



Sustainable Furman

**sustainability**

meeting humanity's needs

journey and destination

taking the long view

NOVEMBER 2009



## EXECUTIVE SUMMARY

Living sustainably entails taking the long view of our actions and their consequences. Just as endowment funds enable colleges to flourish in perpetuity, a commitment to sustainability promotes the well-being of people and campuses over the long term. For more than a decade, Furman University's trustees, faculty, staff, students, and alumni have joined forces to make institutional sustainability and environmental citizenship primary priorities. Such efforts have produced very tangible benefits. Furman University has become widely recognized as a national leader in these endeavors, garnered widespread media coverage as well as numerous awards and foundation grants, lowered its utility bills, and attracted growing attention among prospective students interested in sustainability-related fields of study.

In this master plan, Furman outlines a long-range, comprehensive approach to making the university even more sustainable in its practices, policies, and learning environments. The plan is organized around eight goals that address key aspects of Furman's mission and operations, including the curriculum, co-curriculum, facilities management, and community relations. This document also highlights the growing imperative for Furman to become more energy independent through greater conservation, improved efficiencies, and use of additional renewable energy sources.

*Sustainable Furman* details a set of specific strategies that Furman can implement in coming years to become a more sustainable institution. These strategies range from ambitious programs that affect many people in the Furman community to narrowly defined initiatives that affect relatively few. Taken together, the implementation of these strategies will enrich the Furman educational experience, operate the campus in a more efficient and responsible manner, generate substantial financial savings, and serve the broader community. Accomplishing these goals will also enable Furman to recruit more outstanding students and faculty and acquire the financial resources necessary to support them.

This document also addresses Furman's responsibility as a signatory of the American College and University Presidents' Climate Commitment. Furman has joined almost 700 other institutions of higher learning (representing about 40 percent of college students in the United States) in a pledge to create a long-range Climate Action Plan (CAP). Each institution's CAP details the steps it plans to take to become "carbon neutral"—i.e., to reach a point when campus related activities do not increase the amount of greenhouse gases in the atmosphere.

*Sustainable Furman* includes Furman's Climate Action Plan and outlines possible ways to dramatically reduce our carbon emissions by 2026, the university's bicentennial. The CAP organizes these actions into categories such as energy conservation and efficiency, renewable energy, and transportation. It also defines the relative impact the initiatives can have on our carbon footprint. As the CAP makes clear, a comprehensive, long-term, and well-coordinated strategy is necessary to pursue carbon neutrality.

Of course, the university's ability to implement such initiatives will depend upon many dynamic factors, some of which are beyond Furman's influence or control. Changing government policies, fluctuating energy prices, unpredictable economic developments and financial resources, the methods used by our utility company (Duke Energy) to produce our electricity, technological innovations, and other variables will determine the actual scope and pace of Furman's progress.

While such uncertainties can be daunting, it is critical that we set audacious goals now, even if those goals will necessarily be adjusted and refined as conditions change and circumstances require. Cost is a fundamental consideration. Proposed initiatives will be funded primarily by sources outside the university's operating budget, including projected energy savings, grants from government agencies, corporations, and foundations, federal and state incentives, deferred maintenance projects, performance management contracts, and revolving loan funds.

It is crucial as well that Furman establish clear responsibility for coordination, implementation, and assessment of the plan. These tasks will be located primarily in the **David E. Shi Center for Sustainability**, ensuring our institutional commitment to monitoring and oversight of a wide-ranging and ambitious set of goals.

*Sustainable Furman* is a statement of sweeping aspiration and realistic actions. It initiates an annual process of institutional self-assessment, charts a more sustainable course across a wide range of university activities, and defines an achievable plan for reducing our carbon emissions. It is also a flexible plan designed

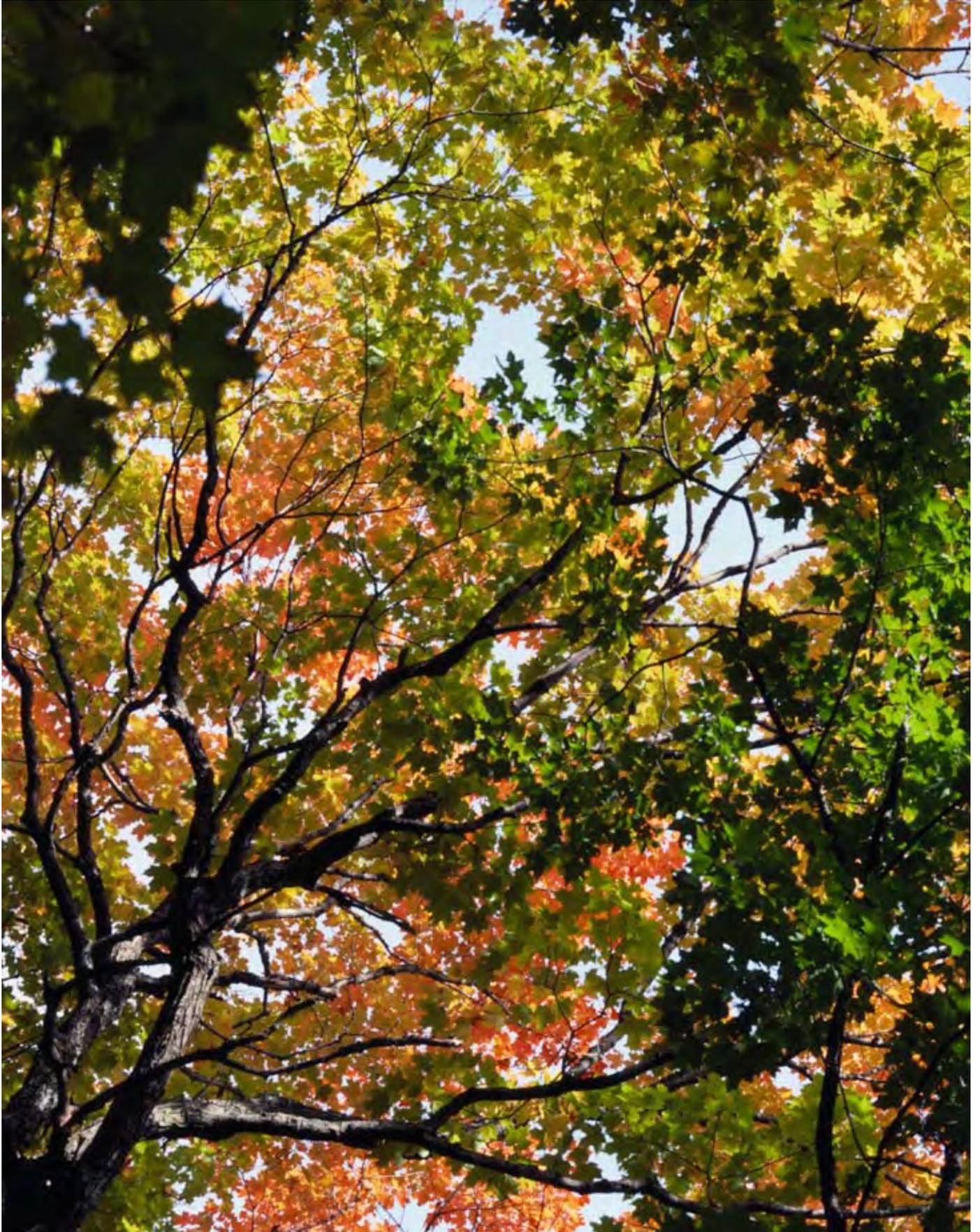
to accommodate changing circumstances, fluctuating financial resources, and unexpected opportunities.

Sustainability has become a core university value and a dynamic force on campus. More than a decade ago, we recognized that fulfilling our educational mission required that Furman operate more efficiently and take greater responsibility for its impact on the environment. That commitment has matured into *Sustainable Furman*—a concrete, holistic, and public statement of our strategic vision intended to ensure that Furman enjoys a flourishing future.



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## I. PREAMBLE

During the first decade of the twenty-first century, higher education has become the seedbed of the nation's burgeoning sustainability movement. Sustainability means living more conscientiously and operating more efficiently. Sustainable organizations are not solely focused on the needs of the present; they operate with the future in mind; they seek to ensure the ability of future generations to fulfill their potential by exercising more sensible stewardship of the Earth's resources.

Although a new movement and a modern term, sustainability manifests an old ideal. In 1910, President Theodore Roosevelt acknowledged that the government and its citizens have an obligation to protect natural resources from wasteful use in the present so as to preserve them for the future. "I recognize the right and duty of this generation," he said to a Kansas audience, "to develop and use the natural resources of our land; but I do not recognize the right to waste them, or to rob, by wasteful use, the generations that come after us."

In other words, living sustainably entails taking the long view of our actions and their consequences. Just as endowment funds enable colleges to flourish in perpetuity, so too does sustainability promote the long-term wellbeing of people and campuses. As centers of learning and research and as dynamic communities, colleges are especially well-suited to model sustainable behavior: to expose students to the implications of climate change and the depletion of natural resources; to inspire students to embrace more sustainable ways of life; and to discover new ways to ensure that future generations will inherit a world still teeming with possibility. In sum, sustainability is an interdisciplinary concept promoting values, systems, and activities that are ecologically sound, environmentally conscientious, socially just and economically viable. As such it has become a driving force in modern life, a guiding principle of campus behavior, and an academic program in its own right.

For more than a decade, Furman University's trustees, faculty, staff, students, and alumni have joined forces to make sustainability and environmental education institutional priorities. In 2001, the Board of Trustees unanimously agreed "to strengthen Furman's commitment to the environment by promoting sustainability through educational programs, campus operations and construction practices, and public awareness initiatives." In 2004, the university's new strategic plan affirmed that commitment, and in 2007 Furman became one of the charter members of the **American College and University Presidents' Climate Commitment**.\*

Furman has steadfastly sought to translate this abiding commitment into a widespread institutional culture that emphasizes operational effectiveness, energy conservation, monetary savings, and environmental stewardship. To do so, we have tried to integrate sustainability into every facet of university life—not just campus operations and construction practices, but also the curriculum, co-curricular activities, the budget, and collaborative projects in the greater community. As a private institution with a very public mission, we have in recent years strengthened our already robust campus climate action initiatives, and have disseminated technical advice and information to other colleges and to the broader community. These collaborations have included activities with the fifteen members of the **Associated Colleges of the South** (ACS) and the three other **Duke Endowment** schools: Davidson, Duke, and Johnson C. Smith. In recent years, we have deepened and broadened student engagement in all of our major initiatives. The university has become a national leader in the sustainability movement, garnering numerous awards, grants, media coverage, and donations ([www.furman.edu/sustain](http://www.furman.edu/sustain)).

Furman, along with other colleges and universities, has assumed an important leadership role in the effort to combat

\*Bolted key words are defined in Appendix I (glossary).

environmental degradation and address the challenges and complexities of climate change. This role is not surprising, for colleges have always been catalysts for action and centers for leadership. By their very nature, colleges are also intended to be sustainable; campuses are built to last and are endowed in perpetuity. Colleges seed the future by preparing young people for lives of leadership and service. But how do colleges weave the premises and practices of sustainability into their cultural fabric? How do we implement more sustainable practices? As a society, how do we make sustainability . . . sustainable? And what is it that we want to sustain and preserve?

This document explains how Furman addresses those questions. We start from the premise that we must understand our ecological impact in a holistic way—not just calculating how much carbon we emit, bottles we recycle, or solar panels we install. Understanding more fully the extent of the university's impact on the environment enables us to identify sustainability goals and strategies, develop key performance indicators, and assess our progress toward becoming a more sustainable institution. In its essence, this document describes a comprehensive plan to ensure that Furman remains a high-performance learning community—forever.

