



# Davidson College Climate Action Plan

May 13, 2010

DAVIDSON



*Keeping Davidson red, black and green*

# Davidson College Climate Action Plan

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## Executive Summary

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In the fall of 2007, President Thomas W. Ross signed the American Colleges and University Presidents' Climate Commitment (ACUPCC). This act marked a significant administrative and institutional commitment by Davidson College to environmental action, fully endorsing the environmental efforts of individuals and groups that have been at work in the Davidson College community for more than a decade.

To comply with the ACUPCC, Davidson brought together a team of 34 staff, faculty, and students to draft recommendations for the Climate Action Plan (CAP). These recommendations have been assessed based on cost, monetary savings, greenhouse gas emissions (GHG) mitigation potential, educational potential, social benefits, and cost per MTCO<sub>2</sub>e (metric tons carbon dioxide equivalent). Through the evaluation of these projects, Davidson has established a timeline and interim targets to work toward the ultimate goal of climate neutrality set by the ACUPCC.

Davidson's sustainability efforts will focus on incremental reductions through on-campus initiatives. GHG emissions reductions projects that also have curricular and cocurricular potential are particularly desirable. While offsets are not an explicit part of the Davidson CAP at this time, students, faculty, and staff will continue to investigate the feasibility of various types of offsets. We believe that Davidson should make every effort to reduce emissions first, and include offsets second.

The ultimate goal of this plan is climate neutrality, for which Davidson has chosen a target date of 2050. The two main interim targets outlined in this document are 10 percent below 2008 levels by 2020, and 15 percent below 2008 levels by 2030. These goals are supported by a set of projects proposed in this plan that are designed to reduce GHG emissions both directly and indirectly.

The CAP is a living document that will be reviewed and revised over time to account for new technologies, developments in climate policy, and the evolution of the campus culture.

## Introduction

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**D**avidson College, as a signatory of the American Colleges and Universities Presidents' Climate Commitment (ACUPCC), is committed to reaching climate neutrality. While this is an honorable goal, at Davidson we believe that there is more to the climate crisis than greenhouse gas (GHG) emissions. As a liberal arts institution, Davidson is committed to educating students to be effective leaders. Specifically, the primary purpose of Davidson College is to "assist students in developing humane instincts and disciplined and creative minds for lives of leadership and service." We believe that sustainability is an integral part of this mission, and as such, goes beyond simple GHG emissions reductions in this Climate Action Plan (CAP).

### *Background*

President Ross's signature on the ACUPCC marked a significant administrative and institutional commitment by Davidson College to environmental action, fully endorsing the environmental efforts of individuals and groups that have been at work for more than a decade in the college community. In 2007, the first sustainability staff position, the Sustainability Fellow, was created to administer the ACUPCC, as well as to generally promote sustainability on campus.

Davidson kicked off this new focus on environmental issues with its first themed year, the "Year of Sustainability." During this year, measurable goals focusing on reducing consumption and waste were promoted on campus. This theme was also aimed at coordinating various programs already in existence around campus, so as to present a unified front for sustainability. With great success, the Year of Sustainability brought Davidson's sustainability champions into the forefront of campus life, invigorated students, and attracted new faculty and staff advocates. It was amid this broad collaboration of individual voices and institutional commitment that we began our CAP process.

### *The Process*

The inaugural Sustainability Fellow, Kealy Devoy '08, coordinated six teams of faculty, staff, and students, charging each with a different area of sustainability: operations and infrastructure, transportation, solid waste, administrative policies, curriculum and research, and student outreach (Appendix A). Not all objectives of this CAP will directly reduce GHG emissions, but will promote sustainability on campus through education and advocacy, adding to the overall culture of sustainability at Davidson. Additionally, those projects that do lead to GHG emissions abatement should consider any and all cocurricular opportunities to be significant social benefits.

The recommendations of the CAP teams have been consolidated into four main categories:

- Operations and Infrastructure
- Transportation
- Consumption and Waste
- Curriculum, Research, and Student Outreach

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<sup>1</sup> Davidson College Statement of Purpose [www3.davidson.edu/cms/x924.xml](http://www3.davidson.edu/cms/x924.xml)

These broad categories address Davidson's greatest GHG emissions culprits, as well as the most pressing needs of the community as a whole.

The charge of each team was to develop and recommend projects and policies to improve sustainability at Davidson College. Projects were then prioritized based on cost, monetary savings, GHG emissions mitigation, educational potential, social benefits, and \$/MTCO<sub>2</sub>e. Teams were encouraged to consider Davidson's GHG emissions footprint, the college's recently completed Strategic Plan, current campus programs, and programs on campuses similar to Davidson's when researching and developing recommendations. These recommendations were vetted and compiled into this report by Davidson's Office of Sustainability.

Each team submitted to the CAP coordinating team a list of recommendations that were evaluated based on environmental, economic, and social sustainability concerns. The draft, consisting of the proposed recommendations, was put to the Sustainability Council, a group of students, faculty, staff, alumni, and community members. Breakout groups discussed each section and evaluated its overall aggressiveness and individual recommendations. The recommendations of these groups were crucial to further development of the final draft of the CAP.

The final draft of the CAP was presented to the Campus and Facilities Planning Committee of the Board of Trustees. This group unanimously endorsed the CAP and recommended it to the full Board of Trustees at their April meeting. The Board of Trustees of Davidson College unanimously approved the CAP on April 7, 2010.

### *Greenhouse Gas Emissions Footprint*

Davidson used the Clean Air-Cool Planet Campus Carbon Calculator to conduct its first GHG emissions inventory, completed in January 2009. This calculator uses the convention of "scopes," which prevent double-counting when multiple firms are reporting GHG emissions. As such, Scope 1 refers to direct, on-campus emissions, such as burning natural gas for heat; Scope 2 refers to indirect emissions from purchased electricity; Scope 3 refers to other indirect emissions, such as consumption and waste.

The sources of GHG emissions that were reported are fuel oil, natural gas, campus vehicles, refrigerants, fertilizer, electricity, commuting, college-supported air travel, solid waste disposal, and paper use. While we recognize that there are more categories that could be reported, such as food procurement, Davidson does not feel that an appropriate method to determine the emissions from these sources is available at this time.

