115,000

Heated Area: 2178ft² Heat

Load: 64.7BTU/yr Degree

Days: 5897

Solar Fraction: 58%

Auxiliary Heat: 2.05 BTU / DD / ft²

Passive Heating System(s): Isolated gain, sun-tempering

Recognition Factors: **Collector(s):** Greenhouse glazing, second-floor glazing, 349ft² **Absorber(s):** Slate floor in greenhouse, black chrome coating on ends of 55-gallon steel drums **Storage:** 110 gallons of water by wood stove, 1540 gallons of water in waterwall-**capacity:**38,200 BTU/F **Distribution:** Radiation **Controls:** Sliding glass doors, Venetian blinds, insulating shades, fan, overhang

Back-up: Electric air-to-air heat pump (19,500 BTU/H)

All of the south-facing windows on the first floor of this house and most of those on the second floor are part of a greenhouse that spans the length of the house. There is one set of sliding glass doors between the greenhouse and the living room as well as another set in the family room. The balance of the wall is covered with water-filled 55gallon drums stacked two high and lying on their sides perpendicular to the greenhouse. This water storage system is topped by a layer of 3 1/2 inch fiberglass batts and a plywood shelf for plants on the greenhouse side and books on the living room side. Above the shelf, the two rooms are separated by a conventional 2- x 4-inch wall with 3 1/2-inch batts. The water wall opening into the greenhouse is glazed while the opening on the living room side is covered by polished aluminum Venetian blinds.

While the greenhouse is a 2-story space, the center portion of the upper level is occupied by the center bedroom, which extends to the exterior wall. The central bedroom does have an opening on each side into the greenhouse, and each bedroom to either side of the central bedroom has two sets of sliding windows opening into the greenhouse space.