Becoming a more sustainable institution carries with it another substantial benefit: it strengthens Furman's ability to sustain itself as a leading liberal arts college. In coming years, we must continue to attract outstanding students and faculty in an

increasingly competitive environment. To do so requires that we offer an educational experience of distinctive quality. In this regard, sustainability is becoming a touchstone for a growing number of prospective students who ask what sets Furman apart from other colleges. Engaging the issues associated with sustainability will also enable our graduates to compete for the growing number of sustainability-related jobs and leadership positions. Moreover, maintaining the considerable momentum we have generated as an acknowledged leader in the sustainability movement will ensure the continued support of foundations and donors whose philanthropy centers on issues related to energy use and environmental stewardship. Of critical importance, of course, is that Furman must continue to operate in a fiscally sound fashion and seek ways to conserve resources and increase efficiencies. A pledge to become more sustainable is, in fact, a commitment to become more financially disciplined and more self-conscious about how we secure and use our resources.

*Sustainable Furman* is a living document—not a static plan. It is intended to provide a flexible blueprint capable of responding to the unpredictable challenges and opportunities of uncertain times and an unknown future. But even as the plan evolves and is implemented in coming years, its bedrock principles will not change, for Furman recognizes that a commitment to sustainability is not a program or a finished project, not a single goal or a final destination. Instead, it is a dynamic element of the university's institutional identity and ongoing journey.



## II. A SUSTAINABILITY MASTER PLAN

*Sustainable Furman* flows naturally from the university's foundational emphasis on environmental responsibility and sustainable practices. These efforts were dramatically accelerated when the university became a charter signatory of the **American College and University Presidents' Climate Commitment** in 2007. Since then, nearly 700 other institutions of higher learning (representing about 40 percent of college students in the United States) have pledged to become "**climate neutral**" by sharply reducing their **greenhouse gas (GHG) emissions** and expanding their research and educational efforts related to climate change.

The first wave of sustainability programs in higher education was centered on—and often limited to—making campus operations more energy efficient. While aggressively promoting energy conservation and high-performance **LEED-certified buildings** (The Leadership in Energy and Environmental Design Green Buildings Ratings System), Furman University has adopted a much broader perspective in making sustainability a pervasive campus priority. Because we are first and foremost an educational enterprise, we are more concerned about fostering learning and promoting environmental citizenship than simply saving energy. We not only want to be more sustainable in our use of natural resources and our efforts to educate students about environmental issues and policies, but we also want to stimulate a continuing conversation about what is most worth sustaining. At the heart of liberal learning is the ultimate question: what really matters?

To help ensure that such fundamental conversations are nurtured and renewed, we have focused considerable attention on integrating sustainability-related topics and issues into the academic program. In fall 2008, for example, the Furman faculty implemented a new curriculum that requires all students take at least one course dealing with "**Humans and the Natural Environment.**" At the same time, the university launched an array of related curricular, **co-curricular**, and extracurricular initiatives to connect the university's academic emphasis on sustainability with student life and community outreach activities.

To oversee and encourage such efforts, the university created a **Sustainability Planning Group** in 2005 consisting of 24 professors, staff members, and students. After signing the Presidents Climate Commitment in January 2007, President David Shi charged the group with producing a campus-wide greenhouse gas inventory and a "**Climate Action Plan**" (CAP) that would describe how Furman planned to meet its commitment to become carbon neutral. Since then, Furman has submitted greenhouse gas inventories for 2007 and 2008 to the Association for the Advancement of Sustainability in Higher Education (AASHE). In developing Furman's CAP, the planning group agreed that a key first task was to identify a possible target date for carbon neutrality that would frame its discussions. The committee agreed that 2026 – the university's bicentennial year – would balance the realities of an uncertain fiscal, technological, and political landscape with the desirability of setting an ambitious yet achievable target date.

To facilitate the development of the Climate Action Plan, the Sustainability Planning Group was expanded in October 2008 to 124 members, including faculty, staff, trustees, students, and community leaders, and was renamed the **Sustainability Planning Council (SPC)**. The SPC includes a core steering committee and four standing committees: curriculum, co-curriculum, communications, and campus operations. The SPC is co-chaired by Tom Kazee, Provost, Angela Halfacre, Director of the David E. Shi Center for Sustainability, and Bill Ranson, Professor of Earth and Environmental Sciences.

At the outset of this planning process, President Shi and the SPC determined that *Sustainable Furman* would be much more comprehensive than simply a plan to reduce carbon emissions. It would instead encompass a long-range sustainability master plan for the university—and thus include not only those activities relevant to our carbon and ecological footprints, but also the broad scope of the university's mission and functions.

Accordingly, the four standing committees of the SPC were asked to prepare an overall plan that would address the many topics pertinent to sustainability at Furman, including the curriculum, co-curriculum, facilities operations, renewable energy, campus behavior related to energy consumption, community outreach projects, and others. To ensure that a diverse set of perspectives would inform this effort, the SPC initiated a series of conversations about sustainability with various groups, including a Board of Trustees mini-retreat in February 2009 and an Advisory Council retreat in April 2009.

Preliminary drafts of the CAP were prepared by the SPC and its ad hoc writing committee, chaired by President Shi. A draft of *Sustainable Furman* was shared with the campus community in the fall of 2009 and discussed by students, faculty, and staff in a series of meetings and online postings in October. This final plan—including a comprehensive university master plan and the Climate Action Plan—was completed for submission to the Board of Trustees in November 2009.

Implementation and coordination of the various strategies outlined in *Sustainable Furman* will be centered in the David E. Shi Center for Sustainability. Since its inception in 2008, the Center has

hosted and facilitated an array of educational events, research projects, and policy discussions on campus and in the greater community. Recently renamed to honor President Shi's commitment to sustainability, the Center will assume primary responsibility for promoting the plan's goals in a multidisciplinary and collaborative environment. The Center will also regularly share information about sustainability initiatives, and will document changing environmental perceptions on campus and in the South Carolina Upstate.

In sum, this plan is the culmination of more than a decade of university strategic planning and policy development. (See Figure 1). Of course, many changes—expected and unexpected—will occur between 2009 and 2026. This will be a period of experimentation and opportunity as the campus community identifies and implements strategies designed to make us more sustainable. Technological advances, new government policies and programs, unpredictable economic developments and financial performance, shifting social priorities, and many other factors will affect the university's progress in achieving climate neutrality. As a dynamic plan, *Sustainable Furman* will be monitored and modified regularly, assuring that it continues to be a catalyst for our sustainability efforts.

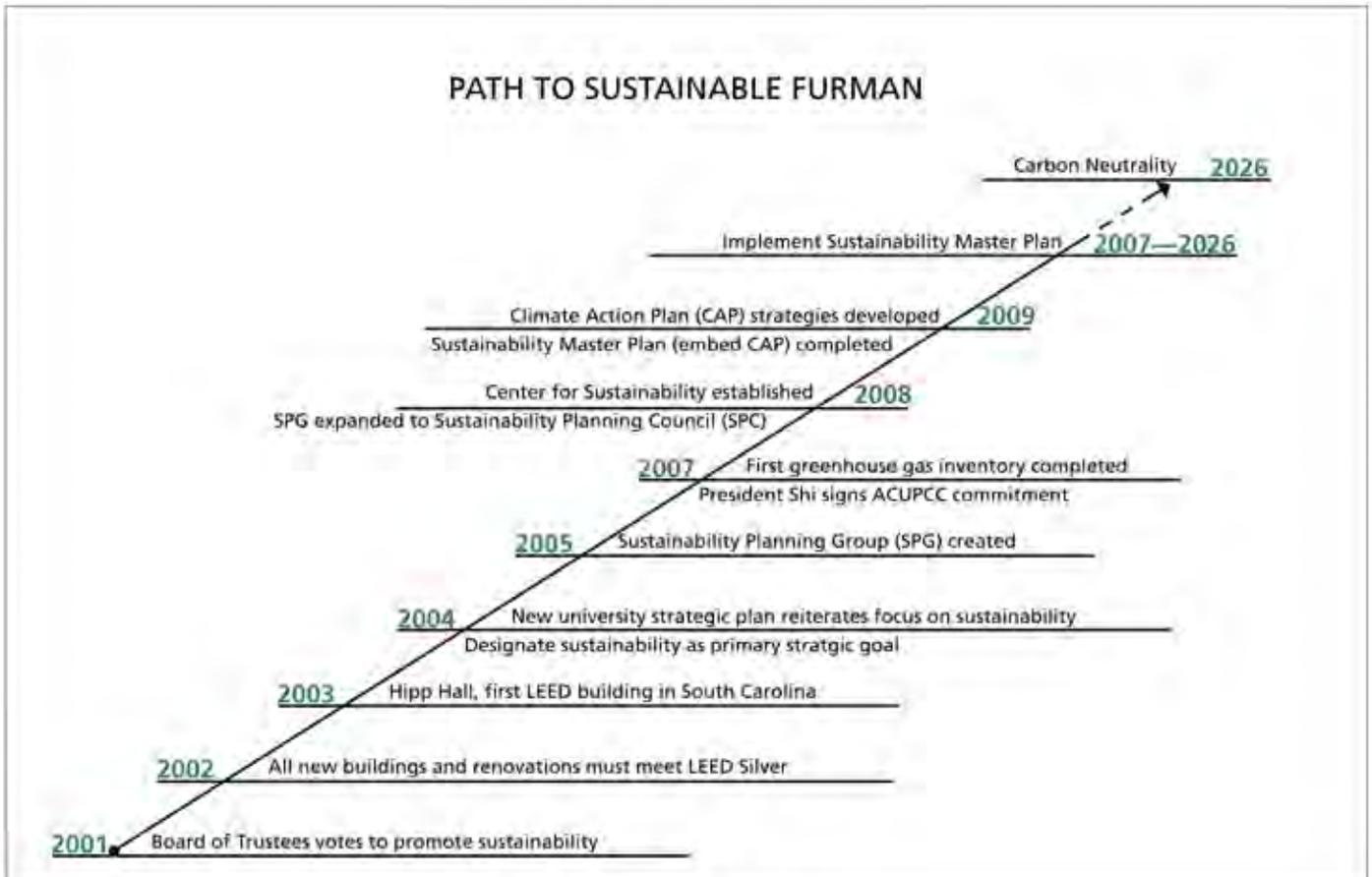


Figure 1: *Path to Sustainable Furman* overviews the key steps taken by the university on the path to sustainability.



### III. OUTCOMES

A more sustainable Furman will mean undertaking tangible actions to reduce the impact of university activities on the environment and promote environmental stewardship. Some of these actions will be symbolic and abstract, others concrete and measurable. Taken together, all of the initiatives resulting from this planning process will seed the future by better preparing young people for lives of leadership and service. Specifically, we anticipate that successful implementation of this sustainability master plan will produce an array of outcomes. Among these are:

- **Greater Student Engagement**
  - o more opportunities for students in the emerging academic and professional fields of sustainability
  - o more student civic engagement in sustainability within the greater Greenville community
  - o more possibilities for faculty to complement their existing research and teaching with sustainability projects
  - o more student career opportunities related to sustainability
- **Conservation Culture and Research**
  - o more awareness of conservation practices and their potential economic benefits
  - o better understanding of how human and institutional activities affect the environment
- **Energy and Emissions**
  - o reduced greenhouse gas emissions
  - o increased resource conservation
  - o fiscal savings resulting from energy conservation efforts
  - o improved energy efficiency
  - o more use of renewable energy systems
- **Campus Wellness**
  - o more cycling and walking on campus and less vehicular traffic
  - o increased wellness through more active and healthy lifestyles, food choices, and contemplative practices
  - o more use of foods grown locally (including on campus) in the Dining Hall and Pala-den (Food Court)

- **Community Connections**

- o adoption of more sustainable land use policies
- o increased community collaboration, including research projects

- **Fiscal Advantage**

- o continued commitment to sustainability through endowment investment initiatives and protocols

This animating vision of a more sustainable university and community cannot be achieved without considerable creativity, innovation, flexibility, and energy. Such efforts must begin with those in leadership positions. The longstanding commitment of the Board of Trustees and senior administrative leadership bodes well for maintaining the momentum already generated. This commitment is critical, for these groups will make the sometimes difficult choices about institutional direction and resource allocation. Their decisions should not, however, be made in isolation. It is imperative that the community remain engaged in the policy-making process, for embracing a conservation-oriented ethic is a daunting undertaking. Indeed, it will not succeed if driven solely from the top or pushed only from the bottom. Tradeoffs and sacrifices must be defined and weighed in a transparent, deliberate, and conscientious fashion. In addition, we must exploit fully the substantial intellectual resources of our students and faculty, recognizing that many of the answers to pressing questions will not come from outside the university but will be generated by a teaching and learning community of impressive depth and breadth. We must appeal to the wellspring of Furman's ethos— our longstanding commitment to personal responsibility and public service—to help the Furman community recognize that living sustainably is consistent with these values. Finally, our efforts will succeed to the extent that individual and institutional accountability is clearly assigned, and progress toward the achievement of goals is regularly, honestly, and accurately assessed.





