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#### Higher Education Energy Performance Report August 2000

Type of Institution	Median Value			
	\$/Million Btu	EUI*	\$/SF	\$/student
K-12	\$5.94	124	\$0.80	\$114
Associate	\$5.91	203	\$1.04	\$138
Baccalaureate	\$5.20	194	\$0.92	\$507
Masters	\$4.45	211	\$0.96	\$252
Doctoral	\$4.31	209	\$0.97	\$357
Research	\$4.17	291	\$1.20	\$487
Specialized	\$5.53	233	\$1.37	\$1,300
All	\$4.65	223	\$1.09	\$356

\*Energy Use Intensity (million Btu/SF)

The chart above represents the results of a survey of 92 institutions of higher education sponsored by the Association of Higher Education Facilities Officers and the Rebuild America Strategic Partnership. It shows that although colleges and universities pay somewhat lower energy rates than those of K-12 schools, their energy use and costs per square foot, and especially their energy costs per student, are generally much higher.

## BIG PLAN ON CAMPUS: ENERGY-EFFICIENT DESIGN SAVES RESOURCES NOW, TEACHES FUTURE GENERATIONS



Photo credit: Courtesy of Bren School of Environmental Science and Management, UCSB

Bren Hall at the University of Santa Barbara, a new 85-000-square foot “living laboratory” that exceeds Title 24 standards by 31 percent and is on track for the LEED™ Platinum rating.

Rarely can the design community make a more far-reaching impact than by designing energy-efficient facilities for higher education. Not only do these buildings save energy, but they also provide enhanced learning environments while serving as living laboratories and sustainability demonstration centers. A campus commitment to energy- and resource-efficient design may provide substantial public relations, recruitment, and retention benefits as well. Most importantly, such a campus can have a major influence on the energy-using behavior of many generations to come. “A green building should teach students, faculty, and staff,” comments Walter Simpson, energy officer at the University of Buffalo. “It should inspire everyone to decrease his or her ‘environmental footprint’ and live lightly on the Earth.”

Visit the EDR website at: [www.energydesignresources.com](http://www.energydesignresources.com)

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## Bren Hall's Energy-Efficient Design

- Bren Hall is designed to take advantage of natural light, heating, and cooling.
- Facing the ocean, the office wing has no air conditioning but relies on flow-through ventilation with operable windows and transoms.
- Its lighting strategy incorporates the use of daylighting and energy-efficient fixtures and lamps, along with occupancy sensor controls on the ambient light system.
- The operable windows in the office wing have mechanical interlocks (small sensors in the frames) so that upon opening, the heaters in the offices are automatically turned off.
- The ventilation system for the laboratories is the most efficient available.
- The white roofing material reflects light, thus cooling the building, and a roof-integrated photovoltaic system will soon generate 7 to 10 percent of the building's power.

## Q AND A WITH A UNIVERSITY EXPERT

For further university client-side perspective on energy-efficient design, *e-News* recently spoke with Mo Lovegreen, Assistant Dean of Planning and Administration at the University of California at Santa Barbara. Ms. Lovegreen has been instrumental in the development of Bren Hall, an 85,000-square foot facility housing laboratory, classroom, and office spaces for the university's Donald Bren School of Environmental Science and Management. The building opened in April of this year and the project participated in the Savings By Design program through Southern California Edison.

### *Q What can you tell us about the unique needs of your campus with regard to energy-efficient design?*

**A** We have reached a point where it is no longer acceptable to simply meet standard design criteria or codes when it comes to energy efficiency at the University. Due to ever-rising energy costs, we are trying to incorporate high performance features into the design and construction of our facilities to make each building perform as efficiently as possible.

With new construction, we receive flat funding on a square-foot basis for the operation and maintenance of the structure. During the life of a building, this amount never changes. Since our goal at UCSB is to be a fully sustainable campus, we must aggressively pursue energy efficient measures to meet the bottom line of balancing our budgets while maintaining our facilities for future generations.

### *Q Are there any unique ways architects should be prepared to work with project contacts at universities?*

**A** I have had the opportunity to work with a number of really great architects, not just on Bren Hall (designed by the Zimmer Gunsul Frasca Partnership), but on other projects here at UCSB and with the U.S. Green Building Council. I have found that an amazing number of great ideas and possibilities can be incorporated into buildings, but many times architects hold back and wait for direction to come from the client.

It would be great if architects were able to push us as a client—or educate us on a project-by-project basis—on what certain features would do and inform us on how the design would save on energy over time.