The inventory, summarized in Figure 1, reports that Davidson's net emissions were 23,387 MTCO<sub>2</sub>e in 2008, our base year. The largest source of emissions is purchased electricity, accounting for 54 percent of emissions. Davidson's electricity provider, Duke Energy, generates more than 50 percent of its electrical mix from coal, so significant emissions reductions in this category will necessitate changes in the way Duke Energy generates electricity.

Currently, Davidson is pursuing several avenues to reduce GHG emissions from electricity through increasing efficiency. A campus-wide lighting retrofit has been completed, with more than 90 percent of lights now using either compact fluorescents or other energy-efficient lighting. An Energy Star procurement policy has also been adopted for all new appliances. Finally, Advanced Energy has completed an energy audit of Davidson's campus. This project, funded by The Duke Endowment, has helped Davidson identify areas in which energy efficiency can be increased.

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<sup>2</sup> MTCO<sub>2</sub>e = metric tons carbon dioxide equivalent, as determined by the Clean Air-Cool Planet Campus Carbon Calculator

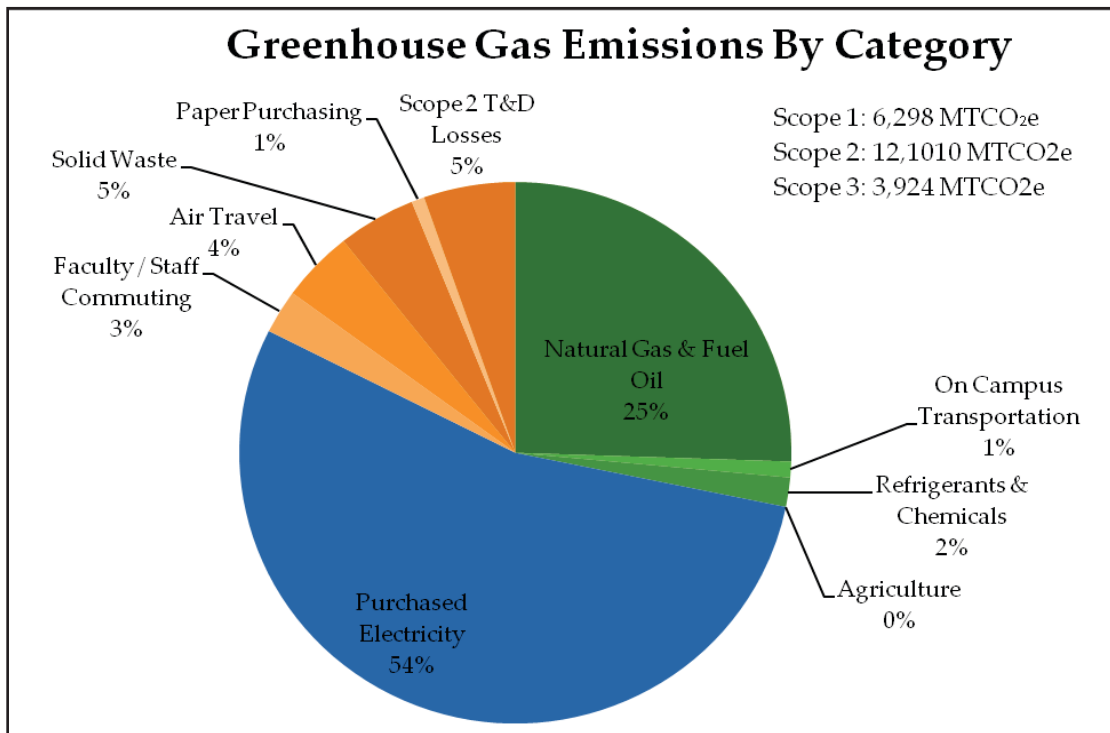


Figure 1. GHG emissions by category

Natural gas accounts for 28 percent of Davidson’s GHG emissions, the campus’s next largest source. Natural gas is burned to produce heat and hot water for buildings. To reduce natural gas consumption, an energy-management program monitors temperature and occupancy in buildings across campus. To heat and cool buildings, Davidson sets thermostats strictly between 68 and 72 degrees in the winter between 74 and 78 degrees in the summer. Additionally, the equipment in the campus boiler plant has been replaced with more energy-efficient models, which have already led to a 15 percent decrease in natural gas usage since coming online in November 2009.

Transportation is responsible for 6 percent of Davidson’s campus emissions. This category includes air travel (Scope 3), faculty and staff commuting (Scope 3), and campus fleet vehicles (Scope 1). One main difficulty in reducing transportation-related emissions is the rich experience and exchange gained through institutional travel. Students, faculty, and staff travel for professional development, presenting research at national conferences, promoting Davidson to prospective students, fundraising, and developing cultural learning experiences. In addition, Davidson has 21 Division I sports teams, which travel to various games and tournaments. Davidson does not wish to compromise the experience of any student, faculty, or staff member by strictly reducing or eliminating institutional travel. The Transportation team operated with these considerations in mind, focusing primarily on fleet vehicles and commuting.

The majority of the remaining GHG emissions stem from consumption and waste. This category covers purchasing and waste disposal, which affect all areas of campus and many aspects of daily operation. The key in reducing GHG emissions in this category lies in good communication among and between departments, which will help ensure that the most efficient ordering strategies are used, and that best practices in sustainable purchasing are being implemented.