## IV. FINANCING

Promoting sustainability involves investing in the future. Given both the extended time frame for implementation of the strategies described in *Sustainable Furman* and the uncertainties about a wide range of contextual factors that will affect the plan's progress (e.g., technological developments, federal and state policy actions, strategies adopted by Duke Energy), it is premature to identify specific funding sources for each of the long-range goals and specific strategies. Implementing a campus-wide energy conservation program is the first priority—and reducing energy use will generate financial savings.

The second priority will be projects that enable the institution to operate more efficiently and thereby reduce carbon emissions. A 2009 report by the consulting firm McKinsey concluded that energy efficiency represents the “most compelling” way to combat climate change. The report predicts that the United States could save \$1.2 trillion by investing in energy efficiency improvements. Such efficiency efforts can be financed or facilitated through savings from lowered energy use, the ongoing replacement of aging equipment and systems, research and development grants, and revolving loan funds and/or energy performance management contracts. Examples of such projects include upgrades to campus utility systems, the construction (or renovation) of energy-efficient buildings, and more widespread deployment of energy management systems.

The deployment of renewable energy systems constitutes a third priority. Over time, the technology, pricing and government incentives associated with renewable energy projects will

improve. The university will consider investing in renewable energy systems, on or off campus, as they become more reasonably priced. Sources of funding for renewable energy projects may include grants, federal incentives, revolving loan funds, collaborative partnerships, savings from a reduction in the amount of electricity purchased by Furman, and investments from the university's endowment.

Many of the strategies described in this plan do not require significant expenditures. Duke Energy, for example, will become a “cleaner” source of purchased electricity with no financial investment from Furman. Likewise, the promotion of conservation-minded behavior across the campus is a low cost, common-sense strategy. Together, these two initiatives will produce a significant reduction in Furman's carbon footprint.

The funding and timing of each sustainability-related project will be evaluated on a case-by-case basis, and within the protocols already established for Furman's expenditures and capital projects. It is important to remember that the status quo is unsustainable; conventional energy costs will continue to rise. Duke Energy, for instance, is projecting 6 percent annual increases in its electricity over the next several years. So the financial benefits of greater energy conservation, energy efficiency improvements, and renewable energy will increase over time. It bears repeating: sustainability involves taking the long view.





## V. STRATEGIC GOALS

The eight strategic goals in this plan are detailed below. Many of the strategies associated with each goal have already been initiated and are in progress; these strategies are marked in parentheses with the year of initiation.

### **GOAL 1: EXPAND AND ENHANCE CURRICULAR OPPORTUNITIES RELATED TO SUSTAINABILITY**

Because sustainability encompasses a wide array of themes, ideas, issues, and activities, it can be creatively incorporated into—and be informed by—virtually all of the academic disciplines. Furman’s curriculum has incorporated sustainability and environmental topics for many years. Only recently, however, have students had opportunities for more focused study and research. In 1999, for example, the faculty approved a multi-disciplinary environmental studies “concentration”—a cluster of related courses from different departments organized around a common theme. In addition, the university’s new curriculum, implemented in the fall of 2008, includes a requirement that all students take at least one course centered on the relationship of “Humans and the Natural Environment.” Moreover, all first-year students enroll in two small group seminars—one in the fall semester, one in the spring—many of which focus on aspects of environmental sustainability. These and other curricular enhancements ensure that no student will graduate without having confronted issues related to climate change and sustainability.

More extensive integration of sustainability into the curriculum should include consideration of a new academic major in sustainability science, and/or a sustainability concentration, and more infusion of sustainability themes into the curriculum. Curricular enhancement should include, as well, consideration of academic programs aimed at external constituencies, including working professionals and the business community.

### **Strategies:**

#### **1.1 Create new curricular programs for undergraduates**

- 1.1.1 Assess the value and financial feasibility of a sustainability science major (2008)
- 1.1.2 Assess the value and financial feasibility of a sustainability studies concentration (2008)

#### **1.2 Enrich the existing curriculum as it relates to sustainability themes and topics**

- 1.2.1 Provide a sufficient number of sustainability-related courses to satisfy the new graduation requirement that all students take at least one course related to Humans and the Natural Environment (2008)
- 1.2.2 Create regular opportunities (workshops) and incentives for faculty members to integrate sustainability into their courses (2009)
- 1.2.3 Promote greater faculty use of the campus sustainability living/learning laboratories in courses or for class-related applied research projects (2009)
- 1.2.4 Promote development of courses that make use of community-based research on sustainability (2009)
- 1.2.5 Assess the feasibility of a scholar-in-residence program

#### **1.3 Develop curricular opportunities to serve the broader community**

- 1.3.1 Expand for-credit and not-for-credit educational opportunities for professionals in the greater Greenville community
- 1.3.2 Assess the value and feasibility of a new executive program in sustainability and leadership at the master’s level
- 1.3.3 Assess the value and feasibility of a program in Sustainability Administration at the Masters level
- 1.3.4 Integrate sustainability topics and themes into the **Osher Lifelong Learning Institute (OLLI)** curriculum



## GOAL 2: EXPAND INNOVATIVE CO-CURRICULAR EXPERIENCES TO ENHANCE STUDENT LEARNING ABOUT SUSTAINABILITY

Active student participation through co-curricular offerings and activities is essential to the success of campus sustainability efforts. Furman students find that personal responsibility toward the environment is very much in harmony with the university's cooperative approach to engaged learning. Students should come away from their Furman experience with the habit of environmental citizenship as a way of life. Beginning in August 2009, for example, a portion of the First-Year Student Orientation program was dedicated to sustainability/climate action. In addition, the Shi Center for Sustainability, the **Sustainability Planning Council (SPC)**, and the **Max and Trude Heller Student Service Corps** have created student service opportunities in the local community related to sustainability.

In 2009, Furman also launched **Sustainable Connections**—a new student organization designed to coordinate efforts among all student-led sustainability initiatives. Sustainable Connections is an umbrella organization that maintains a web-based forum connecting fourteen existing student organizations. Another

new student organization, **Conserve Furman**, focuses on peer-to-peer educational programs promoting the wiser use of natural resources. In 2009, Furman also developed a student volunteer network in support of the university's **Sustainability Living/Learning Laboratories**. These "learning laboratories" are campus projects and facilities that foster learning and research related to sustainability. They include **The Furman Farm** (a student-managed organic garden), **The Cliffs Cottage** (an eco-facility housing the Shi Center for Sustainability), **The Place of Peace** (a former Buddhist temple that was dismantled in Japan, shipped to the United States, and rebuilt at Furman), the **Furman Lake Restoration Project** (an effort to restore Furman Lake to a more natural, healthy environment through the use of native vegetation and reduction of the waterfowl population), **The Thoreau Cabin** (an exact replica of the cabin Henry David Thoreau built at Walden Pond), the **Biodiesel Program** (a laboratory that converts dining hall cooking oil into biodiesel fuel for use in university vehicles/mowers), and the **Solar Aquatic Wastewater Treatment System** (a living machine that uses natural processes—sunlight and plant communities—to clean the water used in the science building and then re-circulate it back into the building as "gray" water using electricity from concentrated solar collectors on site).

More and more students are becoming involved with Furman's sustainability efforts, and co-curricular opportunities are central to their involvement and engagement. We will expand these learning opportunities in coming years.

### **Strategies:**

#### **2.1 Increase campus programming and initiatives designed to heighten student awareness of sustainability issues.**

- 2.1.1 Enhance and expand sustainability-related engaged living and learning communities, including the **Greenbelt Community** and **Environmental Community of Students** (ECOS) First-Year Student Program (1999)
- 2.1.2 Support and expand the **Green Room Energy and Environmental Initiative** (GREEN) Showcase Residence Hall (2009)
- 2.1.3 Enhance the student Sustainability Fellows Program (2008)
- 2.1.4 Enhance the Sustainability Post-Doctoral Fellow Program (funded by the Associated Colleges of the South 2009)

#### **2.2 Provide more opportunities for students to embrace sustainable living**

- 2.2.1 Provide opportunities to sign the Eco-Pledge (piloted 2008)
- 2.2.2 Provide opportunities to sign the Green Graduation Pledge (2007)

#### **2.3 Develop additional student sustainability-related projects**

- 2.3.1 Create a Student Revolving Loan Fund for energy conservation projects (funded by a foundation grant 2009)
- 2.3.2 Create opportunities for students to shadow professionals working in sustainability fields
- 2.3.3 Organize an alternative sustainability-centered spring break program

#### **2.4 Promote sustainability through dedicated cultural events**

- 2.4.1 Increase the number of **Cultural Life Program** events related to sustainability (2008)
- 2.4.2 Create a sustainability-related film series (2007)
- 2.4.3 Host a recycled art competition
- 2.4.4 Develop an annual speaker series with a sustainability-related thematic focus

#### **2.5 Enhance sustainability education opportunities on campus**

- 2.5.1 Include information about sustainability programs during First-Year Student Orientation (2009)

2.5.2 Create a "traveling workshop on sustainability" to promote student awareness

2.5.3 Produce more public service announcements (short films) related to sustainability that can be shown on campus for education (2009)

2.5.4 Post a "Green Guide for Students" (2008)

2.5.5 Update Furman's Sustainability website (2008)

2.5.6 Provide more educational signage about sustainable behaviors on campus (2008)

2.5.7 Enhance campus communications about sustainability (2008)

2.5.8 Produce a Green Purchasing Guide for Students

2.5.9 Produce a Local/Organic Food Guide

2.5.10 Create self-guided sustainability tours via the Furman website and campus map

2.5.11 Create an environmental library website

2.5.12 Create a "Campus as Habitat" website, cataloguing the organisms on campus (2009)

#### **2.6 Celebrate the accomplishments of the campus community by creating a campus Sustainability Awards Program**

#### **2.7 Support student sustainability-related organizations**

- 2.7.1 Provide funding for Sustainable Connections to connect student groups and resources (2008)
- 2.7.2 Provide funding for Conserve Furman to encourage peer-to-peer energy conservation education (2008)
- 2.7.3 Encourage more student government involvement in sustainability efforts

#### **2.8 Support annual campus sustainability events and service activities**

- 2.8.1 Expand energy conservation competitions (2006)
- 2.8.2 Support the Tire Pressure Check program (2007)
- 2.8.3 Promote student attendance at Power Shift (2008)
- 2.8.4 Promote Recyclemania (2006)
- 2.8.5 Engage students and faculty in Campus Sustainability Day (2008)
- 2.8.6 Encourage programming for Earth Day and Earth Hour
- 2.8.8 Create a sustainability service division within the Heller Service Corps (2009)
- 2.8.9 Create a sustainability federal work-study program to support existing sustainability living/learning laboratories (2008)
- 2.8.10 Revive an on-campus bicycle maintenance program
- 2.8.11 Revive "Lake Clean-Up" day
- 2.8.12 Involve Furman alumni in sustainability efforts on campus and in the local community

### **GOAL 3: CREATE A CAMPUS-WIDE CULTURE OF CONSERVATION**

Perhaps more than most institutions, Furman recognizes the importance of beauty and resilience, memory and place, to the spirit of learning and living. It was this reverence for the campus as a compelling educational setting that prompted the administration in the mid-1990s to promote sustainability as a defining institutional value and a primary strategic goal. Furman will continue to expand initiatives and infuse sustainability across all programs and divisions. Furman seeks to involve all members of the campus community in the implementation of climate action and promotion of sustainability. A participatory, collaborative approach will guide such efforts.

