

Casa Verde Builders Energy- and Resource-Efficient, Affordable Homes

Casa Verde Builders is a program of the American Institute for Learning, a non-profit corporation in Austin, Texas, that has been providing alternative educational services to young people for more than 20 years.



Average electricity costs of a Casa Verde home are generally 50 percent lower than the control group and natural gas consumption has been reduced by 10 percent.

In 1992, the City of Austin's Green Building Program needed a builder to build a model energy- and resource-efficient home. This was a requirement of the grant that was used to establish the Green Building Program. After several months of discussions with various community groups, a partnership was formed among the Green Building Program, Austin Habitat for Humanity, and the American Institute for Learning. The Green Building Program would provide technical support for the project. Habitat for Humanity would provide the lot for the project, sell the finished home to one of the families on its waiting list, and provide volunteer labor for some phases of the project. American Institute for Learning would set up a program with staff and students from their alternative school to build the home.

Within a few months a floor plan had been developed, funds and materials for construction promised, and two staff members and eight students selected for the

project. Construction began on August 13, 1993.

The initial home featured FasWall insulated wall forms for the exterior wall system, metal studs for the interior walls, galvalume roofing with a ridge-and-soffit venting system, gas combo or hydronic heating system, a whole house fan, and a covered porch facing west. The flooring was scored and stained concrete in the public rooms, recycled content carpet in the bedrooms, and linoleum counter tops and flooring in the kitchen. All landscaping was done to xeriscape principles.



Hardipanel® siding resists pests and rot and holds paint longer than most other siding products.

Currently, most of the homes built by Casa Verde are three bedroom, two bath, approximately 1200 sq. ft. single family homes. These homes are built using Structural Insulated Panels (SIPs) for the exterior wall systems. The panels provide a very rigid structure with continuous R-16 insulation unbroken by studs. For the Austin climate this level of insulation is more than adequate and the panels provide an envelope with less air infiltration than standard stud walls. The exterior cladding is usually Hardipanel® or Hardiplank® siding. The Hardie® products are very

resistant to pests and rot. They also hold paint longer than most other siding products. This reduces costly maintenance and repairs for the low income families that buy these homes.

The interior non load bearing walls are made of Stramit Enviropanel when this product is available. Stramit is currently imported from Germany while waiting for U.S. plants to go on line. Stramit panels are made of compressed wheat straw and covered with drywall paper. Using the Stramit panels reduces labor by eliminating framing, insulating, and installing drywall on interior walls and replacing these three steps with the single process of installing the Stramit panels. Because the panels are only 2¼ inches thick, rather than the 4½ of stick framed walls, they allow for more interior space. Wet walls are built with metal studs in the traditional manner. Using these products reduces Casa Verde's use of dimensional lumber, thereby reducing the need to harvest mature trees.

To avoid heat build up in the attic, Casa Verde uses galvanized metal roofing systems. These roofs reflect heat and have less mass to store the heat they do collect. When combined with a ridge-and-soffit venting system, they reduce the attic temperature by 20-30 degrees on hot summer days. These roofs will last 30-40 years with little or no maintenance. To prevent the heat that does build up in the attics from penetrating into the conditioned spaces, Casa Verde installs an R-30, 10 inch layer of blown cellulose insulation above the ceiling. In addition to the thermal benefits that reduce the operating costs of the homes, these roofs are made of steel, the most recycled material commonly used in construction. The primary material used in making the cellulose insulation is recycled newsprint, again reducing the need to use virgin raw materials in the construction process.

To complete the thermal package, Casa Verde installs a 14 SEER air conditioning unit with a high efficiency gas furnace. Casa Verde also installs ceiling fans in all major rooms and a whole house fan for use in mild weather. Finally, most of the rooms are designed to have windows on at least two walls to provide cross ventilation.

The design of the homes addresses the issues of providing comfortable living space for families in a small home, energy efficiency and community-building. The front porches provide shade for the walls and windows from the overpowering summer sun while also providing additional living space where the families can get to know their neighbors and keep track of neighborhood activities.

To provide the best possible indoor air quality Casa Verde builds their own cabinets using formaldehyde free Medium Density Fiberboard (MDF). All paints used in the homes are low Volatile Organic Compound (VOC) content paints. Low VOC paints are those having less than 150 grams per liter VOC's. Casa Verde uses a 100 percent recycled PET carpet and recycled carpet pads to further reduce off-gassing and to reduce the use of virgin raw materials. All adhesives used in the installation of the carpets, pads and sheet vinyl flooring contain no VOC's.

The City of Austin has been tracking utility costs for a sampling of the Casa Verde homes and comparing them with other comparable homes in Austin since 1994. Average electricity costs of a Casa Verde home are generally 50 percent lower than the control group and natural gas consumption has been reduced by 10 percent.

Project Description

YouthBuild / AmeriCorps low income, energy and resource efficient infill housing project
 Parent Organization: American Institute for Learning
 Architect: Gayle Borst, Stewardship, Inc.
 Builder: Casa Verde Builders
 Location: Austin, Texas
 Size: 3 bedroom, 2 bath, 1200 sq. ft. single family detached.
 Heating Degree Days: 1737
 Cooling Degree Days: 2907
 Average Appraised Value (Sales Price): \$71,500

Financing

City of Austin:
 Capital Recovery Fee Waivers, Property Acquisition, Construction Soft Costs through forgivable second mortgage, Down Payment Assistance

Training Labor:
 HUD Youthbuild, AmeriCorps and City of Austin

Bank Financing:
 Materials and Subcontractors

Energy Efficiency Features

- 14 SEER central air conditioner
- Programmable thermostat
- Whole house fan
- Ceiling fans in main rooms
- Continuous ridge and soffit venting
- 2 foot overhangs sized to provide shade
- Cross ventilation
- Existing vegetation retained
- Galvalume metal roof
- Designed daylighting
- Large covered porch
- Structural Insulated Panel (SIP) exterior wall systems
- Double paned windows w/solar screens

Recycled Content Materials

- Carpeting - 100% recycled PET bottles
- *Stramit* compressed straw panels
- Metal interior framing
- Galvalume metal roofing
- *Old Paint* primer (100% recycled paint)
- *Choice Deck* porch decking (100% recycled composite lumber)
- Cellulose insulation (100% recycled newsprint)
- High fly ash content concrete

Indoor Air Quality Features

- Low VOC paints and adhesives (less than 150 grams per liter)
- *Medite* formaldehyde-free MDF cabinets
- Pleated media HVAC filters

Engineered Materials

- Manufactured lumber floor I-joists
- Laminated veneer lumber rim joists and beams
- Manufactured roof trusses
- OSB *Sturdi-Floor* decking
- *Hardi*® siding and trim products