Design for Affordable Housing: Cost Effective/Energy Conserving Homes
Foreword

The most troublesome housing problem facing the American family today is affordability. One of the ways HUD is addressing this problem is through the "Joint Venture for Affordable Housing," a demonstration project that involves the housing industry, State and local governments and the Federal Government working in partnership to make housing more affordable. The "Joint Venture" has used streamlined regulations and processing procedures, carefully developed site plans, and cost saving construction technologies to build housing at lower cost.

Many of the techniques used have resulted from past research and demonstration projects, some of which also produced house plans. This catalog presents a range of designs that fit today's lifestyles, and help to make housing more affordable for all Americans. I am pleased to present it for your use.

Samuel M. Price, Jr.
Secretary
The plans in this catalog and the drawings available for sale were compiled by Steven Winter Associates, Inc., under contract to the U.S. Department of Housing and Urban Development, neither of whom warrants the accuracy, merchantability or fitness of these drawings and specifications. Users are cautioned that local site, code, climatic and seismic requirements may necessitate alternative designs or details.

Steven Winter
Alexander Grinnell
Susan Rothenberg
Steven Winter Associates
February, 1982
Introduction

The objective of this house plan catalog is to make available to builders, designers, and the general public "affordable" house plans and construction drawings that have been developed through federally funded research programs.

Ordering information for these House Plans can be found on the last page of this catalogue.

In the process of preparing this catalog, federal departments, government supported laboratories, independent establishments and government sponsored corporations were researched to obtain appropriate plans. In order for plans to be selected it was required that they be:

- Representative of small or efficiently designed houses.
- Cost-effective in detailing and construction methods.
- For construction with conventional materials.
- Energy efficient. The catalog was oriented primarily toward non-solar homes, although a number of houses which indicated optional passive and active solar technologies were included.
- Single family attached or detached houses.
- Representative of varying regional style preferences.
- Available with working drawings (a number of federally sponsored programs produced design proposals without construction details).

Not surprisingly, the federal departments that generated the most qualifying plans were respectively the Department of Housing and Urban Development (HUD) and the Department of Energy (DOE). Both departments have had an ongoing commitment to affordable, energy efficient housing. Some departments, such as the Department of Defense (DOD), have sponsored interesting and technologically innovative research test houses, but they are not included here as they are considered too specialized to be of broad interest.

Another federal department which for many years produced and disseminated house plans is the Department of Agriculture. Since these plans are oriented toward the rural homeowner and are publically available through the Farmer’s Home Administration Plan Service, they have not been included in this catalog.

For those interested in obtaining additional plans, other governmental plan services include:

- Tennessee Valley Authority
  Architectural Design Branch
  400 Commerce Ave.
  Knoxville, Tennessee 37902

- Appalachian Regional Commission
  1666 Connecticut Avenue
  Washington, DC 20235

- HUD USER
  P.O. Box 280
  Germantown, Maryland 20874

- Solar Energy Research Institute (SERI)
  1617 Cole Boulevard
  Golden, Colorado 80401

- State Energy Offices
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| C2 Cycle 2 Demonstration | Washington Natural Gas Company |
| C3 Brookhaven House | Total Environmental Action, Inc. |
| C4 Energy Efficient Residence II | NAHB Research Foundation, Inc. |
Purpose: To foster the use of innovative design, construction techniques and materials that would lead to marketable houses with reduced construction costs, low maintenance and energy conserving ideas.
The house illustrated is one of three minimal "starter" homes designed to be expandable by means of subsequent additions.

Construction drawings include plans for the three configurations: A. a one bedroom 16' x 20' module; B. a two bedroom 18' x 20' module; and C. a 20' x 20' three bedroom module.

Simple, basic framing and cost effective construction detailing have been specified with the intent that these houses could be owner-built. A pier foundation reduces the need for site excavation.
Purpose: To demonstrate to the nation's builders, developers and local public officials that land development and housing costs can be reduced, without a corresponding lowering of the quality of life.