Conservation, the efficient use of all types of resources, from energy to water to budgetary dollars, is the most important way to save natural and fiscal resources and contribute to climate action efforts. At its core, sustainability requires community members to engage in environmentally responsible behaviors. All members of the Furman community—students, faculty, staff, and visitors—should be encouraged and rewarded for acting in environmentally conscious ways, especially with regard to the use of campus resources. Efforts to promote energy conservation will include curricular, co-curricular, and extra-curricular dimensions.

Of particular importance is the need to create a system of incentives for conservation. Encouraging changes in behavior can be challenging, but modest financial investments in this area have the potential to produce substantial and long-term reductions in our environmental impact as well as significant financial payback. A comprehensive energy and natural resources conservation program will require creative approaches, consistent monitoring, ongoing analysis, and technical expertise.

Furman encourages students and community members to develop the habits of mind and heart that will foster lifelong environmental stewardship. Promoting conservation in engaged, co-curricular activities is an excellent way to create, reward, and reinforce those behaviors. Such efforts offer substantial benefits to our community and the environment.

#### **Strategies:**

#### **3.1 Infuse sustainability (especially an energy conservation ethic) more deeply into the campus culture by expanding opportunities for involvement**

3.1.1 Develop a Sustainability Liaisons Program by which each division, department, and program appoints a liaison as part of a campus-wide information network

3.1.2 Create a Campus Sustainability Help Desk (to be in place January 2010)





**3.2 Promote opportunities for individuals and groups to share in the ongoing visioning process for sustainability at Furman**

**3.3 Document, implement, and assess conservation practices on campus**

3.3.1 Conduct a mixed methods (surveys, focus groups, individual interviews, data monitoring) assessment of Furman faculty, staff, and student knowledge of and attitudes about sustainability and conservation (2008)

3.3.2 Identify and address barriers to environmentally responsible behavior (2008)

**3.4 Encourage energy conservation awareness programs and practices**

3.4.1 Initiate a “Conservation Culture” initiative to provide research opportunities for faculty and staff focused on

conservation behaviors and attitudes on campus and in the Upstate (2009)

3.4.2 Ensure that University policies support sustainability initiatives and conservation-oriented practices [e.g., purchasing, building management, grounds maintenance, bookstore sales] (2008 – green purchasing guidelines)

3.4.3 Develop an incentive program for campus conservation efforts

**3.5 Conduct an ecological footprint analysis to determine the environmental impact of university activities**

**3.6 Participate in the Association for the Advancement of Sustainability in Higher Education (AASHE) Sustainability Tracking and Assessment Rating System (STARS)**



#### **GOAL 4: FURTHER IMPROVE THE ENERGY EFFICIENCY OF BUILDINGS, OPERATIONS, AND INFORMATION TECHNOLOGY**

Furman will continue to require high performance and energy-efficient facilities and operations—both new construction and major renovations. In 2001, Furman’s trustees declared that all new and renovated construction projects must meet or exceed LEED Silver (Leadership in Energy and Environmental Design Green Buildings Rating System). The university recently received the South Carolina Green Building Council’s Award of Excellence for its pioneering work in green building technologies. The Charles H. Townes Center for Science is a recent example of Furman’s emphasis on sustainable design. Dedicated in fall 2008, it incorporates an array of renewable energy components, including a solar/aquatic wastewater treatment system, two hybrid solar concentrators, daylighting, energy recovery wheels, and a sophisticated chilled-beam cooling system for thermal efficiency. These high performance facilities are more than classroom buildings; they provide learning and research opportunities for students as they study the role of energy and materials in the built environment. Such opportunities encourage engaged learning from different disciplinary perspectives.

##### **Strategies:**

#### **4.1 Expand energy and water efficiency improvements**

- 4.1.1 Complete upgrades to the campus utility systems (ongoing)
- 4.1.2 Implement projects that decrease water usage (ongoing)

- 4.1.3 Improve the operating efficiency of lighting systems, Heating, Ventilating, and Air Conditioning (HVAC), and electrical systems (ongoing)
- 4.1.4 Continue efforts to minimize heat transmission and air infiltration in buildings (ongoing)
- 4.1.5 Improve the efficiency of information technology equipment and audio/visual systems (ongoing)
- 4.1.6 Upgrade energy control systems (ongoing)
- 4.1.7 Incorporate new energy-saving technologies and systems when they become viable (ongoing)
- 4.1.8 Renovate traditional residence halls to upgrade systems and improve functionality (planned)

#### **4.2 Make operational and maintenance practices more sustainable**

- 4.2.1 Automate the energy data collection system and share the data with the campus community (ongoing)
- 4.2.2 Increase the number of energy data monitoring systems on campus (ongoing)
- 4.2.3 Develop a program to re-commission building systems periodically to ensure maximum operating efficiencies
- 4.2.4 Improve the effectiveness of the campus recycling program (ongoing)
- 4.2.5 Implement more sustainable practices in the areas of purchasing policies, grounds maintenance, building maintenance, and custodial operations (ongoing)
- 4.2.6 Implement more sustainable practices in the use of information technology

## **GOAL 5: CREATE A MORE SUSTAINABLE CAMPUS TRANSPORTATION SYSTEM**

Although Furman is a residential campus, faculty, staff, and students are routinely “on the road.” Students and faculty travel across campus, throughout the Upstate, and to more distant locations for conferences and Study Away programs. Furman employees commute to campus and at times conduct business in university vehicles. Much of this travel takes place in relatively inefficient, gasoline-powered vehicles with one occupant.

We will continue to travel, to be sure; Furman is an energetic community and the demands of learning on- and off-campus, outreach to the community, and the normal conduct of business dictate that we move from place to place in reasonably convenient and timely ways. Alternatives to our current transportation practices and modes exist, however, and we must encourage their broader adoption. Non-essential vehicle use ought to be discouraged, further incentives for carpooling, cycling, and walking should be implemented, and more energy-efficient vehicles should replace inefficient vehicles in the university fleet. Modes of public transportation, such as campus shuttles and city buses, should be evaluated and implemented as appropriate, and their use should be encouraged.

### **Strategies:**

#### **5.1 Educate the campus community about the greenhouse gas emissions generated by transportation and facilitate alternatives to automobile use**

- 5.1.1 Increase the operating hours and routes of the campus shuttle
- 5.1.2 Assess the feasibility and affordability of public transit options
- 5.1.3 Organize a ride-sharing program
- 5.1.4 Revise parking policies and research the effectiveness of changes in automobile registration fees to discourage casual car use on campus
- 5.1.5 Assess the feasibility of a car-share program
- 5.1.6 Assess the feasibility of a campus-wide bike program

#### **5.2 Continue to promote new, more efficient transportation options/operations**

- 5.2.1 Continue to convert the campus fleet to more energy-efficient vehicles
- 5.2.2 Investigate the feasibility of a liquid natural gas fueling station for vehicles
- 5.2.3 Provide plug-ins for new hybrid models

#### **5.3 Examine best practices to address Study Away and other travel-related carbon reduction**





## **GOAL 6: INVEST IN LARGE-SCALE RENEWABLE ENERGY PROJECTS**

Furman is committed to using a variety of methods to reduce its carbon footprint. This will not only save money through energy conservation, it will also reduce the university's financial exposure to dramatic fluctuations in the supply and price of any single energy resource. Currently, Furman spends over \$3.5 million annually on energy and utilities.

In coming years, Furman will develop more renewable energy resources, resulting in a more diverse energy portfolio. Energy consumption is the primary source of the university's **greenhouse gas emissions**. Purchased electricity (just over 30 million kWh per year) including transmission and distribution losses accounts for 62.4% of our emissions, and on-campus energy production (which uses natural gas and propane) accounts for an additional 12.0% of our emissions. If Furman University is to become carbon neutral, these emissions must be reduced (or offset) to zero. Attaining such ambitious goals is difficult given the many unknowns regarding likely technology improvements, fluctuating energy costs, and implementation barriers. Several renewable energy possibilities are being considered, such as solar, geothermal, and biomass. However, a complete feasibility study will be required to understand how much conventional energy consumption can be replaced by renewable energy sources.

### **Strategies:**

#### **6.1 Identify, when financially feasible, the most appropriate large-scale renewable energy projects to reduce the utilities budget and campus carbon footprint**

- 6.1.1 Shift to more **solar photovoltaic** energy sources
- 6.1.2 Incorporate **solar thermal** energy systems
- 6.1.3 Consider an investment in off-site biomass generation plants within Furman's renewable energy portfolio
- 6.1.4 Consider the development of an on-site biomass generation plant that will burn woody debris to generate electricity
- 6.1.5 Add more **geothermal energy** sources

#### **6.2 Continue working with The Duke Endowment and the colleges it supports to examine renewable energy options (ongoing)**

#### **6.3 Pursue emerging state and federal level funding/ incentives to assist with renewable energy efforts (ongoing)**

#### **6.4 Collaborate with Duke Energy to encourage a reduction in the GHG emissions produced by their coal-fired power plants.**

**GOAL 7: ENHANCE SUSTAINABILITY SERVICE OPPORTUNITIES AND CREATE LOCAL CARBON OFFSET PROJECTS AND PROGRAMS**

Like most colleges and universities, Furman will not be able to neutralize its carbon emissions without at least some use of “offsets” – i.e., supporting activities, typically off-campus, that avoid or reduce GHG emissions. According to the guidelines issued by the American College and University Presidents’ Climate Commitment, the best offset projects are local and educational. Many local projects/community partnerships offer significant benefits for students and for nurturing the already strong relationship between Furman and the greater Greenville community. Furman student organizations are enthusiastic about off-campus sustainability projects, and community groups are eager to begin working with these student groups and with the university. Furman’s emphasis has been on local projects we can develop in conjunction with other organizations and with the city and county of Greenville.

**Strategies:**

**7.1 Promote “sustainable service” as a form of community outreach**

7.1.1 Utilize students from the Heller Student Service Corps Sustainability Division for community projects and programs (2009)

7.1.2 Create a “Sustainable Friends of Furman” community volunteer network that focuses on partnership with adult

students enrolled in the Osher Lifelong Learning Institute (OLLI), as well as other members of the community (2009)

**7.2 Collaborate with greater Greenville-area community organizations on service programs and offset options**

7.2.1 Train students, faculty, and staff to perform low-income home energy audits

7.2.2 Implement a low-income home weatherization program, e.g., window replacement, weather stripping and programmable thermostats

7.2.3 Implement low-income home refurbishment, including light bulb replacement, heating system and appliance upgrades, water heater replacement

7.2.4 Investigate the use of manure from the Greenville Zoo as part of a campus composting program

7.2.5 Investigate the establishment of international projects focused on sustainability and the incorporation of sustainability projects in current Study Away programs

7.2.6 Explore the feasibility of developing a carbon mitigation fund specifically for local community offset projects

7.2.7 Investigate partnerships with other universities and entities to establish and maintain forests in the Upstate to sequester carbon

7.2.8 Establish a program to replace the university community’s gasoline-powered lawn mowers with electric or battery-powered mowers

7.2.9 Consider additional related projects such as rain gardens, cisterns, stormwater management and water quality initiatives/organic gardens/local food (2009)





**GOAL 8: CAPITALIZE ON FURMAN'S NATIONAL LEADERSHIP ROLE IN THE COMPREHENSIVE PROMOTION OF SUSTAINABILITY**

Furman's sustainability efforts are holistic and systemic. We have steadfastly sought to translate a strong institutional commitment into a widespread institutional culture—to integrate sustainability into every facet of university life, not just campus operations and construction practices, but also the curriculum, co-curriculum, and creative opportunities for collaborative projects in the greater community. In this process, we have deepened and broadened student engagement in all of our major initiatives, and we have established the university as a national leader in the sustainability movement. Such prominence on a national level has generated widespread media coverage and enabled the university to garner significant funding from foundations and corporations.

