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Sustainable Furman

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Sustainable



KAY OWEN

Furman

A comprehensive sustainability master plan calls for the university to become carbon neutral by 2026.

In the wake of the Arab oil embargo and the first energy crisis of the mid-1970s, American political leaders began extolling the virtues of energy conservation and independence.

But despite their urgent message, the country's dependence on foreign sources of oil increased through the years, and concern about climate change grew.

In December of 2006, 12 college and university presidents resolved to launch a renewed national effort to promote energy independence by becoming founding signatories of the American College and University Presidents' Climate Commitment. They sent letters to 400 of their peers inviting them to join their cause.

By March 2007, more than 150 presidents, including Furman's David Shi, had become charter signatories of the ACUPCC. Today close to 700 presidents, representing 40 percent of the nation's undergraduate population, have pledged to work toward making their campuses climate neutral.

The group's Web site states, "Presidents signing the Commitment are pledging to eliminate their campuses' greenhouse gas emissions over time." As part of their efforts, the institutions agree to:

- Complete an emissions inventory.
- Integrate sustainability into the curriculum and make it part of the educational experience.
- Make their action plan, inventory and progress reports available to the public.
- Take immediate steps to reduce greenhouse gas emissions by agreeing to develop a climate action plan, which is a multi-year strategy to move their campuses toward carbon neutrality — a point when campus-related activities do not increase the amount of greenhouse gases in the atmosphere.

Furman is in the forefront of the movement. Its blueprint is "Sustainable Furman," a holistic, 40-page master plan approved unanimously in November by the board of trustees. Sustainable Furman will impact every aspect of university life, from the academic program to campus operations, transportation and construction practices, environmental stewardship, and community outreach activities.

More than 100 students, professors, staff members, trustees, alumni and community leaders were involved in crafting the plan, which took 18 months to develop.

Says Shi, "From the outset, we determined that any effort in this area . . . needed to encompass a long-range sustainability master plan for the university, which would include not only those activities relevant to its carbon and ecological footprints but also the much broader scope of the university's mission and function, including the curriculum, co-curriculum, and projects and partnerships in the greater Greenville community."

The climate action plan in Sustainable Furman calls for the school to be carbon neutral by 2026, the 200th anniversary of the university's founding.

Most of the proposed carbon-cutting efforts will focus on improving energy efficiency (by upgrading HVAC and lighting systems, appliances and roofing), conserving energy, and making the transition to eco-friendly transportation by continuing to purchase hybrid or all-electric vehicles and encouraging on-campus biking and walking. Larger ventures, such as the development of renewable energy projects, will be implemented as funds become available, most likely through outside grants such as the \$2.5 million awarded in October by the U.S. Department of Energy for geothermal heat

pumps at the North Village apartment complex. (See page 10.)

According to Sustainable Furman, about 50 percent of the university's carbon footprint can be eliminated by developing renewable energy projects and improving the energy efficiency of campus buildings. Duke Energy, which supplies Furman with electrical power, plans to cut its net carbon emissions in half by 2030. These improved efficiencies should help further reduce Furman's carbon footprint another 24 percent.

The university believes the balance of its greenhouse gas emissions — about 25 percent — can be eliminated through conservation, reducing transportation-related emissions, and investing in a community-focused energy conservation offsets program.

As for the Presidents' Climate Commitment's stipulation that participating universities incorporate sustainability-related topics into their academic programs, Sustainable Furman reaches beyond the requirement by infusing energy and environmental issues across the curriculum and in co-curricular projects and research activities.

The university's timing is good. The Department of Labor predicts that, through 2016, careers in environmental science and protection will be among the 30 fastest growing occupations, with a projected increase in employment of 28 percent. Other labor-market studies suggest that sustainability will be embedded into every employment category in the near future, and that understanding of sustainability concepts and issues will become an important prerequisite for employees.

