

Project Profile

A Zero Energy-Capable Building



Photo Credit: Gino DeGrandis

Overview

Site Details

- Location: Cupertino, CA
- Building type(s): Higher education
- New construction, of a historic building
- 22,300 ft²
- Completed 2005

KIRSCH CENTER FOR ENVIRONMENTAL STUDIES

The Kirsch Center for Environmental Studies is a two-story building completed in summer 2005. The center is the home of the Biological, Health and Environmental Sciences Division of the De Anza College. On the first floor there is a biodiversity lab, a biodiversity outdoor classroom, an energy exhibit hall, a small group learning space, a 90-seat lecture classroom and two 45-seat lecture classrooms. On the second floor there is an energy management lab, various study/tutorial areas, a second small group learning space, a resource center, an astronomy observation lab and the division and faculty offices and conference rooms.

Energy

To responsibly approach carbon neutral operation, the design process moved through six steps that roughly tracked increasing cost effectiveness:

Reduction in building load. This was achieved principally through a high performance envelope, an application of adaptive comfort theory, reduced installed equipment power density, and the reduced conditioned volume of a displacement ventilation system. The envelope incorporates a thermal wrap around the entire building to minimize thermal bridging, 70% extra insulation, high performance spectral selective glazing, shaded windows and protective trellises.

Passive energy reduction strategies. The team oriented, programmed, and shaped the building to allow cooling, heating and natural lighting without mechanical equipment.

over

Passive design was valuable, but not adequate for all operating hours. The building's summer and winter design conditions necessitated energy investment for further conditioning.

Efficient active strategies. Passive design was valuable but not adequate for all operating hours. The building's summer and winter design conditions necessitated energy investment for further conditioning. To ensure efficient use, a low pressure demand-controlled underfloor (and side-wall displacement) air supply was provided for the east wing. The naturally ventilated west wing was tempered by a radiant floor capable of cool or warm operation. Condensing boilers and a small evaporative chiller constitute the building plant.

Recovery of energy used. Much of the energy invested in conditioning the building is recovered through an air-to-air energy recovery heat pipe in the 100% outside air air-handling unit (AHU-1) and air recirculation in the second air-handling unit (AHU-2)

Site generation. Only after much improvement was achieved in building efficiency did the team apply site generation technologies to reduce energy use by incorporating 34kWdc of photovoltaic (PV) and 100sf of solar hot water panels.

Offsets. Finally the college invested in carbon credits to achieve near carbon-neutral operational performance. These purchased carbon reductions are generated from grid-supplied renewable sources that meet the Center for Resource Solutions Green-E requirements.

For an in-depth case study, visit:

buildings.newbuildings.org/overview.cfm?projectid=1846

New Buildings Institute

New Buildings Institute (NBI) is a nonprofit organization working collaboratively with commercial building professionals and the energy industry to improve the energy performance of commercial buildings.