Program: Approach '80
Contractor: National Association of Home Builders
Sponsor: NAHB, HUD

sq. ft.: 782
Compact and efficient, this two bedroom home was designed for zero lot line planning with an emphasis on privacy.

The living room and bedroom open onto a recessed deck, and serve to open the internal circulation to the outside while restricting the view from neighboring homes.

The construction drawings reflect current cost-effective framing practices, underfloor plenum heating/cooling systems, and pressure treated wood foundation techniques.
Purpose: To foster the use of innovative design, construction techniques and materials that would lead to marketable houses with reduced construction costs, low maintenance and energy conserving ideas.

Program: Building Value into Housing
Designer: Jane Galblum; Ed McGrath
Consultant, Fairbanks, Alaska
Contractor: Superinsulated Homes, Inc.
Sponsor: HUD

sq. ft.: 825
Designed for energy efficiency in an arctic climate, this house demonstrates the concept of superinsulation.

Superinsulation is a double-walled construction technique which allows for the installation of greater than normal amounts of insulation in the walls, ceilings, and floors.

The functionally well-defined living, dining and kitchen spaces are visually open and oriented to the south to take maximum advantage of solar gain. Small bedroom windows appear larger through the use of angled adjacent wall surfaces.
Purpose: To foster the use of innovative design, construction techniques and materials that would lead to marketable houses with reduced construction costs, low maintenance and energy conserving ideas.

Program: Building Value into Housing
Designers: Richard Larry Medlin, AIA, Tucson, Az.; William Wilde, FAIA, Tucson, Az., Consultant
Sponsor: HUD

sq. ft.: 840
The Medlin house is designed to interact with the seasonal and daily climatic variations of the arid southwest.

Sliding glass doors lead to shaded adjacent exterior patios, extending rooms outdoors. The sloped ceilings create natural convection currents of rising warm air, which are expelled in the summer and recirculated in the winter.

Modularized, this house is designed for quick on-site construction with steel-framed sandwich wall panels and a prefabricated utility core. This plan can be adapted to post and beam as well as to conventional wood framing.
A5/Optimum Value Engineered House

Program: Optimum Value Engineered House
Designer: NAHB Research Foundation, Inc., Washington, DC
Sponsor: HUD, NAHB Research

Purpose: To demonstrate the potential cost-savings of the design and construction concepts developed under the Optimum Value Engineered Building System research program.
The OVE house was designed as a small, basic home that would be economical to build and maintain.

Hallways are minimized by combination with living and dining/family rooms. A compact core backed up to the kitchen and bathroom provides significant cost savings over other plan arrangements.

The construction drawings illustrate the OVE building techniques, including 24" o.c. framing, single top plates, box beam headers, and 22½" windows to fit between studs.
Purpose: To foster the use of innovative design, construction techniques and materials that would lead to marketable houses with reduced construction costs, low maintenance and energy conserving ideas.

Program: Building Value into Housing
Sponsor: HUD

sq. ft.: 968
The two story plan is traditionally arranged with upper level bedrooms and lower level living/dining/kitchen spaces.

Passive solar concepts integrated into the house include mass walls and floors to retain solar heat, south-oriented glazing, and deep, shading overhangs.

This plan could be adapted to sloping sites; varying solar orientation requirements; house, garage and exterior finish styles; and single family, attached or multifamily configurations.
Sponsor: HUD

Purpose: To provide affordable, quality single family housing, incorporating a variety of innovative principles and techniques in the design.

Program: Approach '80

Designer: National Association of Home Builders, Washington, DC

Contractor: National Association of Home Builders, Washington, DC

sq. ft.: 1,000
Approach '80 II can be built either as an attached 1,400 sq. ft. split level house or as a 1,000 sq. ft. ranch.

The large living room allows for the elimination of corridors, and provides flexibility in furniture and spatial arrangements. This compact house is suitable for construction as a detached or attached residence.