## Energy Design Resources Case Studies

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Multi-Agency Library

[www.energydesignresources.com/publications/case\\_studies/int\\_multi.html](http://www.energydesignresources.com/publications/case_studies/int_multi.html)

Bio-Tech Lab and Office

[http://www.energydesignresources.com/publications/case\\_studies/int\\_johnson.html](http://www.energydesignresources.com/publications/case_studies/int_johnson.html)

## Laboratories for the 21st Century

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The Environmental Protection Agency and U.S. Department of Energy established the Labs21 Program out of a belief that improving the energy efficiency and environmental performance of a laboratory requires examining the entire facility from a “whole building” perspective. Labs21 resources include the following:

- *A Design Guide for Energy Efficient Laboratories:* Assists facility owners, architects, engineers, designers, facility managers, to identify and apply advanced energy efficiency features in laboratory-type environments. To download this publication, see <http://ateam.lbl.gov/Design-Guide>
- Labs21 Annual Conference: Oct. 7-9 in Durham, N.C., [www.epa.gov/labs21century/conf/index.htm](http://www.epa.gov/labs21century/conf/index.htm)
- Labs21 High Performance, Low-Energy Design Course: Oct. 10, Durham, N.C. and Oct. 11, Atlanta, Ga., [www.epa.gov/labs21century/training/index.htm](http://www.epa.gov/labs21century/training/index.htm)

## Articles

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- *A Facilities Manager’s Guide to Green Building Design* (consulted in the preparation of this article) by Walter Simpson, energy officer for the University at Buffalo, [wsimpson@facilities.buffalo.edu](mailto:wsimpson@facilities.buffalo.edu), at [www.appa.org/resources/Facilities\\_Manager/010304/greenbuild.html](http://www.appa.org/resources/Facilities_Manager/010304/greenbuild.html)
- The Association of Higher Education Facilities Officers offers further articles and other resources at [www.appa.org/](http://www.appa.org/)

*To learn more about Bren Hall and the Bren School of Environmental Science and Management, see [www.esm.ucsb.edu](http://www.esm.ucsb.edu). To contact Ms. Lovegreen, send e-mail to [mo@bren.ucsb.edu](mailto:mo@bren.ucsb.edu).*

*For more information related to energy efficient design in college and university facilities, consult the resources listed below.*

I hope that this gives the architects the support they need to incorporate their design ideas into the buildings without waiting for the individual building committee to direct them in this area.

### ***Q What are the benefits of having an energy efficient building at the Bren School?***

**A** Bren Hall provided our School of Environmental Science & Management with the opportunity to make an environmental statement about practicing what we teach and setting a benchmark for the new century. The Bren School is a graduate program that offers both master’s and Ph.D. degrees and combines science with law and policy, economics, and management.

The obvious benefit is that we surpass California’s Title 24 standards by more than 31 percent in energy efficiency, so the savings in operations is substantial. But, being a graduate school administrator, I’d have to say that one of the greatest benefits has been the increase in applicants to our program. We found that not only did the number of applications grow dramatically, but the caliber of student was higher as well. In addition, we were successful in recruiting excellent new faculty members to the School. These successes seem to tie back to Bren Hall receiving all the awards for high performance and sustainability, so the “practicing what we teach” methodology has been a great success.

### ***Q How is the building is being used for ongoing instruction?***

**A** In the design of Bren Hall, we varied the installation of certain features so that students and faculty would have the opportunity to use the structure as a living laboratory. In addition to the use of data loggers for monitoring various features, we have additional metering within the building to monitor actual loads for dry labs, wet labs, and offices. We also have additional data collection points for photovoltaic monitoring and weather gathering statistics. These data will be used in some of our Master’s of Environmental Science and Management program core courses.

In addition to the enhancement of our curriculum by having access to this large living laboratory, this work will help us gather and pass data to the Office of the President so that better decisions will be made in future buildings, thus furthering the sustainability efforts begun here. 🌱

## Conference Calendar

### Sept. 12-13

#### Building Expectations 2002: Delivering Performance Milwaukee, Wis.

Focus on Energy - Energy Center of Wisconsin,  
Brenda Jessen

Tel: (800) 466-4631 Fax: (608) 238-0523

[bjessen@ecw.org](mailto:bjessen@ecw.org)

### Sept. 20-22

#### Sustainable Communities Symposium Crested Butte, Colo.

High Country Citizens' Alliance,

Tel: (970) 349-7104, Fax: (970) 349-0164,

[office@hccaonline.org](mailto:office@hccaonline.org), [www.hccaonline.org](http://www.hccaonline.org)

### Oct. 7-9

#### Labs21 Annual Conference Durham, N.C.

Association of Energy Engineers/

World Energy Engineering Congress.

