



Cal Poly's goal is to create a beautifully concise home tuned to the climate, detailed for modern living, proportioned and sized to travel across the country pulled by a single truck; to reduce our household's footprint on the land and make the most effective use of space and resources. Simple. Fundamental. Elegant.

Architecture

Firmitas. Utilitas. Venustas.
Firmness. Commodity. Delight.

The Solar CalPoly team conceived of overlapping goals relating to “firmness.” The team was determined not only to produce a distinguished Solar Decathlon entry, but to also develop this project for use as a potential demonstration/learning tool for raising public awareness about critical issues of environmental responsibility and energy conservation in the state of California. Thus the project has merit not only as a physical artifact but it also symbolically represents some of the social, political, and ecological ideals of the team.

Transportation across the country and set-up time in Washington D.C. were major design drivers for the Solar CalPoly team. Because the house had the longest land mass travel distance of any of the 2005 Solar Decathlon entries in order to get to the National Mall and because of our desire to minimize our use of fossil fuel, the team agreed on a “one truck” solution. The result was the design of a simple, straightforward architectural volume which could be pulled by a single semi tractor/trailer. The team used pre-fab construction not only to minimize construction logistics on the Mall, but also because Solar CalPoly’s pre-fab prototype could serve as a useful example of alternative housing, particularly in the state of California.

The materials palette of the Solar CalPoly dwelling supports the project’s underlying theme: simple, fundamental, elegant. The team chose “longevity” as a material characteristic for the predominant finish material on the exterior and interior of the project. “Trespa” is a wood fiber, paper and resin based composite wall panel system. The choice of this material met our team’s environmental, aesthetic, and practical goals (it contains recycled materials, requires minimal maintenance, and will withstand the elements; it supports the project’s contemporary sensibility; and it is designed to withstand the stresses of a 4,788 mile roundtrip road journey). On the exterior, the three-color scheme was conceived to communicate the internal spatial uses, from hot to warm to cool (from “hearth” kitchen to daily living to support/comfort systems, moving from east to west). The additional screen on the “hearth” kitchen section also connects this project to its point of origin: California. We used the redwood screen not only as a textural expression for this essential section of the dwelling but also to showcase a thoughtful use of a sustainably harvested native material. On the interior, the dominance of light colored finishes are intended to elicit an expansive feeling in a necessarily economical space. A fluid inside/outside relationship is integral to the project, with sliding doors, consciously placed windows (for light, air, and view), ample decks, and a supplemental roof deck. The supporting interior finishes were also chosen for their environmental properties, longevity, and contemporary design aesthetic (bamboo flooring, Richlite countertops, contemporary cabinetry and furnishings, certified organic textiles). The architectural lighting is designed to be efficient, effective, and non-intrusive: ambient luminescence with a touch of focal glow.

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Simplicity and sufficiency were guiding design principles for the Solar CalPoly project. From the project's inception, the students' design proposals for the house were modestly sized, challenging contemporary residential trends. The resulting design is 650 square feet of conditioned living space, thoughtfully designed and detailed to house two individuals. The team strove to design the house from the inside-out with the same care as designing a sail boat, a functionally elegant vessel with architecturally integrated elements, furnishings and storage, making every detail and space count. Transparency, access to adjoining outdoor spaces, and use of a portion of the roof for an outdoor room expands both the virtual and actual size of the house while keeping its ecological and spatial footprint small.

Responding to the climate architecturally before relying on mechanical means for thermal comfort was also fundamental to our design process. The Solar CalPoly dwelling is intended to be "switch-rich," providing opportunities for user control to "sail" the building in *open mode*, collecting and retaining energy in *closed heating mode* and rejecting unwanted heat gains and using stored "coolth" in *closed cooling mode*. Fixed, operable and deciduous shading devices are employed to optimize solar gain in the winter and minimize unwanted heat gains in the summer. "Switch-rich" strategies not only help users adapt the building to seasonal variations but they also support the potential of this prototype project to adapt to various climates.

The passive design strategies are supported by necessary photovoltaic and solar thermal technologies; these systems are integrated with the architecture. In the case of the roof, the modules share precious roof space with the roof deck, which is an essential spatial component of the project. In the case of the south-facing shading devices, the modules perform simultaneous essential tasks by collecting the sun's energy while blocking out unwanted heat.

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The Solar CalPoly project endeavors to be "delightful" and memorable through subtlety. As a physical artifact, the project is conscientiously economical in size, form, and detail. As an artifact connected to its site (an essential source for "delight" in architecture), the exigencies of the competition compelled the team to focus on a more temporal, near environment inside/outside relationship. For this project, the experiential relationship between inside and outside is designed to be as harmonious as possible. This "joint" is essential given the project's economical space. The intention was to project a feeling of expansion from the inside by providing a strong visual and physical connection to the greater outdoors. In addition, the relationship between spaces on the inside is also intended to be fluid. This allows the inhabitants to define and use the spaces according to fluctuating personal needs and desires.

As one of its essential principles, the project embraces simplicity in a time of increasing complexity. Simultaneously, it is through simplicity the team seeks to achieve elegance. With conscientious attention to materiality and detail, the project presents an alternative to our culture's increasingly large, over-commodified dwelling spaces. In this way, the project poses a socio-political polemic, reminding us that we don't necessarily need more in order to live well.



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