**Strategies:**

**8.1 Maintain Furman's commitment to serve as a national and regional leader in promoting sustainability on campuses**

- 8.1.1 Create a sustainability leaders network (e.g., campus and corporate sustainability coordinators)
- 8.1.2 Continue the involvement of Furman staff/faculty/students in national sustainability efforts (ongoing)

**8.2 Promote the sharing of sustainability approaches among other colleges and universities**

**8.3 Provide models of sustainability community service projects for the region and nation**

- 8.3.1 Create a local offset certification entity that will assist Furman and other institutions throughout the region to identify and verify innovative local offset initiatives and calculate their carbon reductions
- 8.3.2 Create a sustainability faculty-staff-student consultancy group for community projects



## V. CONCLUSION

Sustainability has become a core principle and a transformational force at Furman. Our efforts in this arena have won national awards and stimulated the growing interest of students, faculty, staff, alumni, and community members. Student organizations have initiated a dizzying array of campus projects. A cadre of student leaders committed to sustainability has emerged to lead our efforts on campus and—after they leave Furman—in their communities. The fabric of campus life has been altered. 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 across the campus. The seed of sustainability that germinated over a decade ago is blossoming into a collective vision: *Sustainable Furman*. 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.





## CLIMATE ACTION PLAN

Furman's commitment to climate action has been an integral part of our wide-ranging commitment to sustainability. As a signatory of the American College and University Presidents Climate Commitment (ACUPCC), Furman has declared that it will substantially reduce its greenhouse gas emissions (GHG) in the coming years, aiming toward **climate neutrality** – i.e., reaching net GHG emissions of zero—as our ultimate goal.

We have chosen 2026 as the target date for this achievement. This goal is ambitious, to be sure, but with the steadfast commitment and support of the university community, it can be accomplished. Setting such a bold target will focus our efforts in the coming years and further instill a sense of urgency. Our implementation strategy will be flexible and multifaceted, including increased energy efficiencies, conservation, expanded incentives for reduced vehicle use, and increased reliance on renewable energy sources. These efforts, combined with expected improvements by Duke Energy in providing cleaner electricity to the university, will reduce GHG emissions throughout this period.

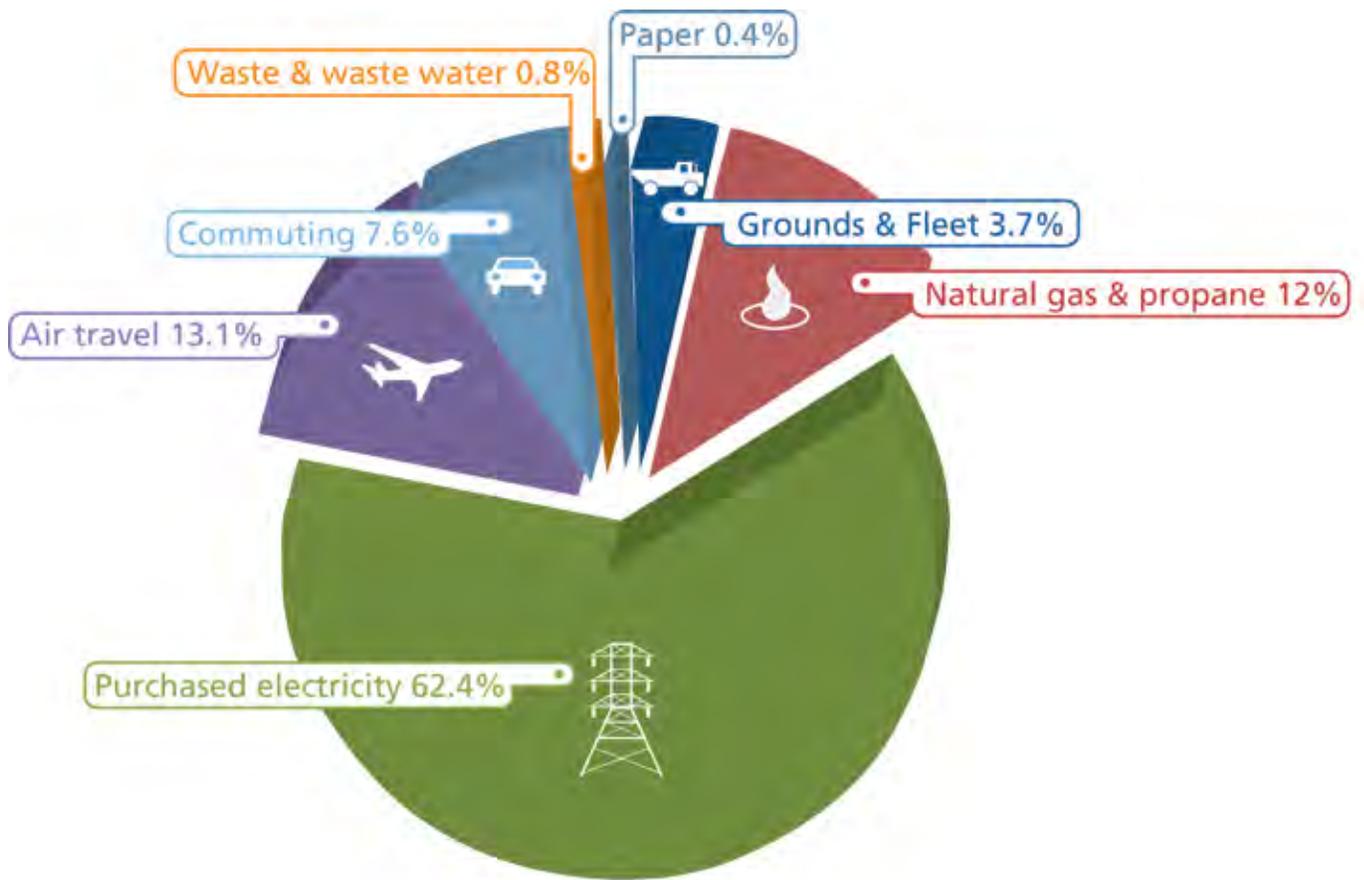
The target date of 2026 also carries considerable symbolic significance, for it will be the year of Furman's bicentennial. It is appropriate that the 200th anniversary of Furman's founding coincide with our achievement of a goal of profound significance for the university and the world around us. Indeed, by reaching climate neutrality and approaching energy independence, we will contribute to a collective effort that will ensure a more sustainable future for generations to come.

As of January 2010, almost 700 college and university presidents in all 50 states have signed the ACUPCC. This high-visibility effort not only garners institutional commitments to neutralize GHG emissions, but it also accelerates the research and educational efforts of higher education to slow climate change. The Presidents' Climate Commitment also will help reduce long-term institutional energy costs, attract more students and faculty, ensure new sources of funding, and increase the support of alumni and local communities.

By signing the Climate Commitment, Furman has pledged to:

- **Complete an annual GHG emissions inventory**
- **Set a target date and interim milestones for becoming climate neutral (i.e., prepare a Climate Action Plan (CAP))**
- **Take immediate steps to reduce greenhouse gas emissions**
- **Integrate sustainability into our curriculum and co-curriculum**
- **Make publicly available the action plan, annual GHG inventory and progress reports**

For more information on the American College and University Presidents Climate Commitment (ACUPCC) see [www.presidentsclimatecommitment.org/](http://www.presidentsclimatecommitment.org/).



33,777 Metric Tons CO<sub>2</sub> Equivalent

Emissions Source	Metric Tons CO <sub>2</sub> Equivalent
Grounds maintenance and university fleet	1,234
Natural Gas & Propane	4,083
Purchased Electricity	21,060
Air Travel	4,431
Commuting	2,560
Water & Waste Water	260
Paper	149

**Figure 2.** GHG emissions totals in Metric Tons of CO<sub>2</sub>e for Furman University in Fiscal Year (FY) 2007.



## I. BASELINE GREENHOUSE GAS ASSESSMENT

Furman's 2007 Fiscal Year (FY) GHG inventory (our baseline year) was produced using the Clean Air/Cool Planet Campus Carbon Calculator™ tool. The calculator accounts for all six greenhouse gases specified by the Kyoto Protocol. This inventory summarizes the GHG emissions generated by Furman University from FY 2007 (July 1, 2006 through June 30, 2007). Emissions are calculated in terms of metric tons of carbon dioxide equivalents (mtCO<sub>2</sub>e).

The Sustainability Planning Council (SPC), which includes faculty, staff, and student members, formed working groups to gather information about emission sources. These data were then entered into the Clean Air-Cool Planet (CA-CP) calculation tool. Data collection took approximately eight months. The SPC worked collaboratively with Furman's Facilities Services, Business Affairs, Travel Services, Athletic Department, Public Safety, Student Life, and individual student researchers to gather these data. Information collected by the SPC was then organized into categories defined by the CA-CP calculator as **Scope 1, Scope 2 and Scope 3 emissions**. Scope 1 emissions include sources related to heating and cooling at the University's Central Plant, university-owned vehicles, and grounds and maintenance activities. Scope 2 emissions include emissions from electricity purchased by Furman University from Duke Energy. Scope 3 is the remainder of Furman University's emissions, namely GHG emissions stemming from air travel and automobile commuting, solid waste disposal, distribution losses from transmitting electricity across power lines, waste water treatment, and paper products. It is important to note that with no reliable estimates for the carbon emissions related to food purchased by the university, these emissions were excluded from this report.

### **FURMAN'S GHG EMISSIONS IN 2007 AND 2008**

To clarify reporting of our carbon footprint for 2007 and 2008, the following broad categories were devised: purchased electricity combined with transmission and distribution losses (62.4% of the carbon footprint in 2007), on-campus energy

generation (12.0%), air travel (13.1%), commuting (7.6%), and grounds maintenance combined with university fleet emissions (3.7%). Solid waste, waste water, and paper accounted for the rest. FY 2007 will serve as Furman University's baseline year from which to decrease GHG emissions to zero in 2026.

Furman included all university-owned or operated buildings in its calculations with the exception of the following: 1) 3,200 square feet of off-campus staff housing and 2) 6,000 square feet of unheated warehouse space north of campus. These holdings were omitted because they lacked reliable/valid data about energy use. The emissions related to these buildings are negligible.

In FY 2007 Furman University was responsible for 33,777 Metric Tons of CO<sub>2</sub> equivalent emissions (see Figure 2).

### **Scope 1 Emissions:**

#### *On-Campus Sources*

Scope 1 emissions totaled 5,317 metric tons of CO<sub>2</sub>e in FY 2007. These emissions include natural gas and propane use related to heating and cooling at the university's Central Plant, operation of university-owned vehicles, and grounds and maintenance activities. The majority of our on-campus emissions resulted from the combustion of propane and natural gas in Furman's central energy plant. In FY 2007, combustion of propane and natural gas resulted in emissions of 4,083 metric tons of CO<sub>2</sub>e. All remaining sources of on-campus Scope 1 emissions totaled 1,234 metric tons.

#### *University Fleet*

Fleet emissions were determined from the total amount of gasoline and diesel fuel consumed by university vehicles. In FY 2007, 33,439 gallons of gasoline and 8,030 gallons of diesel fuel were consumed by university-owned vehicles, resulting in emissions of 379 metric tons of CO<sub>2</sub>e.

While not a direct part of the inventory, it is important to note that Furman has approximately 50 electric vehicles (not including those on the university golf course) for use by Public Safety and Facilities Services personnel as well as Admissions, Housing and Residence Life, and other offices. The electricity consumed by these vehicles is accounted for in the total electricity purchased by the university. In future inventories, the university will track the kWh consumed by these vehicles.

At the time of this inventory, the Furman fleet includes two hybrid vehicles (used by Public Safety). Furman's president also drives a hybrid vehicle for all university-related travel.