Working drawings indicate in-line floor joists, a pressure treated wood foundation, and 24" o.c. framing on a 2'-0" planning module.
B2/Approach '80 III

Sponsor: HUD
Purpose: To provide affordable, quality single family housing, incorporating a variety of innovative principles and techniques in the design.

Program: Approach '80
Designer: National Association of Home Builders, Washington, DC
Contractor: National Association of Home Builders, Washington, DC

sq. ft.: 1,104
Compact and efficient, Approach '80 III is a modern two story house that reflects the increasing use of zero-lot line planning strategies.

This 1,104 sq. ft. house demonstrates economical design and construction practices including 24" o.c. planning modules with 24" o.c. stud spacing, a glue-nailed plywood floor system and in-line floor joists.

First floor
- dining
- kitchen
- garage
- living
- entry

Second floor
- bedroom
- bedroom
- bath

Elevations
- front
- side
- back
Mission Viejo, Ca.
Sponsor: DOE
Purpose: To design, construct, and test a compact house with minimum energy consumption requirements.

B3/Minimum Energy Dwelling

Program: Minimum Energy Dwelling
Designer: Southern California Gas Company
Contractor: Mission Viejo Company,

sq. ft.: 1,109

Mission Viejo, Ca.
Sponsor: DOE
Purpose: To design, construct, and test a compact house with minimum energy consumption requirements.
This southwest style house is characterized by deep porches, overhangs, a tile roof, and stuccoed walls.

The plan is oriented towards a patio lifestyle through the use of kitchen and bedroom sliding glass doors which open onto adjacent outdoor decks. These decks connect indoor and outdoor living spaces and increase the apparent size of the house.
B4/Cost Buster

Purpose: To demonstrate modern, economical construction, free from unnecessary codes and regulations.

Builder: Builders Research Foundation, Inc., Washington, DC

Program: Cost Buster

Contractor: National Association of Home Builders, Washington, DC; Dudley Smith, Builder

Sponsor: National Association of Home Builders

sq. ft.: 1,120
This compact, modularly planned ranch style house was designed as an affordable alternative to larger, conventionally built houses.

The construction drawings document the many innovative design and detailing features, including: 24" o.c. framing, prefabricated DWV plumbing trees, simplified construction details, and modularized windows.
B5/Energy Efficient Residence I

Program: Energy Efficient Residence I
Designer: NAHB Research Foundation, Inc., Washington, DC
Contractor: NAHB Research Foundation, Inc., Washington, DC

Sponsor: HUD
Purpose: To demonstrate and measure residential energy conservation potential and cost effective construction through the design and evaluation of a typical new, one-story home.

sq. ft.: 1,196
The first Energy Efficient Residence (EER I) was designed to maximize fuel savings and decrease construction costs in a plan adapted from a builder's best selling model.

The EER I combines a southern orientation and increased insulation with OVE (Optimum Value Engineering) construction techniques to produce a house proven more cost-effective to build and maintain than the original model.

Energy conserving plan features include an airlock vestibule entry and a family room which can be closed off to become a solarium.
Purpose: To foster the use of innovative design, construction techniques and materials that would lead to marketable houses with reduced construction costs, low maintenance and energy conserving ideas.

B6/Building Value Into Housing V

Program: Building Value into Housing
Designer: Jim Jamison, Valdosta, Ga.
Contractor: Minchew Homes Corporation, Valdosta, Ga.
Sponsor: HUD

sq. ft.: 1,312
Designed by a builder with a reputation for economical, efficient homes, the floor plan of this house is well organized with a minimum of wasted space.

It has been planned on a module for cost effectiveness in material usage, and simplicity of construction.

The house is designed to be constructed of many cost saving techniques including 2" x 6" framing @ 24" o.c., two stud corners, drywall clips, and itemized lumber and materials cutting lists. Exterior finishes and materials can easily be altered to provide for style preferences in different parts of the country.
Purpose: To design a zero lot line house for an urban corner site, incorporating the planning consideration of outdoor privacy and passive solar energy collection and storage.
Planned for high density land use, the coed walls and projecting wooden downspouts. Deep overhangs shade interior rooms during the summer, and allow solar penetration during the winter.