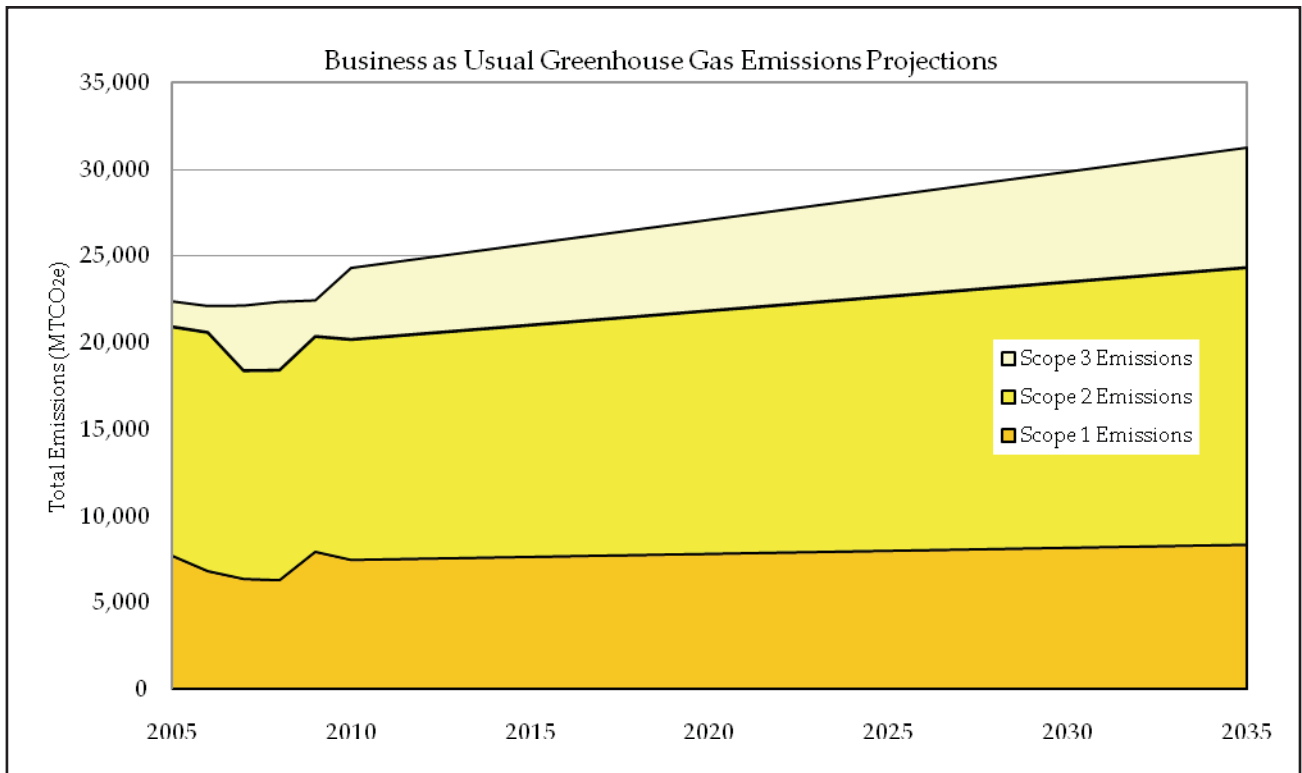


Figure 2. Business as usual GHG emissions projections

Based on the projections module of the Clean Air-Cool Planet Campus Carbon Calculator, Davidson’s GHG emissions will continue to grow steadily if we choose to do nothing, as shown in Figure 2. GHG emissions vary among institutions based on electricity-generation mix, the average commuting distance of faculty, staff, and students, the purchase of carbon offsets, and many other factors. As Figure 3 shows, Davidson emits more carbon per student than most of its peers. The national reported average of carbon emissions per student for undergraduate institutions is 9.17 metric tons CO<sub>2</sub> equivalent, about 35 percent lower than Davidson’s per student emissions.

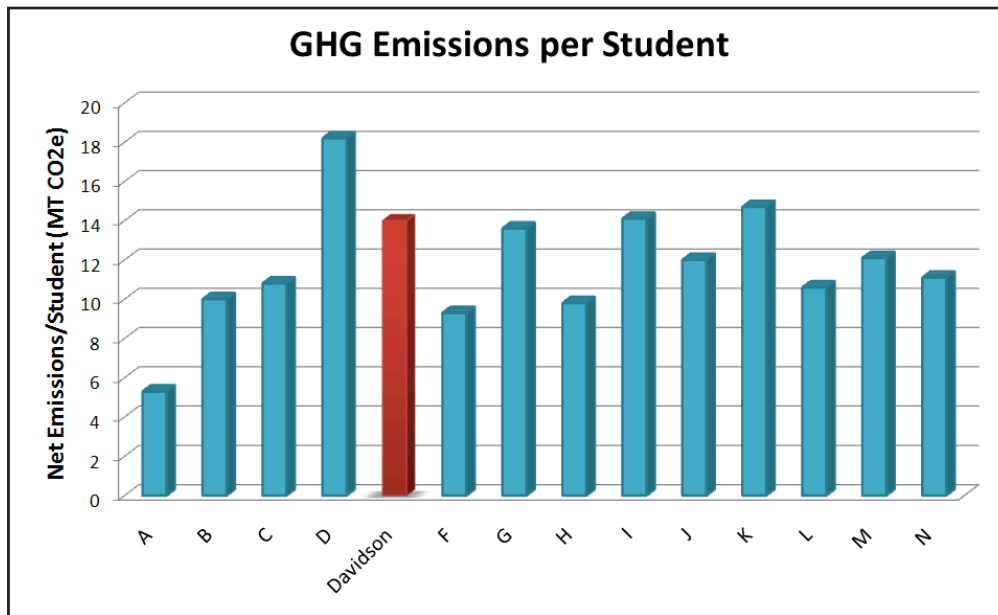


Figure 3. MTCO2e per student at Davidson versus 13 peer schools. Data from <http://acupcc.aashe.org/>

Davidson’s future GHG-emissions footprint will be influenced by five factors: current levels of carbon, the generation forecast of Duke Energy, conservation measures, alternative energy generation, and future campus growth, as seen in Figure 4. The strategies outlined in this plan are predominantly contained in the conservation and alternative energy categories. We have also included strategies to minimize the impact of future campus growth.

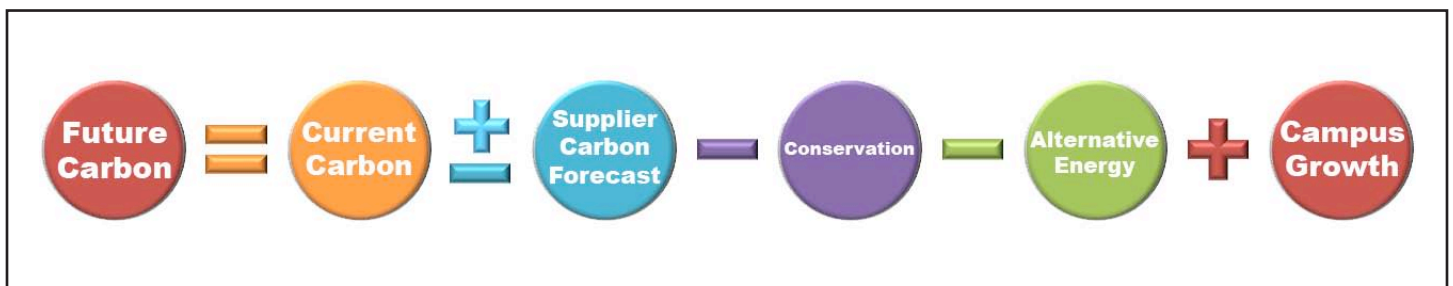


Figure 4. Davidson’s Future Carbon equation

Davidson has confronted a number of constraints and barriers throughout the CAP Process. Perhaps the most notable is our reliance on Duke Energy’s current and future generation mix. As mentioned above, the Southeast is served predominantly by coal-fired power plants, which supply reliable, inexpensive power, but also carry one of the greatest GHG-emissions burdens of any type of energy generation.