The Chronicle of Higher Education has reported that sustainability is one of the top emerging majors among college students, and the Association for the Advancement of Sustainability in Higher Education (AASHE)

says that the number of sustainability programs in the country for undergraduates is growing quickly. These reports conclude that academic institutions that proactively upgrade their curricula with sustainability offerings will be better positioned to prepare America's future leaders — not just technical specialists, but critical decision-makers who understand the broader context of the world around them.

Furman's recently revised curriculum requires all students to take at least one course dealing with "Humans and the Natural Environment." The university is also examining the value and feasibility of a major or concentration in sustainability studies, and has developed workshops and incentives to encourage faculty to incorporate sustainability concepts into their courses.

In addition to its impact on students, Furman's plan seeks to involve alumni and friends by promoting "sustainable service" as a form of outreach.

Service opportunities could take a variety of forms, such as training members of the university community to improve the energy efficiency of homes in low-income neighborhoods. To that end, the university helped to establish the Greenville Sustainability Community Coalition. The group, which includes local leaders and Furman volunteers, will target service projects for Greek organizations, athletic teams and the Heller Service Corps, among others.

Sustainable Furman is the product of Furman's growing emphasis on sustainability over the last 15 years. In 1997 the university introduced a strategic plan that designated sustainability as a strategic initiative, and in 1999 the board of trustees adopted a LEED (Leadership in Energy and Environmental Design) Green Buildings Rating System for all new and renovated construction on campus. In an updated strategic plan approved in 2001, the board resolved "to strengthen our commitment to the environment by promoting sustainability through educational programs, campus operations/construction practices, and public awareness initiatives."

Since that time, the sustainability movement at Furman has gathered momentum, involved more people, earned a host of awards, and attracted millions of dollars in grants and donations.

The university has partnered with the Cliffs Communities to construct Cliffs Cottage, the *Southern Living* sustainable showcase home that is a model of environmentally responsible design, building techniques, materials and energy-saving systems. A Center for Sustainability, funded by an \$850,000 grant

from the Andrew Mellon Foundation, now coordinates all academic, co-curricular and community outreach activities tied to sustainability. The trustees recently voted to name the center in honor of Shi.

Angela Halfacre '92, who joined the Furman staff in 2008 as director of sustainability and environmental education, says, "There is a growing global awareness about the fundamental connection between the quality of the environment and the quality of human society. We want to expand our leadership role in this area by helping the campus community, the region and even the nation develop a deeper appreciation of this connection. And we want our graduates to become effective proponents of sustainability in their homes, communities and professions."

Furman's commitment to sustainability has also been recognized by a variety of organizations.

The university recently received the South Carolina Green Building Council's Award of Excellence for its pioneering work in green building technologies, and the AASHE gave

Furman its National Campus Leadership Award. Clean Air-Cool Planet, a group dedicated to finding solutions to global warming, presented



the university its Climate Leadership Award, and *Kiwi* magazine has twice included Furman among the 50 schools featured in its annual “Green Colleges Report.”

Since 2007 the university has been one of 10 schools nationwide included in the Compton Mentor Fellowships program, which supports graduating seniors who wish to pursue one-year projects in sustainability or environmental fields. Four Furman graduates — Colin Hagan '07, Kartikeya Singh '07, Elizabeth Cooke '08 and Angel Cruz '08 — have received \$35,000 fellowships from the Compton Foundation to develop educational programs and projects based in South Carolina, India and Latin America.

Health and exercise science professor Frank Powell, who has been a champion of environmental issues since joining the faculty in 1974, says that Shi has been the driving force behind Furman’s commitment to sustainability.

“It’s clear that David’s leadership and vision have been the defining factors in what we have accomplished,” says Powell. “He helped to create and build a knowledgeable group of decision-makers at Furman who were not simply going to follow him but were willing to go in other directions.”

That once small group of environmentally minded faculty, staff and students now numbers in the hundreds, and today the campus is home to 15 environmental groups. Among the newest:

- Sustainable Connections, which works to promote cooperation, coordination and expansion of sustainability efforts among students.