This passive solar house reflects an unconventional linear plan with all rooms oriented to a sunlit, mass wall corridor on one side and a courtyard on the other.

Floor plan

Elevations

Section
Sponsor: HUD

Purpose: To foster the use of innovative design, construction techniques and materials that would lead to marketable houses with reduced construction costs, low maintenance and energy conserving ideas.

Program: Building Value into Housing
Designers: Huth Westwood Builders and Environmental Design Alternatives - Architects, Akron, Oh.
Contractor: Huth Westwood Builders

sq. ft.: 1,504

B8/Building Value Into Housing VI
The bi-level Huth Westwood house is organized around a mid-level, double height sunspace which serves as an airlock entry, a sitting area and a solar heat collector.

The sunspace also provides light and a visual focus for the upper level living room.

This house is designed on a 2 foot module for conventional or panelized construction, and is detailed with an all-weather wood foundation and other cost savings features.

First floor

![First floor plan]

Elevations

![Elevations south, west, north]

Second floor

![Second floor plan]

Section

![Section diagram]
B9/Cycle 4 Demonstration

Contractor: Winrock Homes, Inc.
Sponsor: HUD
Purpose: To demonstrate the incorporation of passive solar technology into a contemporary style house which has a popular floor plan.

Program: Cycle 4 HUD Solar Heating and Cooling Demonstration

sq. ft.: 1,515

South (rear) view
A contemporary style house with a modern, open plan, the Winrock Homes house was designed to maximize winter solar gain through windows and doors.

The kitchen living/dining room is oriented to the south and adjoins an outdoor deck or optional greenhouse. Night insulation and summer shading is provided for all south-facing windows through the use of sliding pocket window shutters in the south wall.
B10/Tennessee Valley Authority I

Sponsor: Tennessee Valley Authority

Purpose: To encourage the development of solar assisted housing in the Tennessee Valley

Program: Solar Homes for the Valley

Designer: TVA Solar Applications Branch, Architectural Design Branch

sq. ft.: 1,578

South (rear) view
A traditional saltbox on the exterior, the TVA I has a contemporary interior and plan.

The interior rooms orient to a south-facing great room, which combines the traditional dining, living and family rooms into one multipurpose space. Full height south facing windows allow for maximum solar radiation on the water drums, concrete floor and mass wall, which act as thermal storage. Natural convection in the double height great room carries warm air to upstairs bedrooms.
B11/Tennessee Valley Authority II

Sponsor: Tennessee Valley Authority
Program: Solar Homes for the Valley
Purpose: To encourage the development of solar assisted housing in the Tennessee Valley

Designer: TVA Solar Applications Branch, Architectural Design Branch

sq. ft.: 1,664

This page contains information about a solar-assisted housing project sponsored by the Tennessee Valley Authority. The purpose of the program is to encourage the development of solar-assisted housing in the Tennessee Valley. The designer is the TVA Solar Applications Branch, Architectural Design Branch.
Designed for construction on a south-facing sloping site, this two-level TVA home is a split one story plan.

The lower level double height "great room" serves as a living room, while accommodating the multipurpose family room functions as well. Both the great room and adjacent kitchen are located between thermal mass walls, which absorb daytime solar heat for nighttime radiant warmth. Skylights above the great room provide a window for views to the south from the 2nd floor open hallway.
B12/Tennessee Valley Authority III

Square footage: 1,824
Program: Solar Homes for the Valley
Designer: TVA Solar Applications Branch, Architectural Design Branch

Sponsor: Tennessee Valley Authority
Purpose: To encourage the development of solar assisted housing in the Tennessee Valley

South (rear) view
TVA III is a contemporary split-level home with modern, spacious room arrangements.