As Duke Energy is the sole provider of electricity available to Davidson, and 54 percent of our emissions are due to purchased electricity, Davidson’s ability to abate GHG emissions is highly dependent on Duke Energy’s plans for its generation mix. This plan uses Duke Energy’s publicly available data on its future generation mix to estimate future emissions from purchased electricity. Additionally, Davidson is working with Duke Energy to develop renewable energy projects that will help meet the North Carolina Renewable Portfolio Standard of 12.5 percent by 2025, and reduce Davidson’s GHG emissions footprint.



## Targets and Timeline

Due to the above constraints and other unknown variables, Davidson's sustainability efforts will focus on incremental reductions through on-campus initiatives. GHG-emissions-reduction projects that also have curricular and cocurricular potential are particularly desirable. Davidson has developed the following timeline, with ultimate and intermediate targets for GHG emissions reductions, as well as several of the more major projects:

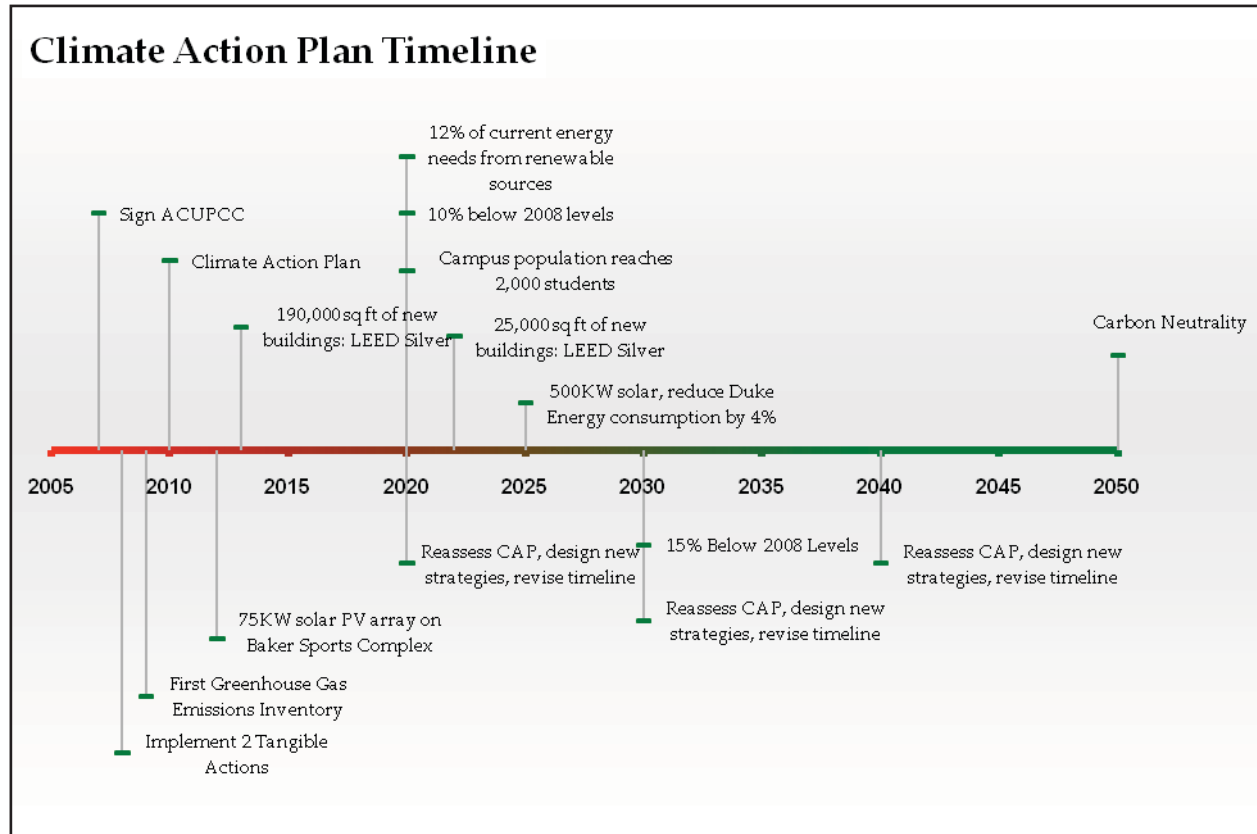


Figure 5. Timeline for Davidson's CAP

It is estimated that the projects proposed in this CAP will allow Davidson to reduce GHG emissions 10 percent below 2008 levels by 2020. A 15 percent reduction will be possible by 2030, based on Duke Energy's predictions. The remaining emissions will be abated or offset by 2050, through projects still under development.

While offsets are not an explicit part of Davidson's CAP at this time, students, staff, and faculty will continue to investigate the feasibility of various types of offsets, including international and domestic projects, as well as the benefits of purchasing them from a vendor versus creating them through projects. It is likely that offsets will be part of Davidson's strategy to reach climate neutrality, but the specifics of such a program are still under development.

Due to rapidly evolving sustainability technologies and ideologies, Davidson's CAP and its associated targets are meant to be fluid and adaptable. For this reason, the targets include specific times for revising the plan based on new technologies and advancements. We believe that this approach will result in a more robust and realistic plan of action for Davidson, as we learn from our own initiatives and from those of our peer institutions.

