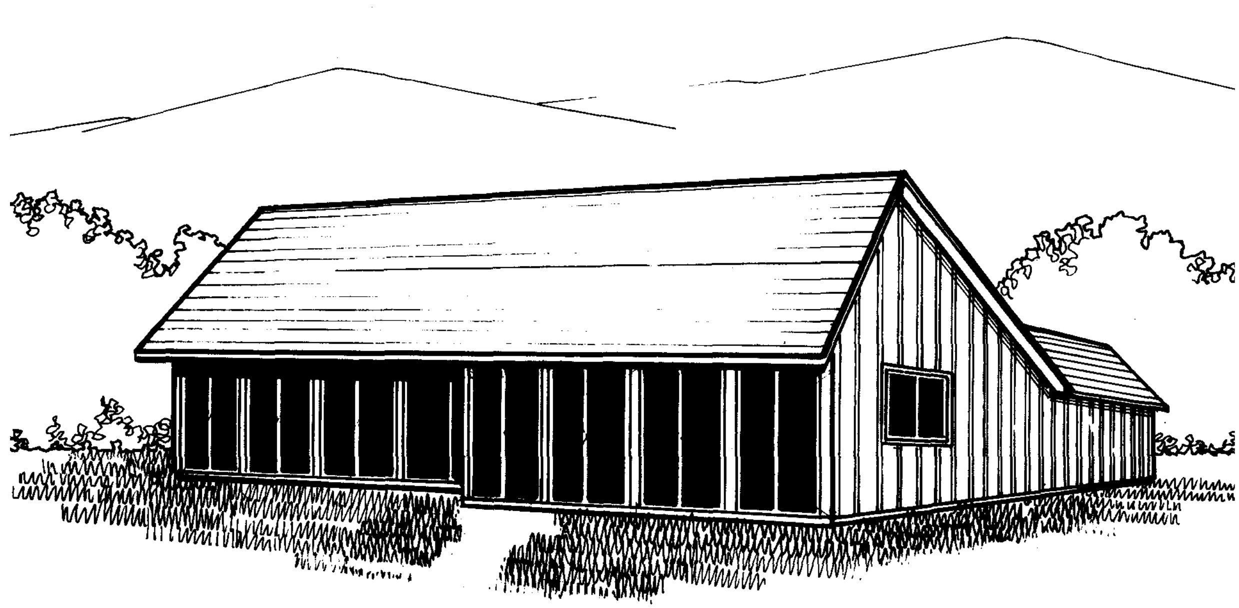
Charlotte, VT



Builder: Pierre Realty, Charlotte, VT

Designer: Aukerman Associates, Burlington, VT Solar

Designer: Harris Hyman and Aukerman Associates, Lamoine, ME

Price: $67,500

Net Heated Area: 1724 ft^2

Heat Load: 97.3 x 10^6 BTU /yr

Degree Days: 7876

Solar Fraction: 54%

Auxiliary Heat: 3.07 BTU / DD/ft^2

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

Recognition Factors: **Collector(s):** Double-glazed south wall, 443 ft^2 **Absorber(s):** Concrete mass and Trombe walls, greenhouse mass floor, living area mass floor **Storage:** Concrete mass and Trombe walls, greenhouse mass floor, living area mass floor-**capacity:** 35,711 BTU / $_o$F Distribution: Radiation, natural convection **Controls:** Manually operable doors, windows, Trombe and mass wall vents, insulating shades, ceiling vents