#### Grounds and Campus Maintenance

Grounds and campus maintenance (agriculture and refrigerant usage) also resulted in on-campus GHG emissions. Emissions related to turf and grounds management were calculated from the total weight of nitrogen in the synthetic fertilizers used on campus grounds (including the golf course, athletic fields, flower beds, etc). Refrigerant emissions were calculated from the weight of various types of refrigerants used in the freezers, chillers and lab equipment at Furman. Emissions from these sources total 855 metric tons of CO<sub>2</sub>e.

#### Scope 2 Emissions:

##### Purchased Energy

Scope 2 emissions accounted for the largest portion of total emissions in FY 2007. They include emissions from electricity purchased from Duke Energy. The fuel mix used by Duke Energy to generate electricity has remained fairly consistent in recent years, and in FY 2007 it consisted of 48% Coal, 48% Nuclear, 3% Hydro-electric, and 1% Natural Gas.

In FY 2007, Furman purchased 30,896,485 kWh of electricity, resulting in emissions of 19,164.7 metric tons of CO<sub>2</sub>e.

Note: In our graphs we report emissions due to transmission and distribution losses as part of our purchased electricity emissions.

#### Scope 3 Emissions:

The remaining emissions in FY 2007 come from commuting activities, as well as business travel, air travel (including Study Away programs), and solid waste taken to landfills. Scope 3 emissions also include emissions due to distribution losses across power lines. Scope 3 emissions were 9,294.5 metric tons of CO<sub>2</sub>e in 2007.

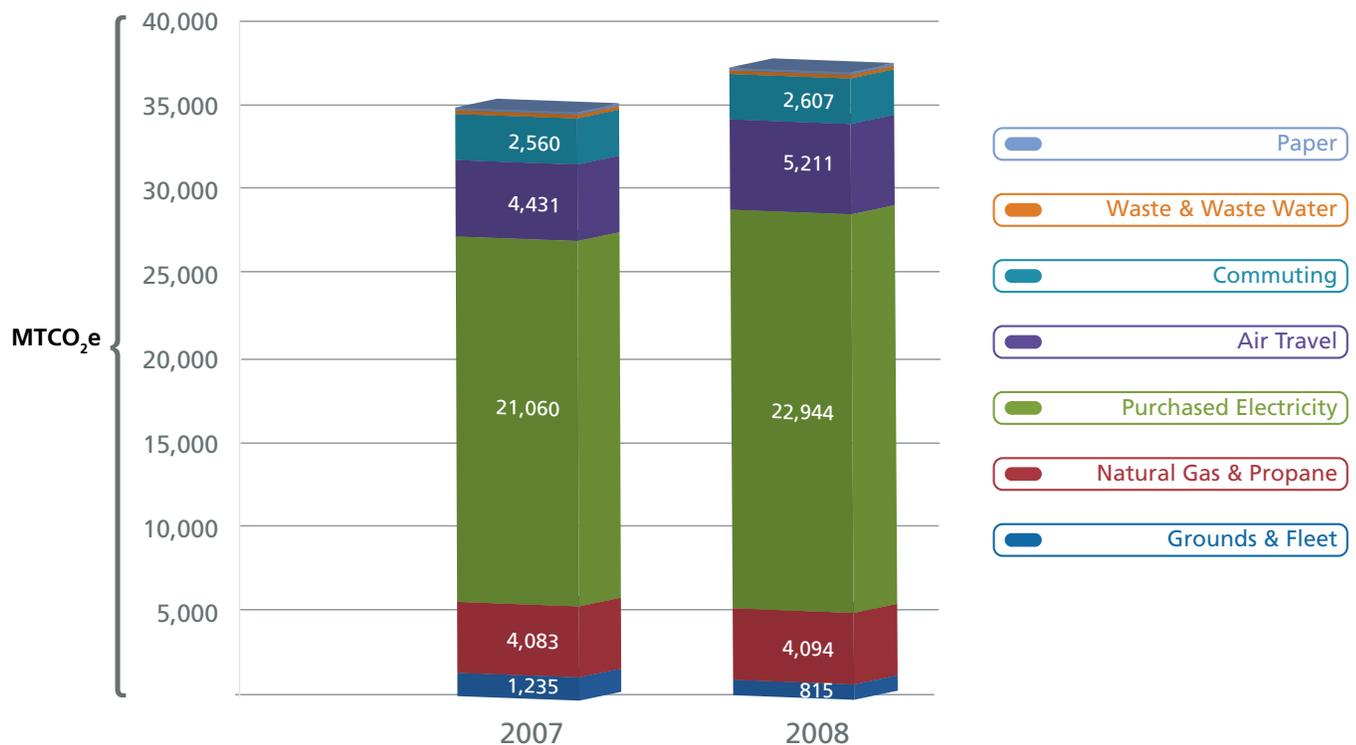


Figure 3. Comparison of GHG emissions totals in Metric Tons of CO<sub>2</sub>e for Furman University in Fiscal Years 2007 and 2008.

### *Commuting and Travel*

Commuting data were extrapolated from the results of a campus commuting survey (random sample; N=165; conducted January 2008; respondents asked to share academic year 2006-2007 experience) along with a student project that calculated commuting distances for all Furman faculty and staff using *Microsoft Streets and Trips* 2008. National miles per gallon averages were used when vehicular type data (in terms of efficiency) were not available.

Business travel data were collected and calculated with the help of the University Travel Services office. Furman's calculations assume that trips of 600 miles or less were taken in an automobile and trips over 600 miles were by air. Furman has changed its forms for reporting travel (as of summer 2008) to require total air miles and total vehicular miles for travel.

Commuting activities resulted in emissions of 2,559.5 metric tons of CO<sub>2</sub>e and air travel resulted in emission of 4,431.3 metric tons of CO<sub>2</sub>e in FY 2007.

### *Solid Waste*

In FY 2007, 1,366 short tons of solid waste were sent to a landfill that uses the methane (CH<sub>4</sub>) recovered to generate electricity. This number is down from 1,537 in FY 2006 and down from the previous five year average of 1,637. Solid waste resulted in emissions of 219.4 metric tons of CO<sub>2</sub>e in FY 2007.

### *Other sources*

Transmission and distribution of electricity losses are directly calculated by the CA-CP tool and amounted to 1,895.4 metric tons of CO<sub>2</sub>e in FY 2007. These were included as part of the purchased electricity category (scope 1) for the purposes of this document and all of its graphs. The remainder of our emissions in scope 3 were in the wastewater category (40.4 metric tons of CO<sub>2</sub>e in FY 2007) and emissions associated with Furman University's paper use (148.5 metric tons of CO<sub>2</sub>e in FY 2007). Without centralized paper purchasing, the use of Furman funds to purchase paper has been difficult to obtain across a wide range of campus offices. In the future, the types of paper and its percent recycled content will be tracked systematically.

A GHG emissions inventory was also conducted for FY 2008 (July 1, 2007 to June 30, 2008). The university's carbon footprint for 2008 increased to 36,049 Metric Tons of CO<sub>2</sub> equivalent emissions, largely due to an increase in building square footage

(Figure 3). With the completion of the new Charles H. Townes Science Center, the science building's footprint nearly doubled in size. The significant expansion of energy-intensive laboratory space resulted in increased electricity usage for the campus. FY 2008 also experienced an increase in emissions from air travel. This is largely due to improved reporting; previously, travelers did not report total air or vehicle miles, so trips less than 600 miles were assumed to be taken by car and trips over 600 miles were assumed to be taken by air. A new form requires reporting of all air and automobile miles traveled, so reporting on Furman's travel emissions is now more accurate.

In FY 2009 GHG emissions will again increase slightly because of the purchase of The Vinings apartment complex south of campus.

## **GHG EMISSIONS FROM COMPARABLE INSTITUTIONS**

Table 1 summarizes the GHG inventories for several institutions comparable to Furman, presenting information from the schools that, like Furman, belong to the Associated Colleges of the South (ACS), as well as schools that are similar to Furman in terms of academic rigor and size. These institutions are included in the "dashboard" of schools used by Furman's Board of Trustees to compare the university across a range of institutional characteristics and activities.

Furman's GHG emissions, normalized by enrollment, fall within the range of values reported by our peer ACS and dashboard schools. Variation across these institutions is the result of many factors. Local climate has a significant impact on energy use, as is the emphasis placed on research at different institutions (resulting in varying amounts of highly energy-intensive laboratory spaces). Universities located in rural areas may use energy differently than universities located in dense urban areas (for example, emissions from transportation are likely to be very different for such universities). The energy mix of a university's electricity provider also has a large impact on a university's carbon footprint. Schools with smaller faculty-student ratios may also have higher carbon emissions due to the need for more classroom and office space per student. Finally, methodological differences in data collection and reporting of GHG emissions likely contribute to the variation observed among our peer institutions.

School	Size of Carbon Footprint (in metric tons of CO <sub>2</sub> e) for 2007	Size of Carbon Footprint Per Full-Time Enrollment (in metric tons of CO <sub>2</sub> e)	Size of Carbon Footprint Per 1000 square feet (in metric tons of CO <sub>2</sub> e)
Bowdoin College *	17,166	10	8.8
Bucknell University *	40,554	11.4	15.3
Carleton College	21,533	10.8	11.9
Centre College *	17,079	14.4	18.1
College of the Holy Cross	23,211	8.3	11.4
Davidson College *	23,387	14	14.9
DePauw University *	38,639	16.8	21.2
Franklin and Marshall College	20,710	10.3	14.7
<b>FURMAN UNIVERSITY</b>	<b>33,777</b>	<b>11.2</b>	<b>16.7</b>
Oberlin College	40,442	14.7	15.3
Rhodes College	18,113	10.8	17
Roger Williams University *	20,791	4.3	15.3
Sewanee: University of the South *	16,161	10.4	12.3
Stetson University	14,211	6.1	11.7
Trinity University	32,405	13.2	14.1
University of Richmond *	36,247	10.2	14.8
Washington and Lee University	26,452	12.1	12.8
Wesleyan University *	32,411	11.1	11.2
Wofford College *	13,899	10.6	15.9

**Table 1.** Reported total greenhouse gas emissions in metric tons of CO<sub>2</sub> equivalent for selected peer institutions (from “dashboard” and Associated Colleges of the South institutions which have completed at least one greenhouse gas emissions inventory as of October 1, 2009; institutions were included if they posted their GHG inventory at [www.acupcc.aashe.org](http://www.acupcc.aashe.org)). While 2007 is the baseline year for Furman University, other schools which calculated their first GHG emissions inventory for 2008 are indicated with an asterisk. Columns 3 and 4 normalize the carbon footprint by full-time enrollment and thousand square feet, respectively.



## II. STRATEGIES FOR EMISSIONS REDUCTION

Furman will focus on five strategies to reduce net GHG emissions to zero by 2026. In implementing the Climate Action Plan, high priority projects will meet one or more of the following criteria: 1) operational cost savings (e.g., energy); 2) greenhouse gas emissions reduction; 3) environmental benefits; 4) educational potential; 5) social benefit; 6) low implementation cost; 7) partnership/collaboration opportunities; and/or 8) ease of implementation.

With these considerations in mind, the five broad strategies central to Furman's plan are:

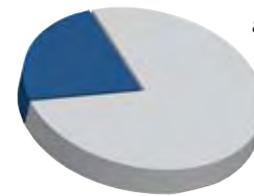
- 1. To increase operations efficiency**
- 2. To create a campus-wide culture of conservation to decrease energy use**
- 3. To create a more sustainable transportation system through changes in behaviors and policies**
- 4. To invest in renewable energy projects**
- 5. To develop offset projects and sustainability-oriented service projects in the greater Greenville community**

It is important to reiterate that Furman's ability to reduce carbon emissions is strongly tied to potential changes in the energy portfolio maintained by Duke Energy (<http://www.duke-energy.com/environment/default.asp>).