- Conserve Furman, a peer-to-peer education initiative developed by students.

- Furman in the Garden (FIG), which focuses on agriculture and food-related issues both on and off campus.

- The Furman Farm, a student-managed organic garden.

- A chapter of Upstate Forever, a local organization that promotes “smart” growth and the protection of natural resources.

Powell says the combination of student support, a large group of young faculty and staff who are devoted to the cause, and Sustainable Furman helps to guarantee that the movement will continue on campus long after he, Shi and other early champions of eco-friendly initiatives are gone.

As Sustainable Furman states, “Nurturing sustainability also nurtures our sense of community by focusing attention on a compelling goal: to ensure that Furman remains a perpetual landscape of possibilities for generations of students to come. Step by step, Furman is making a difference. The campus community is justifiably proud of its sense of place, and even prouder of the culture of sustainability that is spreading. . . .

“The seed of sustainability that germinated over a decade ago is blossoming into a collective vision. The good work of nurturing our environment, our campus and our community is never over. Nor should it be. This plan reflects that ongoing reality and commitment.” [F]

Adapted from an article in the Winter 2009 issue of Inside Furman, the university’s internal newsletter.

Visit <http://furman.edu/press/sustain2.pdf> to read *Sustainable Furman*. Additional information on Furman’s sustainability efforts is available at www.furman.edu/sustain.



Case studies: Building for a sustainable future

The Charles H. Townes Center for Science at Furman was built as a model of green architecture. With its thermal solar panels, day lighting and energy-efficient heating and cooling systems, the complex itself is a teaching tool, as students study its energy use and sustainability systems.

In recent months the south end of Townes Center, across from Stone Soccer Stadium, has sprouted some impressive appendages — an erector set of solar panels and a huge greenhouse. They represent a clear statement that Furman is committed to sustainability, energy/water conservation, and environmental awareness.

Joe Pollard, chair of the biology department, talks about putting “science in sight” as a key mission of the Townes Center. And while Furman has had a greenhouse for many years, the new one is in a prominent location and will be available for use not only in science projects, but also by members of the university community growing their own produce in Furman garden plots.

In addition to these external manifestations of the Townes Center’s sustainable ethos, the complex boasts a wastewater treatment and recycling project known as the “Living Machine.”

The Living Machine mimics the ecology of tides and wetlands. Wastewater is diverted from the Townes Center’s sewer line, collected in a buried tank and pumped into computer-controlled wetland basins. Tidal cycles furnish the oxygen and nutrients for microorganisms that make their home in the wetland basins, and they are enlisted as nature’s way of treating the wastewater. The resulting high-quality effluent can be recycled as water for flushing toilets and urinals or for washing the cages in science labs, for example.

Jeff Redderson, assistant vice president of facilities services at Furman, translates into layman’s terms the expected savings from the solar concentrators and the Living Machine. According to Redderson, the solar concentrators produce 14 kilowatts of electricity and 70,000 BTUs per hour of hot water during peak operating periods — enough to meet the power and hot water needs of a small residential building.



Of the Living Machine, Redderson says, “The wastewater reclaim system processes up to 5,000 gallons a day of sanitary sewer water. The reclaimed water, or graywater, can be pumped back into the building to flush urinals and toilets, which reduces our freshwater consumption by another 5,000 gallons a day. This is enough water to fill up the main campus fountain every four months, or enough water for 100 showers each day.”

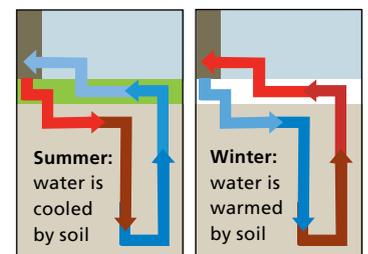
While it is being treated, the water is kept below the surface of a gravel-packed medium with plant life above the surface. So there’s no danger of accidental human contact with untreated water or of the Living Machine becoming a breeding ground for mosquitoes, according to an official with Worrell

Water Technologies, a Charlottesville, Va.-based firm that engineered the system and is partnering with Furman on the project.