Back-up: Two wood burning stoves, electric resistance heaters

Domestic Hot Water: Passive preheat piping set into floor slab

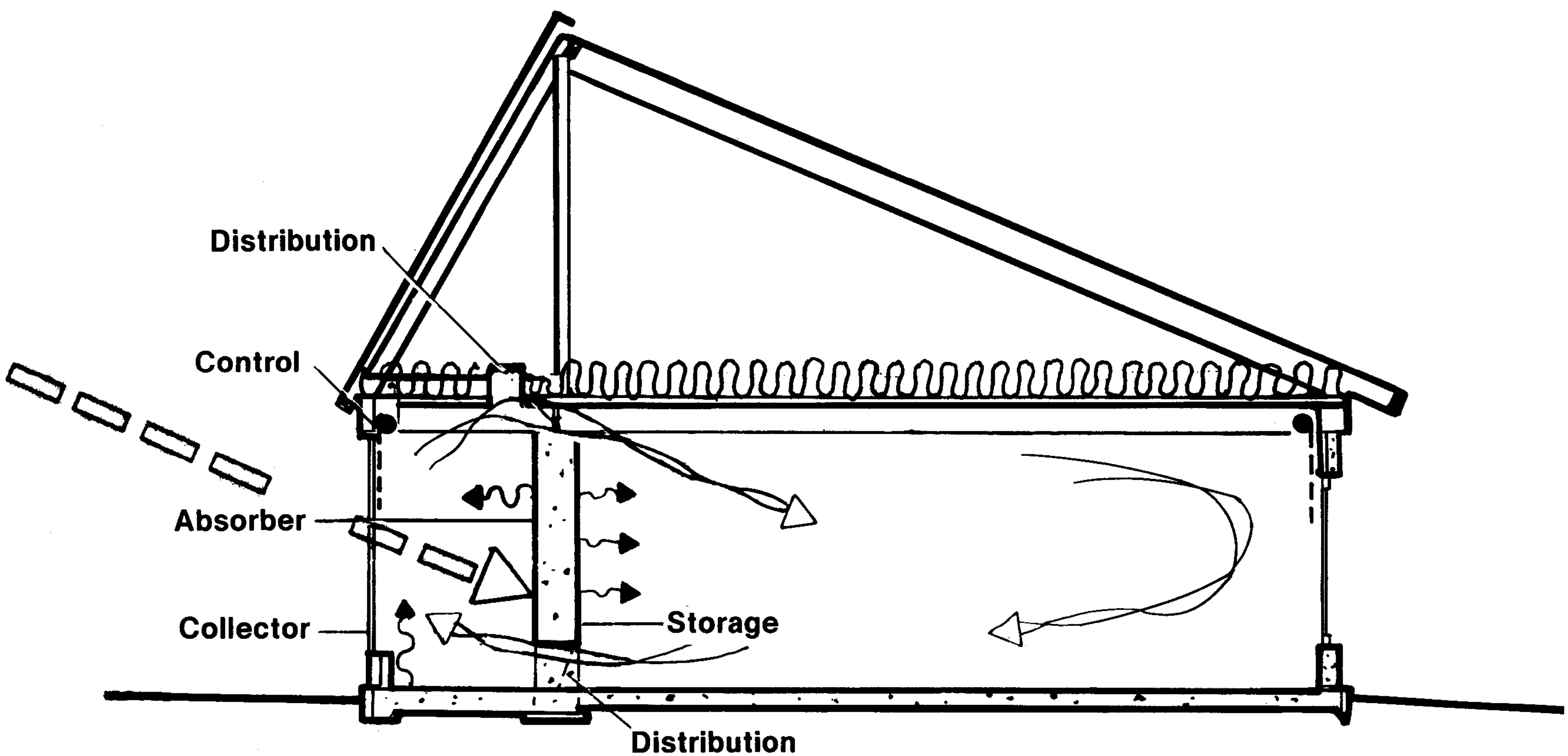
This Cape Cod style, single-story, 3bedroom home is located on a level, treeless lot in a 13-unit subdivision. Its energy-conserving features include: automatically operated insulating shades for the double-glazed, south-facing windows; the separation of living spaces from the north wall by a continuous hallway; the location of a buffer zone along the north wall; and wind protection provided by the garage.

The entire south wall of the house is in effect a double-glazed collector that includes a sliding door that opens into the living room. Living spaces are arranged along the east-west axis of the house, and, except for the living room, are separated from south facing fixed windows by mass storage walls. A narrow greenhouse occupies the space between the mass wall and glazing in front of the kitchen and dining room. The Trombe wall in front of the bedroom is separated from the glazing by a narrow maintenance space.

During winter days, solar radiation is absorbed and stored by the Trombe and mass storage walls and concrete floors; when bedroom doors and manually operated upper Trombe wall vents are opened, convective circulation distributes heat to the living spaces. At night, the mass walls and floors radiate stored heat into the interior. Closing shades, hall doors, and wall vents controls both radiant and convective heat losses.

Summer convective cooling is maximized by opening north windows, hall doors, ceiling vents above the Trombe and mass walls, and the floor-level return register at the base of the walls. The induced cross ventilation pulls cool air in through north windows and vents hot air out through the continuous ridge vent.

A passive domestic water preheat system is set into the concrete floor in the living room. The pipes rest in a bed of very fine granite chips between bricks just below the surface of the slab. The pipe system is covered with slate, and is expected to provide about 50 percent of the annual domestic hot water load.



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.