## *Communication*

This CAP effectively outlines strategies to move Davidson closer to climate neutrality. One key component of achieving this ultimate goal is educating the college community, which is addressed throughout this plan in a variety of ways. More generally, Davidson must strive to communicate with the college community and the public about why and how Davidson is making strides in sustainability. To maintain transparency and make the public aware of our actions, the Office of Sustainability will work actively with College Communications to convey a consistent, consolidated message. The primary mode of communication will be via the Web site (*www.davidson.edu/sustainability*), but we will also use the *Davidsonian* (the student newspaper), the *Davidson Journal*, and other news media sources.







## Summary of Recommendations

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### Operations and Infrastructure

#### Campus Growth

- Objective 1.1:* Implement a policy that new facilities shall be designed to a minimum standard of LEED silver.
- Objective 1.2:* Evaluate the possibility for LEED-EB for all renovations, and use LEED-EB standards as a design guide when it is not feasible to achieve LEED-EB certification for renovations.
- Objective 1.3:* Implement a policy that new facilities shall be designed to consume energy at a rate below the then-current energy intensity level per square-foot average for the campus, as listed in the prior year's carbon footprint calculation.
- Objective 1.4:* Implement a practice that planning for the new facility shall include, as part of its design process, the development of policies to minimize energy consumption by the constituents of the building.

#### Energy Efficiency Projects

- Objective 1.5:* Davidson will design and execute energy-efficiency projects for existing facilities and systems, to achieve a 10 percent reduction below 2009 levels over the next 10 years.

#### Renewable Energy

- Objective 1.6:* Davidson will install forms of renewable energy on campus to reduce the delivery of fossil fuel-based utilities. By 2020, 12 percent of our total energy inventory will be generated by our own renewable sources.

#### Duke Energy's Generation Source Strategy

- Objective 1.7:* Continue to monitor the progress of Duke Energy in its emission-reduction execution. Assist Duke Energy, if possible, in its regulatory conversations by serving as a case study or example.

### Transportation

#### Air Travel

- Objective 2.1:* Initiate a Mileage Tracking program.
- Objective 2.2:* Increase use of technologies that reduce the need for air travel.
- Objective 2.3:* Encourage a better carbon mentality about institutional travel.

#### Grounds and Fleet

- Objective 2.4:* Shift to less greenhouse-gas-intensive vehicles.
- Objective 2.5:* Increase biodiesel use on campus.

#### Commuting

- Objective 2.6:* Reduce the number of student vehicles on campus.
- Objective 2.7:* Provide alternative transportation options.

## Consumption and Waste Disposal

### Consumption

- Objective 3.1:* Centralize green purchasing policies.
- Objective 3.2:* Promote more sustainable behavior among faculty and staff.
- Objective 3.3:* Develop a more sustainable food system.
- Objective 3.4:* Continue to replace paper documents with electronic wherever possible.
- Objective 3.5:* Expand the PawPrint management system to the entire campus.
- Objective 3.6:* Centralize printing for each office or department.

### Waste Disposal

- Objective 3.7:* Purchase office equipment with waste prevention in mind.
- Objective 3.8:* Expand the food-waste composting program.

## Curriculum and Research

### First-Year Experience

- Objective 4.1:* Expose students early in their Davidson experience to sustainability issues through a “Davidson 101” or correlative experience, Orientation presentation, W-course offerings that incorporate sustainability, Odyssey trips, or experiential learning opportunities.
- Objective 4.2:* Focus on institutional goals for GHG emissions and sustainability and utilize partnerships in delivery of information/use the campus as a classroom.
- Objective 4.3:* Establish a mentoring/ advisory system that informs students early on of curricular opportunities about sustainability topics.

### Curriculum Expansion and Enhancement

- Objective 4.4:* Expand the number of courses incorporating sustainability concepts within the curriculum, including adding an interdisciplinary Environmental Studies major.
- Objective 4.5:* Promote new courses relevant to sustainability issues.
- Objective 4.6:* Offer more community-based learning courses that meet community-defined needs and pay particular attention to sustainable, adaptable course assignments and community partnerships.
- Objective 4.7:* Use the campus environment as a learning laboratory to research and implement institutional needs as they apply to sustainability goals.
- Objective 4.8:* Encourage the use of collaborative, case-based, and other experiential assignments through the development of a resource database.
- Objective 4.9:* Provide opportunities for students to connect/ reflect on extracurricular experiences (volunteer, internship, leadership) in the context of sustainability.
- Objective 4.10:* Develop and implement a sustainability competency requirement.

### Curriculum/ Faculty Support

- Objective 4.11:* Prioritize current funding (or create new/ special funding) for student, faculty, or student-faculty research related to sustainability issues and global climate change (e.g., designate a certain number of Davidson Research Initiative grants for these topics).
- Objective 4.12:* Provide resources for new faculty hires and positions that prioritize sustainability areas as desired primary or secondary field.
- Objective 4.13:* Expand the current Office of Sustainability to include: a Director of Sustainability Education, who has both administrative and teaching responsibilities; full-time staff member; and a fellow.
- Objective 4.14:* Establish a permanent Sustainability Committee composed of faculty, staff, and students.

- Objective 4.15:* Create new faculty positions that fulfill identified gaps in the current curriculum, which include geology/ climatology and geography/ demography.
- Objective 4.16:* Continue to consider and broaden funding opportunities for leave time for faculty “retooling” in sustainability-related fields and/or provide incentives/rewards for this kind of professional development.

## **Student Outreach**

### **Interactive Web Tools**

- Objective 4.17:* Install sub-metering technology and make real-time electricity consumption information available online.
- Objective 4.18:* Write a Sustainability Pledge to which students can commit online.
- Objective 4.19:* Create a “green handbook” with sustainable living tips and information about Davidson’s sustainability programs and projects.
- Objective 4.20:* Create an interactive sustainability campus map showing projects Davidson has implemented.
- Objective 4.21:* Develop an online library of instructional videos about facilities and sustainability projects on campus, including:
- Objective 4.22:* Make a carbon-footprint calculator for dorm rooms available online.

### **Educational Programs and Behavioral Change**

- Objective 4.23:* Institute an Eco Reps program to provide sustainability programming through the Office of Sustainability and the Residence Life Office.
- Objective 4.24:* Investigate a system of prompts and rewards for sustainable behavior.
- Objective 4.25:* Design and implement a coordinated, branded, social marketing campaign about environmental issues.
- Objective 4.26:* Make products that promote sustainable behavior available on campus at reasonable or subsidized prices.
- Objective 4.27:* Institute a student green fee to fund sustainability initiatives.