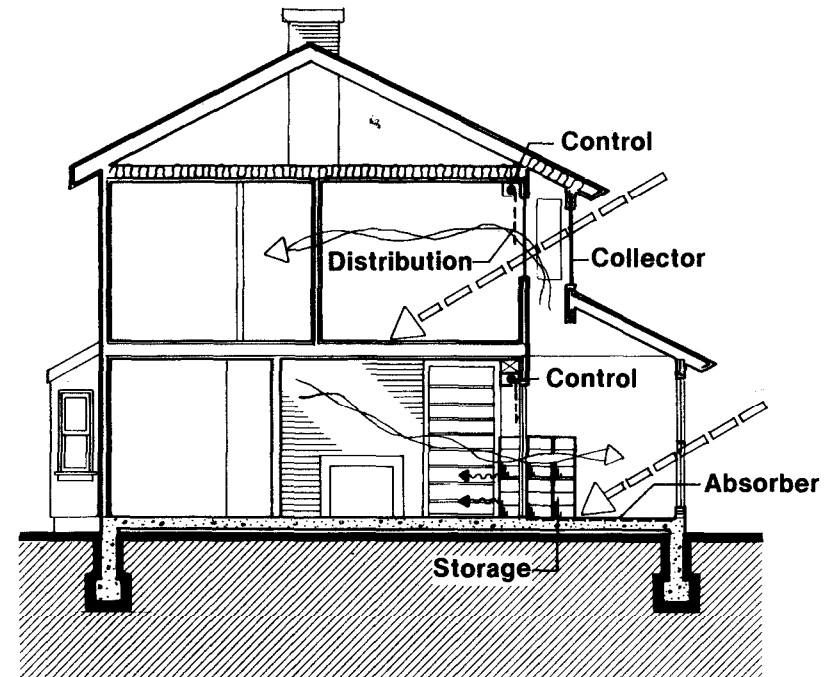
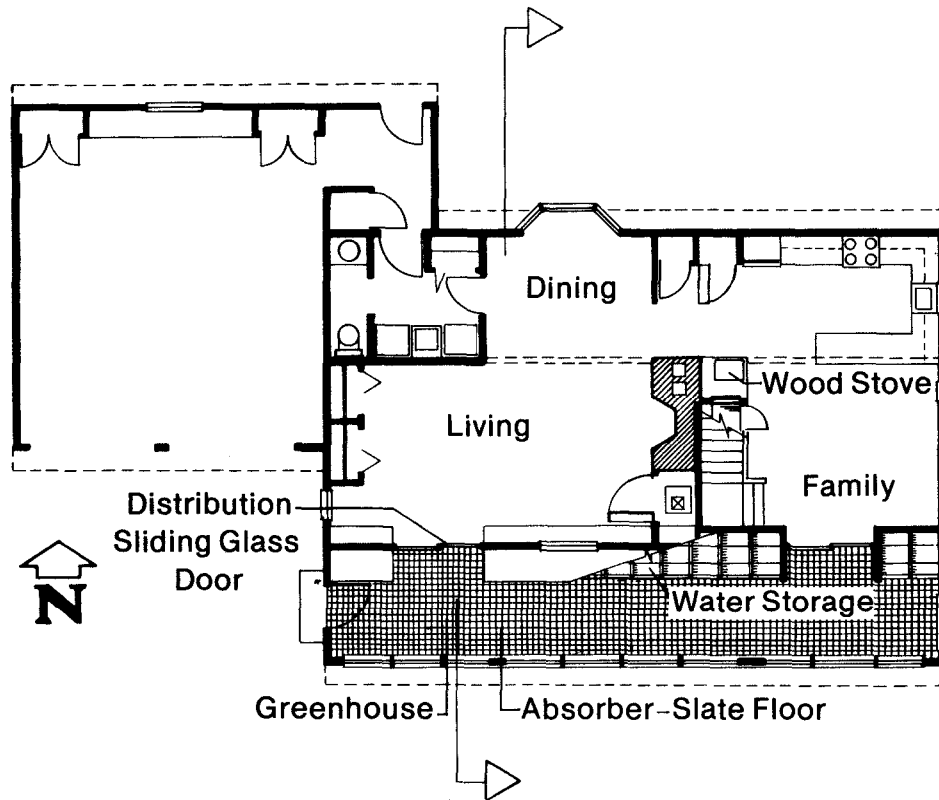
The system collects heat in winter through all the greenhouse glazing, and the heat is absorbed and stored by the dark slate floor and the steel drums, whose ends are covered with a selective coated copper foil for improved absorption. Direct sunlight is also collected in the center bedroom upstairs. When heat is needed in the house, the Venetian blinds allow heat to be distributed into the rooms by radiation from

the water wall storage. When the sliding glass doors are opened, heat is **distributed** by convection from the warmer greenhouse into the house. Similarly, windows in the side and center bedrooms open into the upper greenhouse space to receive the warm air flow.

To control heat loss at night, insulating shades are pulled down over the windows and glass doors (combined value R-15). If necessary, the wood stove in the family room is used. Two 55-gallon water-filled drums are located next to the stove to absorb and store heat. A door in the family room opens to expose more surface area of

these drums, allowing stored heat from the wood stove to heat the room after the fire has burned out.

These passive features are augmented by good conservation measures. The garage is located to the north and west of the house to block winter winds. There is a double airlock entry between the garage, the rear entry, and the house, while the front entrance to the house is through the greenhouse. All walls are insulated with 3 1/2-inch fiberglass batts and 2-inch polystyrene sheathing (R24), and 12-inch batts (R-40) are installed in the ceiling joists.



This plan is from the book
“Passive Solar Homes – 91 new award-winning, energy-conserving single-family homes”,
The U.S. Department of Housing and Urban Development, **1982**

The solar homes designs in this book were the winners of HUD’s fifth (and final) cycle of demonstration solar homes. The 91 winning home plans in the book were selected from 550 applications from builders.

This was a time of great interest and activity in the passive solar home designs – many of the winning homes show a level of innovation not found in most of today’s passive solar designs.

www.BuildItSolar.com

