

## **The Ranch House at Del Sur: Sustainable Design, Construction and Living**

### **General site features supporting sustainable development,**

The facility has a 5.7 kilowatt DC roof integrated solar electric system and uses high efficiency solar cells. The solar arrays are located on the south and west facing roofs and help reduce peak energy loads for the building. The system will produce 8,541 kilowatt-hours of clean renewable electricity every year. At a rate of 15 cents per kilowatt hour, savings would exceed \$1,281 per year.

Since July 2006 through January 2007, the solar system produced more than 6915 kilowatt-hours of clean renewable electricity. According to the EPA, the environmental benefits of using solar electricity versus the burning of non-renewable conventional fuels has reduced harmful air emissions the equivalent of planting of 49 mature trees, or not driving 5,472 miles.

Nearly 54 percent of the facility's site was restored with drought-tolerant and native landscaping. The site was previously used as farmland without any hardscape surfaces. The project added hardscape features but compensated for their increased storm-water runoff by using pervious concrete pavement and diverting much of the runoff to a filtration system located on site. This system removes more than 80 percent of suspended solids from storm water before it starts infiltrating into the ground. Irrigation water will be reduced by more than 70 percent based on a typical landscape design with about 15 percent of the planting as turf grasses. Water used for irrigation will be from municipally supplied reclaimed water. Weather-based, satellite irrigation technology matches watering times to the needs of individual plant types and local weather conditions.

The building was oriented so all regularly occupied rooms allow use of natural daylight for lighting and to capture cooling ocean breezes. Overall, more than 80 percent of the facility's spaces have enough daylight available to allow them to be used as regular work areas. The facility generates electricity from a rooftop-integrated, photovoltaic solar electric system.

An indoor air sensor monitors carbon dioxide, temperature, humidity and volatile organics in real time for information to be viewed over the Internet; trends are cited and any necessary actions are then taken.

### **Recycling procedures**

Over 90 percent of waste materials generated during construction were diverted from landfills. The majority—concrete, lumber, paper, plastic, glass and cardboard—were handled at a nearby waste management facility built by the developer. Concrete and lumber were ground up on the nominated building's site and used for a variety of purposes, such as mulch, soil additive. Stones reclaimed from the site were used as building materials for the facility.

### **Energy efficiency**

An energy-efficient heating and cooling system is installed in the building and only energy-saving appliances are used. Energy loss is greatly reduced through the use of air-tight ductwork, low-emission windows, fluorescent lighting and deep eaves.

Based on LEED energy cost calculations, which exclude office equipment energy use, the facility's energy use will be reduced by 45 percent. Additionally, the integrated rooftop photovoltaic system supplies more than one-third of the energy used by the building. Including the solar system, the overall energy cost savings for the facility are nearly 65 percent.

### **Water conservation**

All plumbing fixtures—lavatories, sinks, toilets and showers—were selected to reduce water use by more than 40 percent compared to a standard design. Water waste is significantly curtailed by use of dual-flush toilets, a tankless water heater, the previously mentioned 54 percent drought-resistant landscaping and the facility's weather-based irrigation system.

### **Special materials used in construction**

Reused Building Materials: Nearly 30 percent of LEED-based building materials were reused timbers. Nearly 50 percent of these materials were large timbers reclaimed from a public dock built in the early 1900s. Nearly 20 percent of these materials were planks reclaimed from a barn built in the 1880s. The remaining 30 percent of these materials were stones reclaimed from the development site that were used as stonework, with minimal processing, for an entry wall, a fireplace and site landscape walls.

Recycled Content Building Materials: Nearly 12 percent of LEED-based building materials were made from recycled products, such as sunflower boards, wheat boards, cotton insulation, terra cotta ceramic tile and cork. The 12 percent is based on all of the LEED-based building materials, including the 30 percent of reused building materials that are not counted by LEED as recycled content.

Local Building Materials: More than 72 percent of LEED-based building materials were manufactured by local suppliers and nearly 23 percent of LEED-based building materials had their raw materials obtained within 500 air miles of the facility.

Rapidly Renewable Building Materials: More than 6 percent of LEED-based building materials were made from such rapidly renewable materials as cotton, sunflower seed husks, wheat straw and cork. These materials have less than a 10-year re-growth cycle, as required by LEED.

Low-Emitting Building Materials: Low-toxic materials were used in construction of the building. These included adhesives, sealants, paints, primers and carpeting. Composite boards, such as plywood, were selected to not use urea-formaldehyde based resins when manufactured.

**Education & Awards**

A comprehensive education program has been instituted by the developer to educate visitors to the facility on its many environment-friendly building practices and sustainability features. Targeted audiences include prospective home buyers, industry groups and environmental advocacy organizations, civic leaders and influence-shapers, students and the general public. The facility is actively promoted as a resource showcase open to the public to encourage them to learn about—and commit to—environmental stewardship.

Notable awards for the developer and the project include the city's Recycler of the Year Award; 2006 Smart Growth Project of the Year from the local chapter of the Urban Land Institute, 2006 Earth Award from a local environmental organization; the state landscaping association's [State]-Friendly Construction Award and the Sustainable Community of the Year from the regional building industry association.