## Background

Energy use at Davidson College, between electricity, natural gas, and fuel oil, is a substantial portion of our GHG-emissions inventory. Scope 1 emissions are attributed to our direct consumption of fossil fuels. Natural gas and #2 fuel oil are consumed on campus as Scope 1 emissions for the production of thermal energy. Seventy-five percent of our campus square footage receives steam from our central boiler plant, whereby natural gas and fuel oil are consumed to generate pressurized steam. The delivered steam energy is used for building

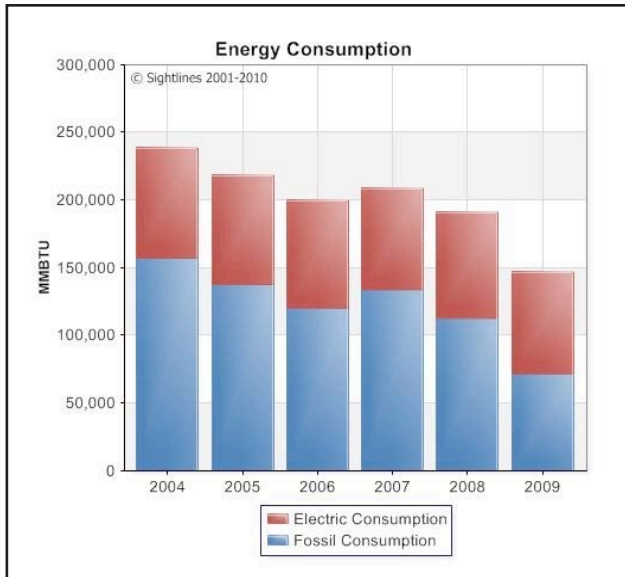


Fig 1.1: Total energy consumption per year. ©Sightlines LLC.

heat, the production of domestic hot water, and a few direct uses (for example, steam used in cooking, laundry, and sterilization processes). The remaining 25 percent of our square footage consumes natural gas directly for heating, cooking, and domestic hot water. Reductions to our Scope 1 emissions must come through reductions in fossil fuel consumption, both through efficiencies and through the generation of heat via renewable energies.

Scope 2 emissions are indirect, attributed to our purchase of electricity and the corresponding carbon intensity of the production means of our electricity provider, Duke Energy. Cooling, lighting, and end user plug load are the three largest categories of electrical consumption at Davidson. Reductions to our Scope 2 emissions will be both from our reduction in campus consumption through efficiencies and renewable energy, and by Duke Energy's plan to reduce its carbon intensity in electrical production.

Our carbon-emission future related to utilities is a function of the following components: Duke Energy's progress in altering its carbon intensity in electricity production, our ability to achieve efficiencies in our energy consumption, and our replacement of carbon-emitting energy with carbon-neutral renewable energy; while adopting higher emission standards for ourselves as our campus square footage grows.

Over the past decade, Davidson has devoted tremendous effort to campus energy efficiency. Figure 1.1 represents the campus consumption of electricity and fossil fuels, expressed in a common denominator form of BTU's.

The trend line over the past six years represents a 25 percent overall decrease in total energy consumption, even though the campus square footage grew by 3 percent during this period. This increased efficiency is largely attributable to multiple energy-efficiency capital projects, most notably the expansion of the central chilled-water system and the expansion of the digital energy-management system, coupled with a very strategic operation of both systems.

## Analysis and Recommendations

### *Campus Growth*

Without corrective action, it is assumed that Davidson College will continue its current carbon emission intensity, and that added square footage will be additive to our emission inventory by the same emission intensity per square foot. With this assumption, our model predicts an unmitigated increasing future path that corresponds to our projected growth. In the context of this CAP, Davidson has a strong sense of the campus square-footage

growth over the next 10 years. This short-term growth is based upon the recently concluded Strategic Plan and Facilities Master Plan, which call for a modest growth in enrollment. Beyond this short-term expansion, our future prediction includes a general assumption of campus growth based on historic trends of 2 percent routine growth with a static enrollment plateau. Table 1.1 reveals current growth expectations for the next 10 years.

Year	Facility	Square Feet
2012	Residence Hall	80,000
2013	Academic Facility	75,000
2013	College Store	10,000
2013	Library Addition	25,000
2015	Event Space	15,000
2020	Visitors Center	10,000

Table 1.1: Short-term square footage additions

However, Davidson does not want to add new square feet at the same emission intensity of our existing building portfolio. Therefore, Davidson will embrace the following policy strategies to ensure that future construction performs better than existing:

**Objective 1.1: Implement a policy that new facilities shall be designed to a minimum standard of LEED silver.**

Based on estimates by the U.S. Green Building Council (USGBC), completing the six building projects above according to LEED Silver standards would cost a total of \$1,290,000 upfront, and save a total of \$645,000 per year over the 20-year life cycle of the buildings. Additionally, it is estimated that LEED Silver construction will reduce GHG emissions by about 1,100 MTCO<sub>2e</sub> per year, representing 3.88 percent of Davidson’s footprint.

**Objective 1.2: Evaluate the possibility for LEED-EB for all renovations, and use LEED-EB standards as a design guide when it is not feasible to achieve LEED-EB certification for renovations.**

Davidson does have plans for facilities growth, but the college will also focus on renovating and improving existing buildings. For many of Davidson’s buildings, particularly historic ones, it would be cost-prohibitive to strive for LEED-EB certification. However, this option should be considered for all projects. If LEED-EB certification is not a feasible option, designers should be encouraged to include as many LEED-EB standards as possible.

**Objective 1.3: Implement a policy that new facilities shall be designed to consume energy at a rate below the then current energy intensity level per square foot average for the campus, as listed in the prior year’s carbon footprint calculation.**

Some research has drawn into question whether achieving LEED certification guarantees an energy-efficient building. Davidson’s energy use per square foot has been stable or declining each year for almost a decade. The combination of the LEED certification policy and this energy intensity policy is designed to ensure that new buildings are designed to be more energy efficient than traditional buildings, and to continue Davidson’s downward trend in energy use-per-square-foot ratings.