Figure 4 represents each carbon reduction strategy that Furman might adopt as a **"wedge."** The figure summarizes the relative contribution that each of the five strategies can make to our goal of becoming carbon neutral by 2026. Figure 5 illustrates these relative contributions by means of a pie chart, and demonstrates that several of the strategies (color-coded in the chart) consist of multiple components. The renewables category, for example, might include a combination of solar technologies, on-site **biomass gasification**, and other renewable energy projects or investments.

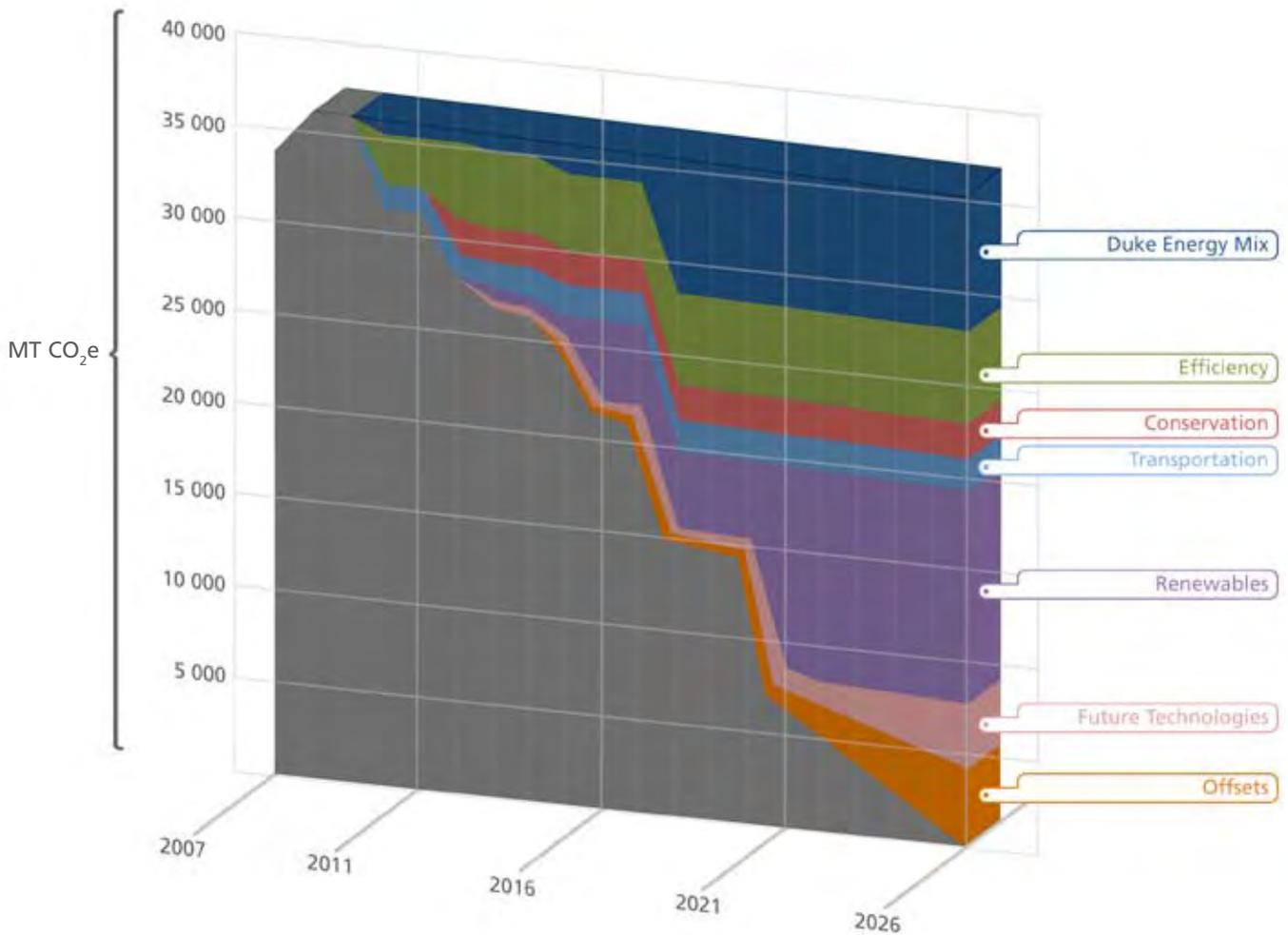
Neither graph represents a fixed plan. Rather, they constitute a collection of strategies Furman will investigate, supplement, and modify over time. As new technologies emerge and as the costs of renewable technologies diminish, other feasible projects will likely be implemented to reduce GHG emissions. In the end, the decision to pursue any emissions reduction project will require the balancing of fiscal responsibility with the pressing need to become carbon neutral.

Each carbon reduction strategy is described and evaluated below.

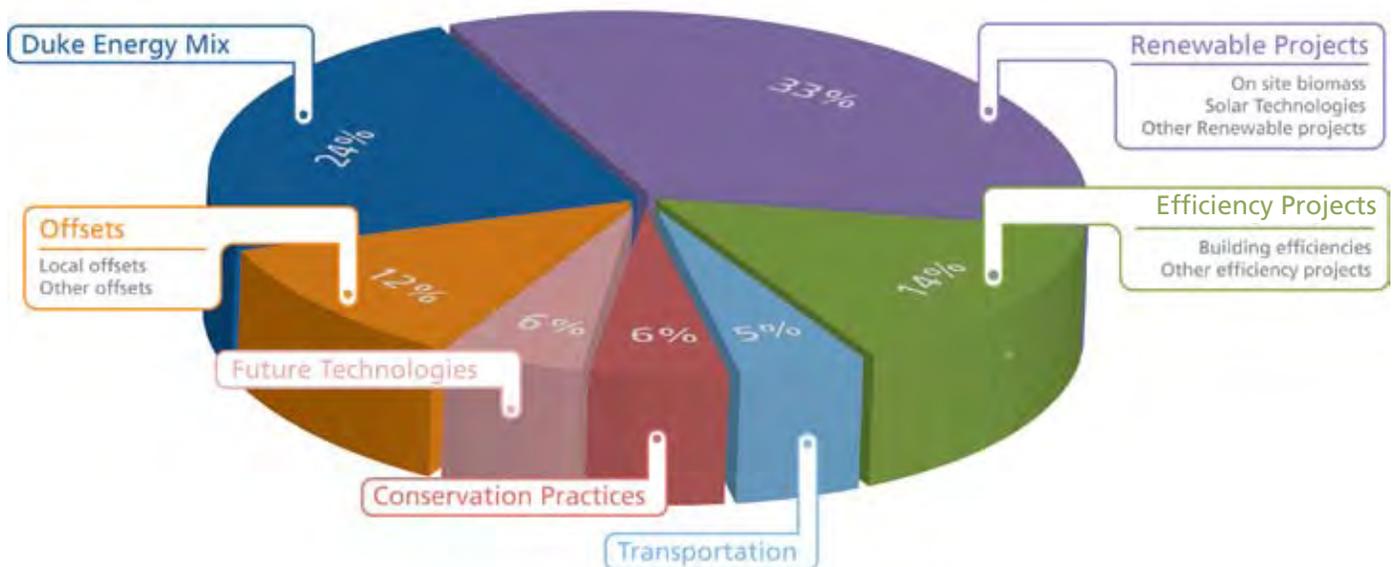


### a. Duke Energy

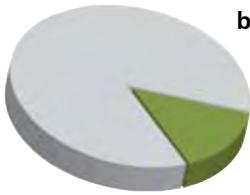
Over 60% of Furman's carbon footprint stems from emissions generated by Duke Energy's electricity production. While Furman will reduce its energy use and carbon emissions through the strategies detailed below, the path that Duke Energy follows with regard to its own energy mix will be an important component of Furman's path toward carbon neutrality. Duke Energy's own projections indicate that the utility will decrease net emissions per megawatt hour by 50% by 2030 ([www.duke-energy.com/environment/default.asp](http://www.duke-energy.com/environment/default.asp)). This shift to a lower carbon-emitting energy mix will likely be the single greatest contribution toward Furman's goal of being carbon neutral by 2026. As both Furman and Duke Energy move to decreased carbon footprints, we look forward to opportunities for collaboration and cooperation to meet the goals of both entities. However, Furman will continue to implement strategies to substantially reduce GHG emissions independent of the progress Duke Energy makes on reducing its own carbon footprint.



**Figure 4.** Potential emissions reduction wedges for Furman to reach carbon neutrality by 2026. This graph shows potential contributions from each of the five emissions reducing strategies described in this report (efficiency, conservation, transportation, renewables, and offsets), along with contributions from Duke Energy's changing energy mix and potential contributions from future technologies.



**Figure 5.** Examples of potential projects needed to achieve a reduction in GHG emissions of 33,777 Metric tons CO<sub>2</sub> equivalent.



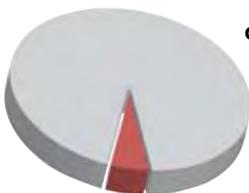
### b. Efficiency

This sector includes strategies related to improving the efficiency and performance of Furman’s buildings, energy systems, and water systems. These

strategies and projects are reflected in Goal Four of *Sustainable Furman*. We estimate that these strategies will result in a reduction in emissions of at least 15% of the 2007 baseline.

A major component of this sector’s carbon reduction potential will be the ongoing re-commissioning of campus buildings. Various strategies to increase the efficiency of electrical and water systems (and save money) also contribute to the reduction of carbon emissions, such as upgrading building envelopes (roofs, sheathing), to reduce heating and cooling costs, improving the efficiency of HVAC and lighting systems, and renovating older buildings (especially the fifty-year old residence halls).

Although conservation and efficiency are often used interchangeably, we use the terms in this report to refer to two distinct sources of emissions reductions. *Efficiency* refers to the improved energy performance of buildings and appliances; for example, replacing an aging air conditioning system in an academic building would be an example of an efficiency strategy. *Conservation* refers to changes in behavior that result in lowered emissions. Students deciding to unplug their television when not in use would be an example of a conservation strategy.



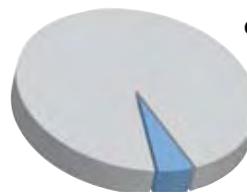
### c. Conservation

Energy conservation on campus is a crucial component of Furman’s climate action strategy (see Goal Three of *Sustainable Furman*).

In the baseline year,

almost 57% of emissions resulted from purchased electricity. To reach carbon neutrality by 2026, the university community must embrace a conservation ethic. Furman has set a goal of reducing its electricity use through conservation up to 10% (which will result in a 5.7% reduction in total emissions). The university will accomplish this through several educational and incentive programs. For example, Furman has recently begun a Conservation Culture Research Initiative, which will provide opportunities for faculty and student research into campus behaviors and perceptions, as well as provide education and awareness campaigns on campus to promote energy conservation.

In the fall of 2008, the Shi Center for Sustainability compiled a baseline assessment of behaviors and perceptions related to energy conservation on campus. Future assessments will measure how conservation behaviors and attitudes are changing over time. A variety of programs to encourage campus conservation behavior are being investigated and tested. These pilot projects will enable us to better estimate GHG emissions reductions produced by conservation, which can then be refined in conjunction with cost estimates before scaling up projects to include the entire campus. These projects may focus on all aspects of campus life, including student energy use in residence halls, energy use within academic buildings by students, faculty, and staff, and transportation behaviors of Furman faculty, staff and students.



### d. Transportation

Strategies to reduce emissions from transportation could result in a reduction of GHG of up to 5% from the baseline. Transportation, including air

travel and commuting, accounts for 20.7% of our carbon footprint. Efforts will focus on both reducing miles traveled and shifting to vehicles and modes of travel with lower GHG emissions (see Goal Five of *Sustainable Furman*). Some specific strategies for reducing miles traveled could include the creation of a ride-sharing program and a bicycle rental program, bringing public transit to campus, and increasing vehicle registration fees to discourage parking on campus. In addition, the campus fleet will be transitioned to lower-emissions vehicles, and the campus community (students, faculty, and staff) will be encouraged to purchase lower-emission vehicles. The feasibility of expanding the existing biodiesel producing facility is also being investigated. Our goal is to decrease emissions from commuting by 50%, and to decrease air travel emissions by 10% (e.g., by encouraging more teleconference and virtual meetings).

