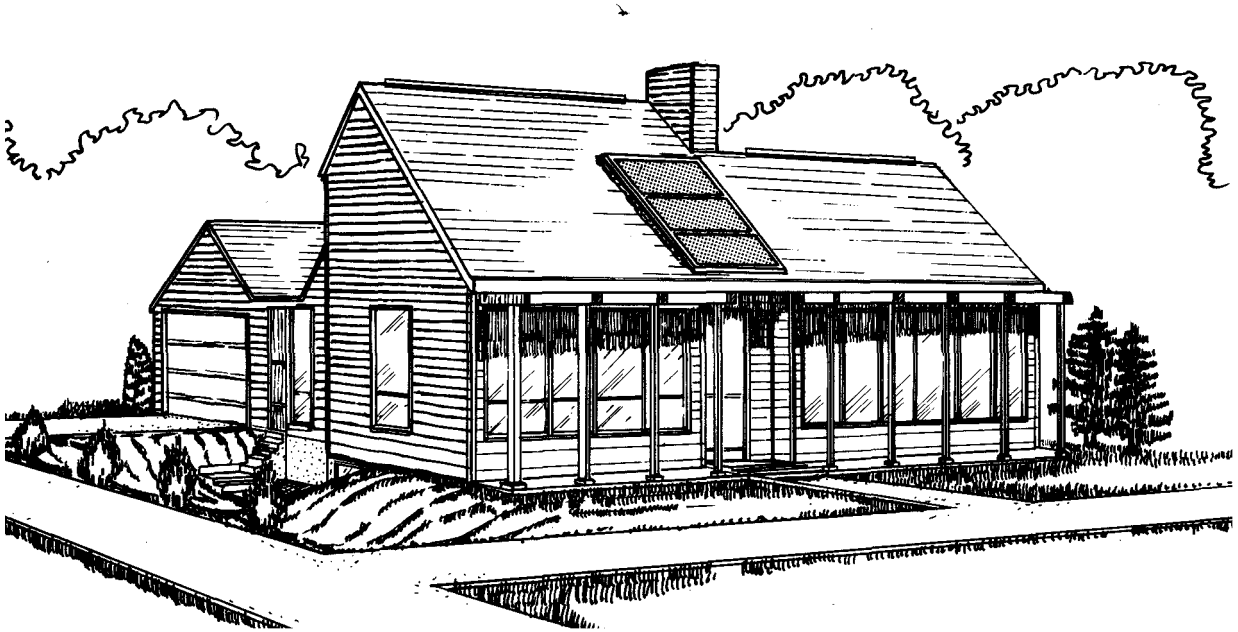
Indianapolis, IN



Builder: Barnard Brothers, Inc., Indianapolis, IN

Designer: Sun Design Group, Indianapolis, IN

Solar Designer: Sun Design Group

Price: $80,000

Net Heated Area: 1553 ft²

Heat Load: 55.0 x 10⁶ BTU/yr

Degree Days: 5679

Solar Fraction: 24%

Auxiliary Heat: 4.72 BTU/DD/ft²

Passive Heating System(s): Sun-tempering, indirect gain

Recognition Factors: Collector(s): South-facing windows, 156 ft² **Absorber(s):** Glass tubes **Storage:** Water in glass tubes, concrete tube enclosures—**capacity:** 11,000 BTU/°F **Distribution:** Radiation, forced and natural convection **Controls:** Louvers, window shades, attic fan