**Objective 1.4: Implement a policy that the design process for a new facility shall include the development of practices to minimize energy consumption by the constituents of the building.**

How a building is used after it is built has a significant impact on its efficiency, no matter how well-designed the

building may be. This policy is meant to ensure that planning for the building considers how the building will be used, and plans for educating the future occupants about energy use. Specifically, various policies may need to be adopted for specific parts of the building, such as temperature set-points, fume hood use, or security lighting.

Davidson currently strives to establish an operational-maintenance endowment for each new facility. To further increase the sustainability of Davidson's campus, even in a period of growth, we will investigate a policy to establish funds to purchase carbon offsets for each facility as a part of the operational maintenance endowment. This will allow Davidson to be prepared to purchase offsets for new buildings, should we decide to include that in our strategy for GHG emissions reductions.

### *Energy Efficiency Projects*

Davidson's energy management system and the central chilled-water system have been expanding since 1999, and so most of the "low-hanging fruit" in energy-efficiency projects have been picked. However, there are always additional topics and strategies that will derive additional efficiencies, most likely at a lesser reduction success rate than has been achieved in the recent past.

#### **Objective 1.5: Davidson will design and execute energy-efficiency projects for existing facilities and systems, to achieve a 10 percent reduction below 2009 levels over the next 10 years.**

To begin to identify additional energy conservation projects, Davidson conducted an energy audit in 2009 with generous funding from The Duke Endowment. Projects with an energy savings return-on-investment period of less than seven years will be considered for internal capital financing. The following list is not intended to be exhaustive, as Davidson will continue to develop efficiency projects in all of its facilities. Initial topics include:

- Replacement of the two 500 BHP circa 1964 boilers in the central boiler plant with three high efficiency, 300 BHP circulative steam generators.
- Scheduled steam trap audits to reduce waste from steam short-circuiting through trap devices.
- Scheduled boiler tuning to the manufacturer's operating specifications.
- Removal of lamps from vending machines.
- Establishing a motor management policy to replace all existing motors with NEMA premium motors.
- Expansion of the digital energy-management system to all facilities.
- Installation of metal halide substitutes in the athletic facilities.
- Daylight harvesting.
- Continuing retrofitting of the exit lights across campus.
- Installation of a cover for Cannon Pool.
- Thermal ice storage, both as a demand-avoidance strategy and as an on-peak supplement that will allow the existing chillers to function at their designed peak efficiency level.

Additionally, Davidson will embrace a schedule of retro-commissioning on a very detailed, per building level, to enhance the efficiency of systems operations. A retro-commissioning study is currently underway for Baker Sports Complex, and we will undertake a number of efficiency capital projects as a result of that study.

These projects are estimated to cost Davidson \$2.1 million, and will yield an annual savings of \$300,000 and 1,422 MTCO<sub>2e</sub>. This reduction accounts for 3.98 percent of Davidson's 2008 emissions.

Davidson would like to embrace renewable energy as a strategy to reduce the college's utility operating cost and emission output. While much technological progress has been made, the college is still researching the most effective ways to implement renewable energy on campus.

**Objective 1.6: Davidson will install forms of renewable energy on campus to reduce the delivery of fossil fuel-based utilities. By 2020, 12 percent of our total energy inventory will be generated by our own renewable sources.**

- Install a 75KW solar PV array on Baker Sports Complex in 2010–11.
- Execute additional solar PV projects identified in the Solar Design Associates study to add 500KW of solar generation capacity on existing facilities in the next 15 years, reducing the Duke Energy-supplied electrical delivery by 4 percent.

Through the generosity of The Duke Endowment, a study was conducted by Solar Design Associates in 2009 to determine effective potential solar sites and technologies for the campus. As a result of the study, a 75 KW monocrystalline solar photovoltaic array is scheduled to be installed on the rooftop of Baker Sports Complex by May 2011. This project, at a capital cost of roughly \$500,000, would see an energy saving of 128,850 kWh and \$14,170 per year. This represents a GHG emissions reduction of 0.29 percent. Davidson has applied for a federal stimulus grant to complete this project.

We are also seeking funding for additional solar PV projects. The estimated cost of the projects needed to ensure 500KW of generation capacity is \$2.66 million; this would yield an annual energy savings of 859,000 kWh and \$94,500. A total of 500 KW of solar capacity would reduce emissions by 1.92 percent below 2008 levels.

The two solar projects listed above will reduce GHG emissions below 2008 levels by a total of 2.21 percent. To reach a 12 percent reduction by 2020, an additional 9.79 percent reduction will be necessary, representing about 2,300 MTCO<sub>2e</sub>. The projects making up this goal may cost up to \$12,000,000, depending on the mix of technologies pursued. Several technologies are being investigated to meet this goal, including solar thermal, geothermal, biomass, and biodiesel.

Thermal energy derived from solar panels is also being considered as a supplemental heat source for the Cannon Natatorium. As currently imagined, this solar configuration will run in parallel to the existing steam-supplied pool water heating system, thus reducing the work of the natural gas-fired central steam system.

Geothermal energy is also being considered in Davidson's long-term renewable energy plans. The 2010 Facilities Master Plan has identified the need for a campus lake to address storm water detention and sediment retention requirements now imposed on the campus. In addition to meeting those needs, the lake will be convenient to the central chilled-water plant, and will be well suited as a geothermal heat sink. Although this strategy will primarily target water conservation, it will also help conserve electricity through the avoidance of the cooling towers and through free cooling use. It also can help heat and cool more remote facilities.

Our Facilities Department is also evaluating several other renewable energy strategies, although to a lesser degree. These other options include the use of concentrated solar for hot water or steam generation, the use of biomass woody debris as a fuel source, the use of biodiesel as a fuel source in the central boiler plant, and the use of small-scale wind energy. Furthermore, the department will keep a watchful eye on emerging technologies and their potential application at Davidson.

These projects represent a significant portion of the initiatives that Davidson will pursue in order to reduce direct GHG emissions, as shown in Figure 1.2. It is evident that striving for 10 percent renewable energy is cost effective and will see significant GHG emissions gains.

