

Greening UF


FROM "GREEN" BUILDINGS
TO A CARBON-NEUTRAL
CAMPUS, UF IS A NATIONAL
LEADER IN SUSTAINABILITY

BY AARON HOOVER

UF sustainability director David Newport (left) and building construction Professor Charles Kibert are leaders in the concepts of a carbon-neutral campus and environmentally sensitive construction projects.

Rinker Hall, the new home of the School of Building Construction, was designed as a pilot project for green construction methods.





The nation's 76 million residential and five million commercial buildings consume 68 percent of its electricity, 40 percent of its raw materials and 88 percent of its drinking water. They account for a third of U.S. municipal solid waste and produce a third of its pollution.

So many have been blamed for illness that the Environmental Protection Agency lists indoor air quality among its top five environmental health risks.

Literally, the environmental and health costs of buildings have been going through the roof. To contain them, the construction industry has begun to embrace a new trend known as "green building." The burgeoning movement traces its roots to research at the University of Florida.

And UF's involvement goes beyond the intellectual. The university cemented its commitment to green-building practices earlier this year when it dedicated Rinker Hall.

The \$10-million, 47,270-square-foot home to UF's School of Building Construction, Rinker

Hall was designed to use half the electricity of other buildings its size and just a fraction of the water. Most of its components were recycled, or came from responsibly managed forests, or can someday be reused in another building. Inside Rinker's three stories, with space for 450 students, the classrooms, labs and offices were built with materials selected because they don't emit chemicals tied to so-called sick building syndrome — with other steps ensuring against mold or other biological pathogens.

Situated at the heart of campus, Rinker Hall's abundant windows, airy classrooms and sky-lit atrium make it look more pleasant than futuristic.

That's just the way it was planned, says Charles Kibert, a green-building pioneer who recently stepped down as chair of the School of Building Construction: "This whole building was done to serve as an example — a pilot project for green building."

The university remains a leader in solar research and continues to flirt with solar technology.

Environmental Progressivism

Rinker Hall crests a new wave of environmental progressivism on the UF campus. But campus-based experimentation with environmentally sensitive alternatives dates to at least 1954, when UF established one of the first solar research

parks in the nation. Designated a historic site by the American Society of Mechanical Engineers last year, the Solar Energy and Energy Conversion Laboratory spawned experiments in solar energy on and off campus in the 1970s and 1980s. Solar hot-water heaters and other instruments appeared at residence halls, swimming pools, Shands Hospital, even a photo processing lab and a coin laundry. One massive off-campus project sought to heat and cool Gainesville's airport using 744 solar panels covering 16,000 feet of rooftop. Gainesville was so well known for solar experimentation that *Mother Earth News* called it the "Solar Capital of the World" in a 1974 publication.

UF's solar-park research launched numerous commercial products, such as solar-assisted heating and air conditioning

systems. The university remains a leader in solar research and continues to flirt with solar technology. Most recently, a group of students has launched an initiative to install photovoltaic cells on UF building rooftops.

In the nearly 50 years since the solar park opened, the environmental ethic has spread to many parts of campus. Much of the recent activity dates to 1997, when a grassroots group of students and faculty founded "Greening UF" to encourage "sustainable" thinking and practices. In other words, using resources to provide for today's needs without compromising future generations.

The Greening UF movement spurred UF to become the nation's first public university to publish a "Sustainability Indicators Report" under the Global Reporting Initiative in 2001. The initiative, a voluntary program affiliated with the United Nations, expands the information that companies and institutions report to include not only financial indicators but also environmental and social ones.