[www.epa.gov/labs21century/conf/index.htm](http://www.epa.gov/labs21century/conf/index.htm)

### Oct. 9-12

#### EEBA 2002: Excellence in Building Conference Phoenix, Ariz.

Energy & Environmental Building Association,

Tel: (952) 881-1098, Fax: (952) 881-3048,

[info@eeba.org](mailto:info@eeba.org), [www.eeba.org/conference/](http://www.eeba.org/conference/)

### Oct. 31 - Nov. 3

#### Building Performance: Improving the Quality of the Built Environment Washington, D.C.

AIA's Building Performance PIA,

Peg Hamil, The American Institute of Architects

Tel: (202) 626-7317

[phamil@aia.org](mailto:phamil@aia.org), [www.aia.org/pia/piaevents.htm](http://www.aia.org/pia/piaevents.htm)

### Nov. 13 - 15

#### First International Green Building Conference and Exposition Austin, Texas

U.S. Green Building Council.

[www.usgbc.org](http://www.usgbc.org)

## Training Opportunities

Be sure to take advantage of these training opportunities at the following locations:

### CTAC

SCE's Customer Technology Application Center

6090 N. Irwindale Ave., Irwindale (626) 812-7537 or [www.sce.com/ctac](http://www.sce.com/ctac)

### ERC

Southern California Gas Company's Energy Resource Center

9240 E. Firestone Blvd., Downey or (562) 803-7500

[www.socalgas.com/business/resource\\_center/erc\\_seminar\\_info.shtml](http://www.socalgas.com/business/resource_center/erc_seminar_info.shtml)

### NUCF

National University Conference Facilities

9388 Lightwave Ave., Room 123, San Diego. (858) 636-5726 or [vvaplon@sdge.com](mailto:vvaplon@sdge.com)

### PEC

PG&E's Pacific Energy Center

851 Howard Street, San Francisco. (415) 973-7268

### San Jose

PG&E-sponsored training at Leininger Learning Center, Kelley Park

(off Senter Road between Alma and Story Roads) San Jose. (415) 973-7268

### Ridgehaven

The Ridgehaven Building, City of San Diego Environmental Services Dept.

9601 Ridgehaven Court, San Diego. (858) 636-5726 or [vvaplon@sdge.com](mailto:vvaplon@sdge.com)

Date	Course	Time	Location	AIA
Sept. 13	Simulation of Chilled Water Plants	9 a.m. - 4:30 p.m.	PEC San Francisco	6
Sept. 19	Design Strategies for High-Performance Glass	9 a.m. - noon.	CTAC Irwindale	3
Sept. 30	Title 24 Refresher: How to Meet the Latest State Standards for Energy Efficiency	8:30 a.m. - 3 p.m.	Ridgehaven San Diego	5
Oct. 3	Energy Efficient Lighting for Foodservice	9 a.m. - noon.	CTAC Irwindale	
Oct. 9	Energy Efficient Design of Cleanroom Facilities	9 a.m. - 4:30 p.m.	PEC San Francisco	6
Oct. 10	EnergyPro Workshop: High-performance Design Strategies for Lighting and Building Envelopes	8:30 a.m. - 4:30 p.m.	NUCF San Diego	5
Oct. 11	EnergyPro Workshop: Mechanical System Design Strategies	9 a.m. - noon.	NUCF San Diego	3
	EnergyPro Workshop: Advanced Building Modeling	1 - 4 p.m.	NUCF San Diego	3
Oct. 15	Turning Green Into Gold	8:30 a.m.	ERC Downey	4
Oct. 17	eQUEST Energy Simulation Tool Training	8:30 a.m. - 4:40 p.m.	CTAC Irwindale	
Oct. 18	Underfloor Air Systems	9 a.m. - 4:30 p.m.	San Jose	6
Oct. 22	Underfloor Air Systems	9 a.m. - 4:30 p.m.	PEC San Francisco	6
Oct. 24	HVAC for Architects: A Primer and Update	9 a.m. - 4:30 p.m.	PEC San Francisco	6
Oct. 30	Solar Geometry (pre-req for afternoon session)	9 a.m. - noon	PEC San Francisco	3
	Designing Shading Devices	1:30 - 4:30 p.m.	PEC San Francisco	3
Oct. 31	Advanced Daylighting	1 - 4:30 p.m.	PEC San Francisco	3