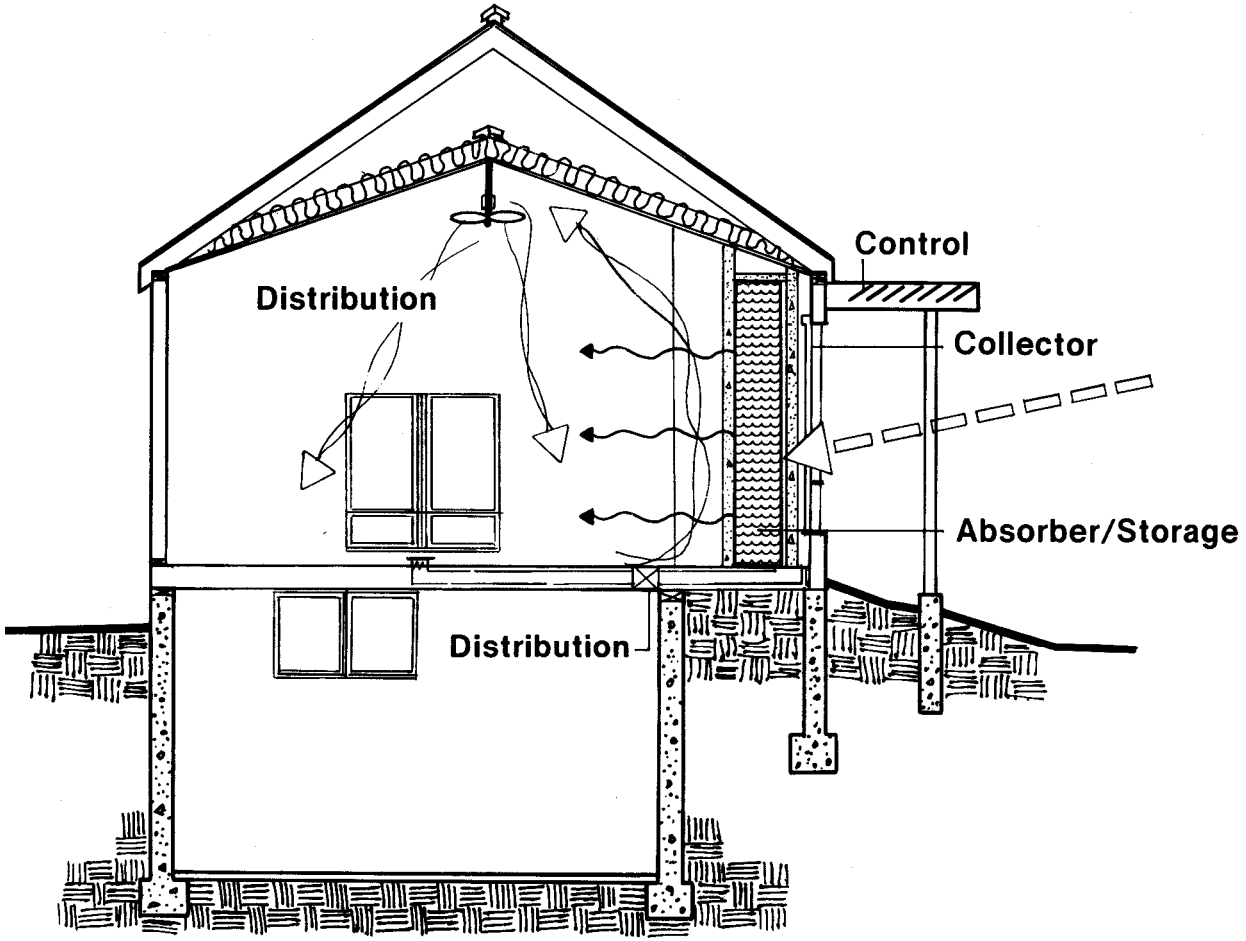
Back-up: 24,000 BTU/H electric air-to-air heat pump

Domestic Hot Water: 43 ft² air flat-plate collectors, air-to-water coil heat exchanger

Bedrooms in this compact 2-story house are located below grade, while the major living spaces are at grade. The garage is located to the north to block cold winter winds.

In winter, 40 percent of the collected sunlight passes through windows to warm the rooms directly. The rest is absorbed and stored by 14 water-filled tubes, located in pairs along the side of the house, just inside and at a 450 angle to the windows. Each pair of tubes is surrounded in back and on both sides by a plastered "u" shaped, 6-inch thick concrete wall, with a 6-inch air space between the tubes and back wall. Grille vents at the top and bottom of the wall allow convection. As the tubes radiate heat to the concrete for storage, convection currents carry heat from the tubes up the air space and distribute it into the living spaces. The concrete wall radiates heat to the spaces more gradually than the tubes would themselves. A ceiling fan circulates air as needed. There is also an attic fan to exhaust air in warm weather conditions. All windows are double glazed and have insulating shades (for a total of R15) to control night heat loss.

Total insulating value of the frame walls, with 31/2-inch glass fiber batts and 1-inch foam sheathing, is R-21, and with an additional 31/2-inch insulation at the stairs, wall insulation there is R-32. The roof, with 12inch batts, is R-41. Windows are minimal on the north, east, and west elevations. Additionally, a horizontal trellis extends out from the south wall; it has wood .slats built in at an angle to block high-altitude sun while permitting low-altitude sun to enter.



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