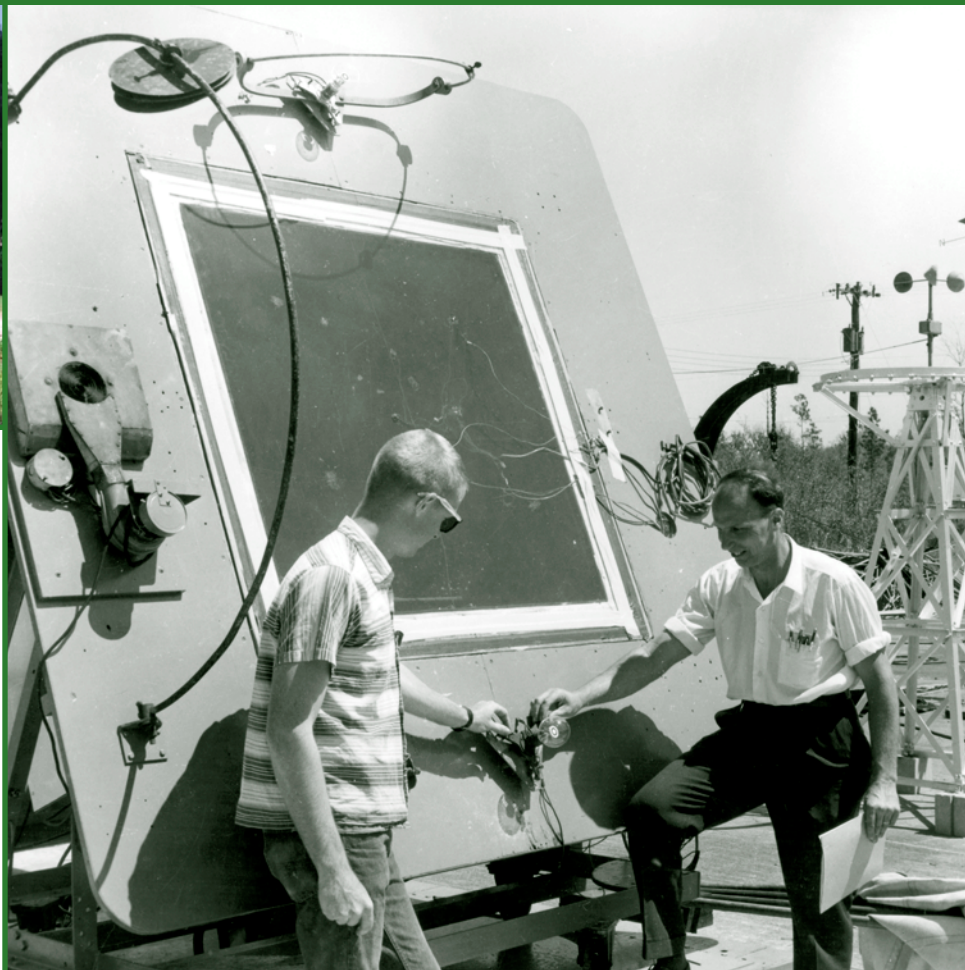
Last year, the UF Sustainability Task Force, an advisory group and outgrowth of Greening UF, issued a 19-page report calling for a series of sweeping environmental and energy conservation measures. These included managing UF lands to ensure biodiversity, buying a low-emission vehicle fleet and including green considerations in UF's investment decisions.

Barbara J. Graham



The Solar House at UF's Energy Research and Education Park. The house was moved to this site in the 1970s. While no longer used as a residence, ongoing experimentation continues within it. The house is also the site of the Erich A. Farber Archives.

Mechanical engineering Professor Emeritus Erich A. Farber (right) adjusting a calorimeter with an early Solar Energy and Energy Conversion Laboratory student in the mid-1950s.





Kristi Ortiz

The University Police Department has three Toyota Prius hybrid vehicles that operate on combination gasoline-electric engines that deliver more than 48 miles per gallon.



UF also is the nation's only public university with an active program to become "carbon neutral" — to reduce to zero the amount of carbon dioxide and other greenhouse gases the university contributes to the atmosphere. The person heading up the project, Dave Newport, has the unique title "Director of Sustainability."

A longtime environmental magazine publisher, Newport was elected to the Alachua County Commission in 1998 on a strong environmental platform. With two other like-minded commissioners, he racked up such green triumphs as Alachua Forever, a \$29 million taxpayer-funded land conservation program. But since losing a reelection bid last year, Newport has thrown his passions behind another goal — cutting in half the amount of electricity UF consumes.

Long-Term Savings

Sitting in his third floor office in Rinker, Newport explains that more than 80 percent of UF's greenhouse gas contributions stem from the production of electricity to heat, cool and light the campus' more than 900 buildings. Pollution isn't the only negative. The light bill for the university and its 60,000 students, faculty and staff is \$75,000 a day.

Newport is recommending that UF chip away at its power appetite by creating a revolving fund for energy efficiency retrofits to accompany renovations or expansions. The energy savings from each retrofit would reimburse the fund for the next project. He's also pushing to make energy efficiency a financial consideration in UF's selection of building contracts. That would be a sea change. Public institutions in Florida separate capital cost from operating cost, which means the lowest bid wins the contract — even if the building's electricity bill winds up costing taxpayers more in the long term. Indeed,

Rinker's efficiency upgrades added about \$1 million to its total cost.

Newport, who is working closely with UF energy specialist Jeff Johnson on the project, admits he has no authority — other than President Charles Young's mandate to make UF "a global leader in sustainability."

So one of his first steps is a high-tech appeal to common sense. He's created a searchable online database that allows users to see how much electricity each of UF's buildings currently consumes — and how much could be saved if the building received efficiency upgrades.

"What is cool about it is that you can spend so many dollars on a building on energy efficiency measures and put those in the database, and it will calculate how much less power the building will use, and how long it will be before the payback," he says.

As Newport's efforts build on campus, others are advocating green concepts statewide and nationally. For example, the Florida Energy Extension Service, part of the UF Institute of Food and Agricultural Sciences, has set up a partnership with a Gainesville contractor to build and sell ultra-environmentally friendly homes.

The goal of the eight-home project at the 88-home Madera subdivision is to prove to home builders that green homes can also earn money.

"We're essentially building homes that have significant green characteristics and are also fully integrated into a commercial, for-profit development venture," says Pierce Jones, a UF professor of agricultural and biological engineering who serves as assistant director of the Florida Energy Extension Service. "We want consumers to choose green features because they recognize their true value. And we want these upgrades to be profitable for the builders, so they'll keep offering them."



