

Santa Clara University

Santa Clara University's Solar Decathlon home—the Ripple home—is designed to educate and encourage the widespread adoption of sustainability and solar energy through the “ripple effect” of education. The Santa Clara home embodies the unique spirit of California—its historical missions and fresh outdoorsy spirit—while implementing state-of-the-art photovoltaic and thermal systems and still maintaining the look and feel of a traditional home. The team is building a house of the future to live in today.

What's Different?

- The home features bamboo I-joists developed onsite—the first of their kind in the nation. Bamboo, a fast-growing grass, is a sustainable resource because it retains its root structure after harvest and renews itself in 5–7 years, compared to the 30–50 years needed for hardwood trees.
- The integrated-controls system manages appliances, lighting, heating/ventilation/air-conditioning, and the electrochromic window film through one graphical user interface that is accessible by computer or cell phone. Through this system, the user can remotely turn off lights, appliances, etc.

Architecture, Interior Comfort

- An 8-foot-wide NanaWall made of highly insulating glass lets in light without unfavorable heat gain or loss and can be fully retracted.
- Paints that are low in volatile organic compounds were used in the interior, and formaldehyde-free glues were used for cabinets and furniture, creating an indoor environment that is both beautiful and healthy.
- A 1,200-square-foot deck surrounds the Santa Clara home, extending the living space.

Heating and Cooling Systems

- A high-capacity thermal system ensures high thermal storage capacity.
- An absorption chiller generates solar-powered air-conditioning with hot water from flat-plate thermal collectors.

Lighting (including Daylighting)

- Dimmable fluorescent lighting is used throughout the living room and bedroom.
- The photovoltaic panels on the south module act as passive solar shades that shade windows in the hottest part of summer.
- Electrochromic film (which can be lightened or darkened electronically) is used on the sunny-side windows, enabling either automatic or manual control of light and heat admission into the house.

PV and Solar Thermal

- The Santa Clara home is powered by the highest-efficiency PV panels available on the market: SunPower SPR 215 modules. The system is rated at 7.4 kW.
- A hybrid inverter system allows for grid-tie and battery backup.
- Flat-plate thermal collectors power solar air-conditioning without the use of electricity.

Communications

- To foster education about sustainability, the team developed a 3-month outreach program that challenged local high schools to compete against one another to do the best job of "greening" their campuses.
- The Santa Clara team has contributed to a multitude of Silicon Valley clean technologies and to sustainability events and groups.

Budget

- Total budget cost is \$550,636, including building costs and housing and transportation for the team in Washington, D.C.
- The competition house cost \$299,000, while a marketable prototype is estimated to cost \$240,000.

Future Plans

- The home will return to the Santa Clara University campus and serve as a test bed for sustainable engineering studies. It will also be open for public tours and act as a “demonstration building” for local sustainable building efforts.

Kid's Corner

- The bathroom is tiled with recycled Coke bottles.

Team Information

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