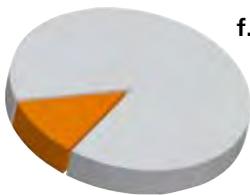


### e. Renewable Energy

Increasing Furman’s use of renewable energy will be a crucial part of the university’s overall strategy for carbon

neutrality. A significant reduction in emissions may come from potential projects on campus, including increased solar capacity, both photovoltaic and solar thermal, expansion of geothermal energy systems, and possible construction of a **biomass gasification** plant on campus (see Figure 5). Furman also has the opportunity to partner with other universities through The Duke Endowment to explore off-campus renewable energy options, and

one such option is a joint investment in a biomass plant with other Duke Endowment schools.



#### f. Offsets

While Furman intends to reduce on-campus emissions as much as possible, we recognize—as have most other universities across the country—that some use of carbon offsets will be unavoidable. In particular, while emissions related to transportation (commuting, business, and Study Away travel) can be reduced, they cannot be eliminated. To the extent that offsets are necessary, Furman intends to focus on local, student-led service projects that will benefit the larger community. We also intend to pursue third-party verification for all offset projects.

Offset possibilities include a variety of community-based activities and programs. Furman's award-winning service organization, the

Max and Trude Heller Student Service Corps, has already organized a sustainability division for students interested in sustainability-related community service opportunities. In addition, a "Sustainable Friends of Furman" community volunteer network is being created, connecting campus and community members [including members of the **Osher Lifelong Learning Institute (OLLI)**, an institute on campus devoted to providing educational opportunities for older adults] to volunteer opportunities on campus related to sustainability, including at the Furman Farm and other sustainability living/learning laboratories. Some of the community service projects which could serve as offsets include performing energy audits, home weatherization, and home refurbishment for low-income community members. These projects will serve as offsets for Furman, but will also provide low-income families with significant energy savings. Another offset opportunity within the Greenville region includes using manure from the Greenville Zoo in Furman's composting program. Furman is also investigating the potential for developing international offset projects paired with Study Away programs.



## CONCLUSION

The strategies and potential projects for climate action presented here will allow Furman to move steadily towards carbon neutrality by 2026 and maintain its role as a national leader in climate action planning and sustainability. Through reductions in emissions related to increased efficiency, an increasingly diverse energy portfolio based in renewable energy, creative conservation efforts on campus, changes in transportation behavior and vehicle choice, and the use of offsets where necessary, Furman can meet its goal of carbon neutrality. To be

sure, these strategies must be initiated in the context of the university's available financial resources, and this plan presumes considerable flexibility in adjusting goals and timeframes as dictated by changing circumstances. Nevertheless, despite the challenges that Furman and all universities face in reaching such an ambitious goal, we believe that the comprehensiveness of our planning process, coupled with the extraordinary support of the faculty, students, staff, and Board of Trustees, will result in a successful and well-managed transition to lowered GHG emissions.





## APPENDIX I: GLOSSARY

**American College and University Presidents' Climate Commitment (ACUPCC)** – A document signed by College and University Presidents that pledges to achieve carbon neutrality by a date of their choosing. The document details steps needed to assist the colleges and universities in working towards carbon neutrality. One such step is the creation of a Climate Action Plan (CAP). President Shi signed the commitment in 2007.

**Associated Colleges of the South (ACS)** – A consortium of 16 liberal arts colleges in the southern United States. It was formed in 1991. Member institutions include: Birmingham-Southern College, Centenary College of Louisiana, Centre College, Davidson College, Furman University, Hendrix College, Millsaps College, Morehouse College, Rhodes College, Rollins College, Sewanee: The University of the South, Southwestern University, Spelman College, Trinity University, University of Richmond, Washington and Lee University.

**Biomass Gasification** – High temperature combustion of existing and available forest products provides heat energy to make electricity. Although the carbon found in the biomass is released into the atmosphere, it represents recently sequestered CO<sub>2</sub> that would otherwise give up its CO<sub>2</sub> through normal degradation. Combustion of biomass is considered carbon neutral.

**Carbon/climate neutrality** – Reaching net annual greenhouse gas emissions of zero.

**Carbon inventory** – Accounting of all direct and indirect emission sources of an institution, individual, facility, product, company, etc.

**Climate Action Plan (CAP)** – Document that describes the strategies necessary to decrease GHG emissions. Can be crafted at different scales, for example, for an individual building, university, country, etc.

**Co-curricular** – Educational opportunities that are complementary to student's learning experience at Furman but are not part of the regular curriculum.

**Conserve Furman** – A student peer-to-peer educational program that promotes a conservation campaign each year. In 2009 the focus is energy conservation, in 2010 it is water conservation, and in 2011 the focus will be on transportation.

**Cultural Life Program (CLP)** – More commonly referred to as the CLP, this program is a co-curricular component of Furman's academic requirements. The term refers to all events, such as concerts, lectures, performances and films, which have been approved by the Cultural Life Program Committee (comprised of faculty, administrators and students). Students are required to accrue 32 CLP credits in order to graduate, and registration status is linked with a designated number of CLPs per year.

**The Duke Endowment** – Founded in 1924 by James B. Duke, The Duke Endowment works to "strengthen communities in North Carolina and South Carolina by nurturing children, promoting health, educating minds and enriching spirits." The Duke Endowment's higher education program funds four colleges and universities: Duke University, Furman University, Johnson C. Smith University, and Davidson College. (See [www.dukeendowment.org](http://www.dukeendowment.org) for more information.)

**Environmental Community of Students (ECOS) First-Year Student Program** – A living/learning community of fifteen first year students who live together, take sustainability-related classes together, and work for three hours each week on a variety of sustainability-related projects.

**Ecological Footprint** – The area of land and ocean required to support the consumption of food, goods, services, and energy plus the area of land required to assimilate waste, including carbon dioxide from fossil fuel combustion. The ecological

footprint is a broad measure of resource use which highlights where consumption is exceeding environmental limits.

**Ecological Footprint Analysis** – A method of the assessing the nature and scale of the environmental impact of a country, region, community, organization, product or service. The ecological footprint analysis is used to measure and communicate progress towards sustainability.

**Furman Lake Restoration Project** – The University is continuing its efforts to restore the lake to a more natural, healthy environment. A professional landscape architect specializing in native plants developed a complete restoration master plan for the revegetation and redesign of the lake's borders. Phase I was completed in June 2009. Student and faculty efforts to reduce the wildfowl population have been extremely successful in reducing the nutrient and bacteria loading to the lake. Three rain gardens provide attractive examples of ways to collect storm water and improve water quality.

**Geothermal Energy** – The capture and use of the reasonably constant mid-fifty degree F temperature energy found a few feet beneath the Earth's surface. The primary applications are found in more efficient heating and cooling of buildings.

**Greenbelt Community** – The Greenbelt living/learning community is designed for students who are interested in learning about sustainability and being role models for sustainable living for their peers. This community is for sophomores, juniors and seniors only. The names of the four buildings are the Shack, the Hut, the Cabin and the Cottage.

**Greenhouse Gas (GHG) emissions** – Gases in the atmosphere that absorb and emit radiation and affect the temperature of the Earth. The six gases regulated by the Kyoto Protocol are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons and perfluorocarbons (HFC and PFC), and sulfur hexafluoride(SF<sub>6</sub>).

**Green Room Energy and Environmental Initiative (GREEN) Showcase Residence Hall** – A pilot project to showcase, and in the process foster, eco-friendly lifestyle choices and product selection among students in an effort to help the university reduce its eco-footprint. Students chosen to live in the room serve as environmental stewards for the project.

**"Humans and the Natural Environment"** – General Education Requirement (GER) required of all students at Furman University.

**LEED-certification** – The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ is a voluntary program that aims to facilitate the adoption of environmentally-friendly practices for construction projects.

**Max and Trude Heller Student Service Corps** – Largest community service program in Greenville, involving over a thousand Furman students working with dozens of different community agencies/schools.

**Offset** – Refers to carbon offsets, i.e., ways to implement carbon reduction projects outside of an organization's boundaries. These are typically third party verified and registered.

**Osher Lifelong Learning Institute** – Learning institute for older adults at Furman University. Provides classes and learning opportunities to members of the Greenville community.

**Renewable Energy** – Energy that comes from sources which are naturally replenished (such as solar, wind, or hydroelectric), as opposed to non-renewable resources which exist on the earth in fixed amounts (such as coal and oil).

**Scope One** – Emissions include sources related to heating and cooling at the University's Central Plant, university-owned vehicles, and grounds and maintenance activities (from Cool Air–Clean Planet).

**Scope Two** – Emissions include those from electricity purchased by Furman University from Duke Energy (from Cool Air–Clean Planet).

**Scope Three** – The remainder of Furman University's emissions, namely GHG emissions stemming from air travel and commuting, solid waste disposal, distribution losses from transmission across electric power lines, waste water treatment and paper products (from Cool Air–Clean Planet).

**David E. Shi Center for Sustainability** – The animating hub of Furman's distinctive sustainability efforts, the Shi Center is an academic, transdisciplinary, and non-partisan institute that coordinates the university's efforts to transform its campus culture and nurture sustainability leadership skills among students, faculty, staff and community partners. Beyond a curricular emphasis, these initiatives range from recycling and

energy conservation, to the installation of renewable energy systems and the forging of creative partnerships with the greater Greenville community.

**Solar/aquatic wastewater treatment system** – Space assigned in a greenhouse where plants and microorganisms organized in a system of connected tanks purify wastewater from the Townes Science Center. The energy needed to run the system and heat the greenhouses is obtained through the use of solar concentrators.

**Solar Concentrators** – System of lens and mirrors that focuses sunlight onto solar panels, i.e. a solar photovoltaic system, making them more efficient.

**Solar Photovoltaic (PV)** – Converting sunlight directly into electricity.

**Solar Thermal** – Capturing the heat from sunlight to heat water for domestic use or to make steam for industrial electricity production.

**Sustainability Planning Council (SPC)** – The Sustainability Planning Group was founded in 2005 with approximately 24 members; in 2008, it was expanded to become the Sustainability Planning Council (SPC), with 124 members (faculty, staff, and students). The SPC is governed by a core committee, made up of approximately 20 members (the committee chairs, subcommittee conveners, and student representatives), and four other committees: the curriculum and sustainability studies committee, co-curricular/sustainability student engagement committee, campus sustainability institutional assessment committee, and communication and sustainability committee. Faculty, staff, and students serve on each committee.

**Sustainability Planning Group** – See Sustainability Planning Council.

**Sustainable Connections** – Sustainable Connections, formed in 2008-2009, is an over-arching virtual clearinghouse and online network that will serve as database and catalyst for the many student groups, associations and activities that relate to sustainability at Furman University. Its main purpose is to promote cooperation in and facilitate coordination of on-campus efforts, initiatives and events focusing on sustainability in any of its forms.

**Sustainability Living/Learning Laboratories** – Furman's sustainability-related co-curricular programs, including the Cliffs Cottage, Furman Farm, Place of Peace, Townes Center for Science, Biodiesel program, Recycling and Composting program, and the Thoreau cabin.

**Wedge** – The portion of carbon emission reduction represented by a strategy.



## APPENDIX II: CONTRIBUTORS

**The following individuals participated in the implementation, data gathering, analysis, and discussions that contributed to the development of our Sustainability Master Plan and Climate Action Plan.**

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Key: S – SPC Core; O – Offsets; T – Transportation; R – Renewables; V – Conservation; U – Curricular; A – Assessment; E – Co-Curricular Student Engagement; I – Communication; M – Student Mellon Sustainability Fellows; B – Bank of America Sustainability Fellows; G – Green Room; L – Lake Restoration; Y – Recycling; FF – Furman Farm; CFS – Shi Center for Sustainability; Italics - Student



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