Alex Swanson

A worker installs an insulated concrete wall at a construction site in Gainesville's Madera subdivision. The forms are filled with fly-ash concrete, creating a wall that is highly insulated and impervious to termites or wood rot.

The homes will burst with energy-saving or environmentally friendly features. Options include insulated concrete form walls, built with concrete and insulation; floors made of renewable bamboo; energy-efficient fluorescent lights; and a water-saving washing machine and dishwasher. Native drought-tolerant plants will replace traditional lawns. All of Madera's homes will meet federal "Energy Star" standards as well as green home standards adopted by the the Florida Green Building Coalition, a statewide green building advocacy group Jones helped found. Thirty percent more efficient than standard-built homes, the UF-built homes will use just half the electricity and water of a typical home.

Juddy Carter, owner of Carter Construction, UF's partner in

the project, says his hope is that the project will help get out the word on the availability of green features and their value to home owners.

"The thing that interests me the most is being involved with the cutting-edge technologies being developed today," he said. "We have to showcase some of that to make the public aware."

Sustainable Construction

A decade ago, few people had even heard of green construction. Today, some 100,000 Energy Star homes have been certified. Rinker Hall, meanwhile, joins some 600 private and public commercial buildings nationwide to be certified under a national standard known as Leadership in Energy and Environmental Design, or LEED.

Kibert pioneered many of the ideas behind the trend. As a longtime mechanical design engineer for private companies, Kibert was always disturbed by the amount of waste generated in the construction industry. Building a 2,000-square-foot home can generate six tons of waste. When he left the private sector to come to UF in 1990, Kibert decided to try to do something about the problem.

His early work on construction waste quickly broadened into research aimed at taking an environmental approach to the overall site planning, design, construction and use of buildings. He and other UF researchers coined the term "sustainable construction" and were the first outside the literary world to use the term "deconstruction" for the study of maximizing reuse of building material.

Kibert organized the first International Conference on Sustainable Construction in 1994, drawing 300 people from 30 countries. He went on to publish more than 90 papers and books, most related to green building.

Kibert's research confirmed his hunch that the traditional approach of focusing on initial costs is wrong. It causes excessive waste during construction. It creates energy inefficiencies that wind up making the building more expensive over the long haul. And it leaves many occupants sick, leading to lost productivity and other ills.

With his colleagues at the School of Building Construction, Kibert helped to create Summer House, a green environmental education center at Kanapaha Botanical Gardens in Gainesville, among other buildings. But Rinker is in many ways the most complete physical culmination of Kibert's ideas.


The building's urinals are waterless, with each saving a remarkable 40,000 gallons annually. Its toilets flush with rain-water collected in an 8,000-gallon cistern, and the grounds are irrigated with reclaimed water. Carefully oriented along a north-south axis to maximize daylight exposure, its windows, skylights and reflective louvers make artificial light all but unnecessary except at night. Its thin, white aluminum exterior deflects heat rather than absorbing it, and the walls contain three separate layers of insulation.

The building is in many ways recycled. Wall panels, drywall, concrete, ceiling tile, steel products and numerous other components contain reused materials.

Reflecting studies that show employees are happier and more productive in more natural settings, most offices and classrooms have windows, and most windows open.

Kibert says he and other planners sought to make the building environmentally sensitive in the broadest possible sense — from the choice of the site on a former parking lot at the center of campus to energy use and indoor air quality. The result is already a success in some respects. For example, more than half of the construction waste generated when Rinker was built was recycled. Because it has been occupied only since January, it's too early to determine if Rinker has achieved all of its goals. Some information, like electricity use comparisons, will be available soon. Other data, such as whether employees report fewer sick days, will take longer to ferret out, Kibert says.

The founder and director of UF's Powell Center for Construction and the Environment, Kibert is at once optimistic and philosophic. Rinker is, after all, partly an experiment in the evolving idea of what it means to be green.

"I would hope the news will be good," he says, "but if it isn't in some areas, we'll go back and find out why and fix them." 

Charles Kibert
Professor of Building Construction
(352) 392-5965
ckibert@ufl.edu

David Newport
Director of Sustainability
(352) 392-5965
dnewport@ufl.edu

Pierce Jones
Assistant Professor of Agricultural and Biological Engineering
(352) 392-8074
cz@energy.ufl.edu

Related web sites
<http://www.bcn.ufl.edu/rinker/rinker.shtml>
<http://www.sustainable.ufl.edu/oos.html>
<http://www.energy.ufl.edu>



The building's urinals are waterless, with each saving a remarkable 40,000 gallons annually.

Carefully oriented along a north-south axis to maximize daylight exposure, Rinker Hall's windows, skylights and reflective louvers make artificial light all but unnecessary during the day. Bricks from the old Hume Hall, which was demolished to make room for the UF Honors Residential College at Hume Hall, were recycled in Rinker Hall.

