ECO-HOME™ NETWORK MEMBER OPEN HOUSE

1329 SOUTH 8TH AVENUE, ARCADIA, CALIFORNIA

SUNDAY, FEBRUARY 22ND, 2004 · 1 - 4 PM
E-HN MEMBERS - FREE · GUESTS - $5 PER PERSON

HOUSE FOR THE EARTH

Eco-Home™ Network is honored to have been invited to visit an "eco-star" rising in Arcadia, in the San Gabriel Valley of Los Angeles County, that is a showcase of imaginative, resource-conserving design techniques and high-tech "green" technology, infused with the architectural wisdom of the ages.

Owner/architect/builder, Dr. Edward Huang, a Senior Planner with the Los Angeles Community Redevelopment Agency and a former Planning Commissioner with the City of Arcadia, explained that he designed his family's new two-story, 5,200 square foot house to be more than a home. "Striving for a demonstrative green building, my house incorporates various conventional and advanced building systems and products, and possesses several unique innovations with general applicability," Ed Huang says of his environmental dream house.

Viewed from the street, Huang's paragon of green building appears to be an elegant example of traditional Mediterranean-style architecture complimented by a gracious, centuries old oak tree located on the northerly property line. Ed and his wife, Caroline, a real estate broker, recognize the oak as the most significant natural resource on the site and the need for integrating the oak with the new house. They have created an innovative design to honor, preserve and appreciate the venerable tree.

At the heart of Huang's home is an open-air courtyard that acts as a whole-house wind scoop that captures the northwesterly prevailing breeze, a cool air supply to the house. Around the central court, the building is basically one room deep, without many interior walls to block natural ventilation and light.

A fence made of living bamboo along the property line was restored, and additional bamboo, saved from other construction sites, have been planted in the courts to further cool the spaces and release oxygen to the house.

Huang's emphasis on natural ventilation — and the complementary designed-in effects of thermal convection and thermal mass — is present in every part of the house and in the house as a whole.

A thermosiphon tower adjacent to the central court utilizes air's stacking effect to release heat from the home's interior to the exterior through vents around the tower, siphoning in the cooler "exterior" air from the courtyard below.

To further enhance the natural ventilation and at the same time minimize western exposure to the sun, the rear facade of the house, facing west, features a "staggered" recession from northwest. The recession provides not only "wind walls" to capture the northwesterly prevailing breeze but also vertical shading from the afternoon sun.

A variety of passive solar design techniques use the sun's insolation where solar energy input is beneficial and deflect it where it's not wanted. Patios, porches, arches and balconies on the east and west — front and rear — facades not only add architectural interest but also block direct sunlight from entering the house. Major spaces such as living room, dining room and kitchen are placed along the south wing with large south-facing windows to invite view and light. The depth of eave overhangs and the height of window sills along the south facade are calculated to admit low-angled winter sun and block the high-angled rays of the summer sun.

Located at the southwest corner of the house, where it receives maximum sun exposure, is a greenhouse outfitted with GE thermoplastic glazing and aninsulated concrete foundation. The greenhouse serves as a heat source for the

Entryway

house in the winter. In the summer its heat is kept out of the house and vented out by several GAF regular and automatic open/close foundation vents, a power vent and a ODL skylight. The wash water from greenhouse sink will be directed to irrigate the planting beds.

Two patios, one covered and the other with a trellis, shade the west side of the house. The covered patio has an outdoor kitchen and other outdoor living amenities, to keep cooking heat and people outside during warm weather. Similarly, the central court is served by a wet bar and sound systems. Designed with the courtyards and patios, "my home is a Mediterranean house for a Mediterranean lifestyle," Ed Huang avers. "A house is more than just a physical object. It's not just an architectural style and layout, but also a lifestyle layout, a way of life."

Outdoor Kitchen

The exterior walls are white to maximize reflectance of solar heat. Light instead of dark colors increase the solar reflectance of the Energy Star-labeled MonierLifeTile's concrete roof tiles. S-tile instead of flat tile is used to enhance ambient air circulation below as well as above the tiles.

Solar-thermal and solar-photovoltaic technology puts the sun to work year-round for the house. An 80-gallon SunEarth Copper Heart solar water heating system occupies a portion of the southwest upper roof, the hottest spot of the structure. The solar hot water system is integrated for maximum efficiency with a Controlled Energy Corporation's Aqua Star wall-mounted tankless gas water heater. The solar system preheats the water running through the tankless unit to reduce gas consumption. The gas heater provides instantaneous hot water while saving both water and energy, since it doesn't maintain a tank of hot water inside the house that is subject to standby heat losses, and eliminates the double energy loss of competing with interior air conditioning in the summer.

Courtyard from Second Floor

Perfect Electrical installed a two-kilowatt Siemens Earth-Safe solar-photovoltaic (PV) system — complete with a rooftop sprinkler system to keep the solar panels clean and maximize green power production – which will supply at least half of the home's electricity (and, in the future, power for an electric vehicle charging station which is being pre-wired in the garage).

To cover the few days a year when the house needs mechanical heating, ventilation or air conditioning, T & L A/C Inc. designed and installed an efficient 2-zone system: a 5-ton unit serves all the spaces mainly used in daytime and a 3-ton unit, the bedrooms.

A Lennox's Elite direct-vent gas fireplace/heater, located at the north end of the two-story family room, comes into play during cool weather. The chimney vent pipe comprises a two-in-one pair of pipes: cooler winter outdoor air is brought in through an inner pipe, and is heated by the warm exhaust air exiting the fireplace through a surrounding outer pipe — quite unlike the standard fireplace and chimney, which just vents warm indoor air. "This is a less expensive but more efficient way to make a fireplace," Ed says.

The house is built with a tight envelope: it utilizes Owens Corning's enhanced fiberglass insulation in the exterior walls, underfloors, and attics, including 8-1/4 inch R-30C on all cathedral ceilings, and QuietZone acoustic batts in interior walls.

Environmentally friendly, energy/water saving appliances and fixtures have been selected, including: Hayden Industrials' Super central vacuum system with a washable filter; Kohler's 1-piece toilets; ETI's floor warming system; and Energy Star labeled clothes washer and dryer (Maytag's Neptune), ceiling fans (Builder's Best); compact and T-8 fluorescent lamps.

Thermosiphon Tower

The house is built with a consciousness of resource conservation. Wood waste products such as engineered truss joists, oriented strand board and Medium Density board are used for, respectively, floor/ceiling structure, roof/wall sheathing, shelving and molding. Used doors, hardware, bricks, pavers, even trees and shrubs on this site and other nearby job sites were salvaged and reused. Construction wastes, including lumber and tiles have been minimized though reuse and recycling wherever possible, completing the picture of building the home for living in alignment with the earth's life support systems.

"I'd like to have the opportunity to clone this house design, to reproduce it elsewhere, and spread the benefits of this design to other residents and to the environment," Ed Huang reflects as he surveys what he has wrought. "I've designed this house not just for myself and my family — but for the earth."

Join other Eco-Home™ Network members here on February 22nd to experience Dr. Huang's "house for the earth".

Adapted from an article by Greg Wright in HVACR News, June 2003. All Photos by Jan Hoag.

Directions : Take Freeway 10, exit at Santa Anita Ave., head north, turn right on Camino Real Ave. and left on 8th Ave. Or, take Freeway 210, exit at Santa Anita, head south, turn left at Durate Rd, right on 8th. Inquiries about this house can be directed to Ed Huang at ehuang@cra.lacity.org or by telephone to (213) 977-1785.