The first floor features a large kitchen/dining room overlooking a sunken living room. The second floor plan includes two full baths and two bedrooms; the third bedroom is above the garage on the intermediate level. All rooms are oriented toward the south for energy efficiency, natural lighting and solar assisted heating. Optional water storage tubes can be used for solar heat retention and night reradiation.
**C1/Denver Metro Program II**

*Sponsor:* Solar Energy Research Institute

*Purpose:* To encourage the construction of energy conserving, passive solar and active solar homes in the Metropolitan Denver area.

*sq. ft.:* 2,200

*Program:* Denver Metro Program

*Designer:* Rudolph B. Lobato Associates, Longmont, CO

*Contractor:* Heritage Construction and Management Inc.

*South (rear) view*
Designed to take maximum advantage of available solar energy, the Heritage One house combines many techniques of solar design.

The south elevation has an optional trombe wall and a two story greenhouse. Other optional solar technologies include a rock storage bed, underslab hot air ducts, hot tub solar collectors and a greenhouse waterwall.

The waterwall, vertical mass wall and water storage tubes are centrally located allowing adjacent living spaces to realize full benefit of stored solar energy.
C2/Cycle 2 Demonstration

Sponsor: HUD
Purpose: To establish solar energy as a usable energy alternative, and to encourage the use of solar energy by the designer, the builder and the consumer in residential applications.

Program: Cycle 2 HUD Solar Heating and Cooling Demonstration
Designer: The Mithune Associates,
Seattle, Wa.
Contractor: Washington Natural Gas Co.

sq. ft.: 2,607

South (rear) view
Dramatic in both plan and elevation, the Washington Natural Gas house features flowing spaces, angled walls and south-facing balconies.

On the first floor a curved freestanding cabinet acts as both a room divider and a multi-purpose storage unit. The unusually shaped rooms and curved stairwell accent the contemporary styling.

The house is designed with an angled solar collector wall which supplies hot air to the basement rock storage bin.
C3/Brookhaven House

Program: National Thermal Storage Research Project
Designer: Total Environmental Action, Inc., Harrisville, NH
Sponsor: Department of Energy and

Brookhaven National Laboratory
Purpose: To demonstrate how thermal mass materials can be used to cut heating costs in conventional single family housing.

sq. ft.: 3,022

South view
The Brookhaven house blends traditional architectural styling with passive solar detailing and an open floor plan to provide for a contemporary lifestyle.

The gabled roofs, arched fan window, use of porches, and the centrally organized kitchen all reflect historic precedents. The optional south facing sunspace provides a "conservatory" link between dining and living rooms, and acts as a passive solar collector.
Sponsor: HUD
Purpose: To demonstrate and measure residential energy conservation potential and cost effective construction through the design and evaluation of a typical, new, two-story home.

C4/Energy Efficient Residence II

Program: Energy Efficient Residence II
Designer: NAHB Research Foundation, Inc., Washington, DC
Contractor: NAHB Research Foundation, Inc., Washington, DC

sq. ft.: 3,052

South (rear) view
The second Energy Efficient Residence (EER II) is a two story house, designed to demonstrate energy conserving detailing and (OVE) Optimum Value Engineering construction techniques.

This contemporary styled house is divided into an upper level living room and master bedroom and lower level secondary bedrooms/guest rooms oriented around a family room.

The solarium additions to the living room and family room act as solar collectors. Other energy conserving features include an optional rock storage bed to store solar heat gain, and a partially bermed lower level.

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Elevations

Second floor

- balcony
- solarium
- master bedroom
- living
- dining
- kitchen
- entry
- bath
- garage

First floor

- bedroom
- family
- bedroom
Ordering Information.

To purchase House Plans call or write: HUD USER
P.O. Box 208
Germantown, MD 20874
(301) 251-5154

All orders must be prepaid by check, money order, deposit account, or VISA or MasterCard.

HUD USER is a national information service sponsored by the U.S. Department of Housing and Urban Development.

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Send House Plans to:

name

address

city state zip

program code(s)

total cost

enclosed

☐ Check
☐ Money order

account no. exp. date

account no. exp. date

signature

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