



## FACT SHEET: JERRY YANG AND AKIKO YAMAZAKI ENVIRONMENT AND ENERGY BUILDING



### LEADERSHIP IN THE BUILT ENVIRONMENT

Stanford actively incorporates sustainability practices and innovation into every aspect of campus life, from operations and building to student life, teaching, and research. A premier example is the Jerry Yang and Akiko Yamazaki Environment + Energy Building (Y2E2), designed to conserve natural resources and offer a unique and extraordinary learning environment. Opened in March 2008, Y2E2's innovative design delivers substantial efficiency gains over similar standard buildings, using 42 percent less energy and 90 percent less potable water. As President John Hennessey noted when commissioning the building, the design realizes state-of-the-art concepts in sustainability, flexibility, and a collaborative work environment, and it reflects the "critical role that cutting-edge research facilities play as hubs for dynamic intellectual exchange and innovative research in the ongoing search for knowledge that serves the public good."

### DESIGNED TO CONSERVE

#### Achieving 42 Percent Less Energy Use

##### Load Reduction

Y2E2 employs a strategic east-west orientation and four roof-to-base-ment atria that work all day long to bring in natural light and warmth, thereby reducing the building's energy demand. The design also includes high-performance windows, sun shades along its southern exposure, and efficient server rooms.

##### Passive Systems

Whenever possible, the building capitalizes on the laws of nature for heating and cooling rather than using mechanical systems. Spaces on the north and east facades are naturally ventilated, and after hot summer days, the building opens itself up at night, using its four atria as chimneys that purge the hot air.

##### Efficient Active Systems

To supplement passive systems for space conditioning, Y2E2 employs highly efficient active systems for heating and cooling. Active chilled beams were installed throughout the building and radiant flooring was installed in the main entry. Both technologies use water to conduct heat rather than the less efficient conventional air systems.

##### Energy Recovery

Y2E2 uses the conditioned air exiting the building to pre-cool or pre-warm the incoming air. Exiting air passes over large coils located

between the exhaust and supply ducts on the roof, essentially taking the edge off the outside air before it is conditioned by the building systems

##### Onsite Generation

Y2E2 has three clusters of solar panels installed on the south-facing roof. Researchers are studying the three types of panels (monocrystalline, polycrystalline, and thin film) under various weather conditions.



**"Y2E2 IS MUCH MORE THAN A BUILDING; IT IS A SYMBOL OF WHAT IS POSSIBLE. IT IS DESIGNED FOR PROBLEM-SOLVING, DESIGNED TO CONSERVE, DESIGNED TO INSPIRE, AND DESIGNED TO TEACH."**  
—Jeffrey Koseff, Perry L. McCarty Director of the Woods Institute



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## ENVIRONMENT + ENERGY BUILDING

### Achieving 90 Percent Less Potable Water Use

#### Indoor Fixtures

Y2E2 led the charge to capture and reuse thousands of gallons of high-quality water being flushed at Stanford's Central Energy Facility (CEF). The recycled water plant adjacent to the CEF sends cooling tower blow-down water to flush the building's toilets and urinals. Y2E2 uses this water source efficiently via waterless and efficient urinals, dual flush toilets, and efficient sink fixtures.

#### Landscape Water

Y2E2's water story continues outdoors. Native and drought-tolerant plants are thriving. Grass was used to maximize the cooling effects on the surrounding outdoor space, but only sparingly. Like most of the campus, the Science and Engineering Quad is irrigated with water from nearby Felt Lake, thereby eliminating the landscape demand for potable water.

## DESIGNED TO INSPIRE AND TEACH

- Y2E2 is the first of four buildings that comprise Stanford's Science and Engineering Quad (SEQ). It was designed and built according to the Sustainable Performance Criteria established within the SEQ Master Plan. The criteria uses the best, most appropriate standards from existing rating systems, such as LEED and Labs21, and set the highest performance goals at the time for Stanford buildings. The success of Y2E2 resulted in even more aggressive energy reduction targets for the remainder of the SEQ buildings and helped spur an update to campus-wide new construction standards.
- The building is a pioneering model of interdisciplinary organization. It provides space for faculty, staff, and students from more than ten departments, centers, programs, and institutes. In lieu of traditional departmental spaces, the building accommodates focal areas for environmental research. The spatial connections provided by the building's atria and its interior and exterior transparency support the spirit of collaboration, connectedness and interdisciplinary solutions.
- By virtue of its reduced energy operational costs, Y2E2 has already recovered the additional capital investment in the building's energy systems.
- Fly ash, a byproduct of coal burning, was used as a replacement for cement in the building's concrete construction (basement walls and floor slabs).

- Rapidly renewable materials were used in building finishes. Examples include the use of bamboo in handrails and furniture upholstery, as well as reclaimed redwood in the building's exterior trellises.
- Providing a simple finish on the structural concrete alleviated the need for many tons of carpet in the building. Limited use of carpet for noise reduction includes high recycled content material.
- Y2E2's structural design, particularly in regard to seismic safety, ensures the performance of the building in a major earthquake. The seismic design is a sustainable feature because it will reduce the amount of reconstruction required.
- The university worked with local building authorities to modify existing codes, allowing the building to use recycled water for toilet flushing, as well as a novel use of fire doors in the atria to support a passive smoke control system.
- An enhanced metering system and 1400 sensors measure the performance of building systems. An extensive database on building performance, building energy use, and photovoltaic performance will be available to students and faculty for use in their research and classes.

## TOURS

Since its inauguration in March 2008, Y2E2 has been a popular tour site for students, researchers, corporate executives, and donors. Y2E2 launched Stanford into a new era of building design and operation, paving the way for almost one million square feet of new construction inspired directly by its proven success. Docent-led tours detailing the history, design, and function of Y2E2 are available upon request. If you are interested in scheduling a tour, please email the Y2E2 Building Manager, Pat Carlson ([patcarl@stanford.edu](mailto:patcarl@stanford.edu)), with a specific tour date and time. Tours are typically arranged between 9 AM and 5 PM on weekdays, but special requests can be accommodated.



#### MORE INFORMATION

<https://sustainable.stanford.edu/solutions/buildings-initiatives>

#### CONTACT

Energy: Scott Gould, Senior Engineer, [scottg@bonair.stanford.edu](mailto:scottg@bonair.stanford.edu)  
Sustainability Programs: Fahmida Ahmed, [fahmida@stanford.edu](mailto:fahmida@stanford.edu)