The Living Machine leaves a small ecological footprint — 120 square feet. A custodian spends about 30 minutes a day making sure the system is running properly.

As for the solar concentrators, they use parabolic mirrors to concentrate the sun’s energy over 1,000 times normal levels. According to Redderson, they can produce 14 kilowatts of electricity and 70,000 BTUs per hour of hot water during peak operating periods. That’s enough to meet the power and hot water needs of a small residential building.

Meanwhile, on the other side of the campus, a \$2.5 million grant from the U.S. Department of Energy (DOE) will allow Furman to replace the HVAC heating and cooling system in the 11-year-old North Village housing complex with a more environmentally friendly and energy-efficient geothermal heat pump system.



The geothermal heating and cooling system is expected to save the university more than \$2 million in energy costs over the next 20 years and allow Furman to take a big step toward achieving its goal of carbon neutrality on campus.

Redderson says the North Village work will likely begin in the summer of 2011 and will take two years. Eighteen wells 300 feet deep are planned for each of the complex's 11 buildings, with 275 geothermal heat pumps to be installed.

More than 1,000 Furman students reside in the apartment-style complex.

A geothermal heating and cooling system uses the water stored underground, where the Earth's temperature is constant, to heat residences in the winter and cool them in the summer. It is the most environmentally responsible and energy-efficient HVAC system available.

The DOE grant is part of \$338 million in Recovery Act funding for the "exploration and development of new geothermal fields and research into advanced geothermal technologies." The grants support 123 projects in 39 states. The recipients include industrial companies, academic institutions, tribal entities, local governments and DOE's National Laboratories.

Of the 28 colleges and universities nationwide to receive a grant, Furman was the only liberal arts college and the only institution from South Carolina.

"The United States is blessed with vast geothermal energy resources which hold enormous potential to heat our homes and power our economy," said Department of Energy Secretary Steven Chu. "These investments in America's technological innovation will allow us to capture more of this clean, carbon-free energy at a lower cost than ever before. We will create thousands of jobs, boost our economy and help to jumpstart the geothermal industry across the United States."

According to the Department of Energy, the grants are directed toward identifying and developing new geothermal fields and reducing the upfront risk associated with geothermal development through innovative exploration, drilling projects, and data development and collection. In addition, the grants will support deployment and creative financing approaches for ground source heat pump demonstration projects across the country.

Collectively, these projects will represent a dramatic expansion of the U.S. geothermal industry and are expected to create or save thousands of jobs in drilling, exploration, construction, operation of geothermal power facilities, and manufacturing of ground source heat pump equipment.

Compiled from reports by Ann Green and Vince Moore.

In support of sustainability

Furman is seeking to forge a variety of strategic partnerships for the David E. Shi Center for Sustainability — the hub of the university's sustainability efforts — and to raise additional resources to underwrite the center's mission and endow its operations. Naming rights are available for many of these programs, including:

Shi Center operations — Endow core staff and functions as well as student internships and postdoctoral fellowships.

Educational programs — Sponsor or endow curricular and co-curricular initiatives, including degree/certificate programs and engaged learning activities for students.

Conservation initiatives — Sponsor or endow creative and ongoing programs related to waste management, recycling, conservation, energy generation and other areas.

Campus features — Underwrite ongoing developments and features of The Cliffs Cottage, subsidize lake restoration efforts and organic farm needs, and support building improvements related to energy efficiency or renewable-energy projects.

Environmental outreach — Sponsor an array of service projects and partnership possibilities designed to support corporate initiatives/productivity and community development.

To learn more about supporting the Shi Center for Sustainability, contact mike.gatchell@furman.edu, (864) 294-2475.