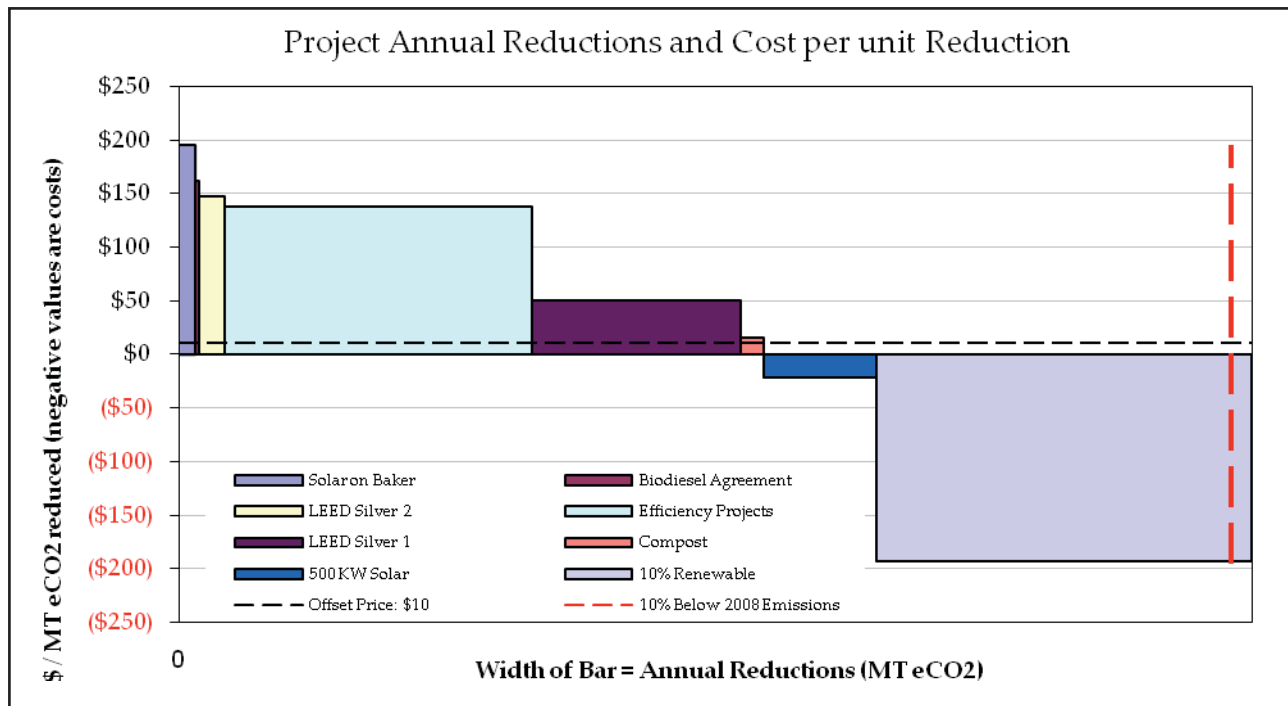


Figure 1.2: Comparison of cost and GHG-emissions reduction for top eight projects

### Duke Energy's Generation Source Strategy

Our Scope 2 emissions are factored by the source of our electricity and its production cleanliness. Duke Energy currently has a 52 percent coal-fired generation portfolio, which factors heavily in the college's carbon footprint. Davidson has met several times with leaders from Duke Energy to understand the future of their generation capacity. We have learned that Duke Energy has an aggressive strategy to substitute coal and natural gas with both nuclear- and hydroelectric-based energy generation. Although Duke Energy has listed multiple disclaimers related to future plans and the governance of the North Carolina Utilities Commission, they have shared a generation template that we have included as a fundamental basis of our plan. Fig. 1.3 represents Duke Energy's projected emissions per megawatt-hour.

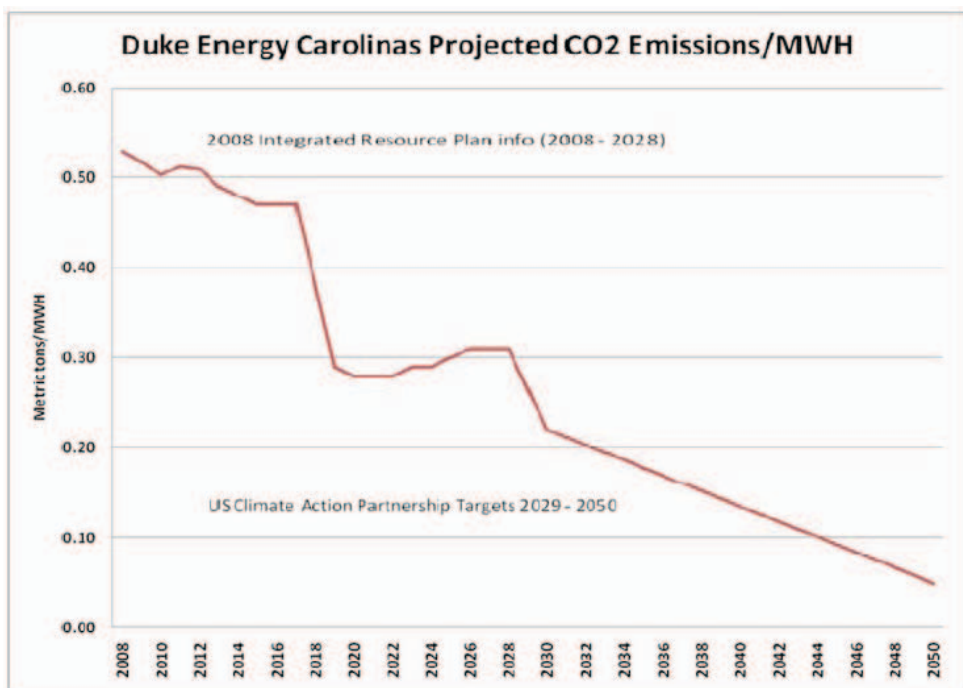


Figure 1.3: Projected electricity-based emissions by Duke Energy

generation template that we have included as a fundamental basis of our plan. Fig. 1.3 represents Duke Energy's projected emissions per megawatt-hour.

**Objective 1.7: Continue to monitor the progress of Duke Energy in its emission reduction execution. Assist Duke Energy, if possible, in its regulatory conversations by serving as a case study or example.**

Davidson estimates that, based on the predictions published by Duke Energy (Fig. 1.3), we will see a 7 percent reduction in GHG emissions by 2030, and a 15 percent reduction by 2050, as seen in Fig-



ure 1.4. It is our sincere hope that we can continue to work with Duke Energy to ensure that these targets are met, as well as develop new projects to encourage further developments in sustainable energy generation.

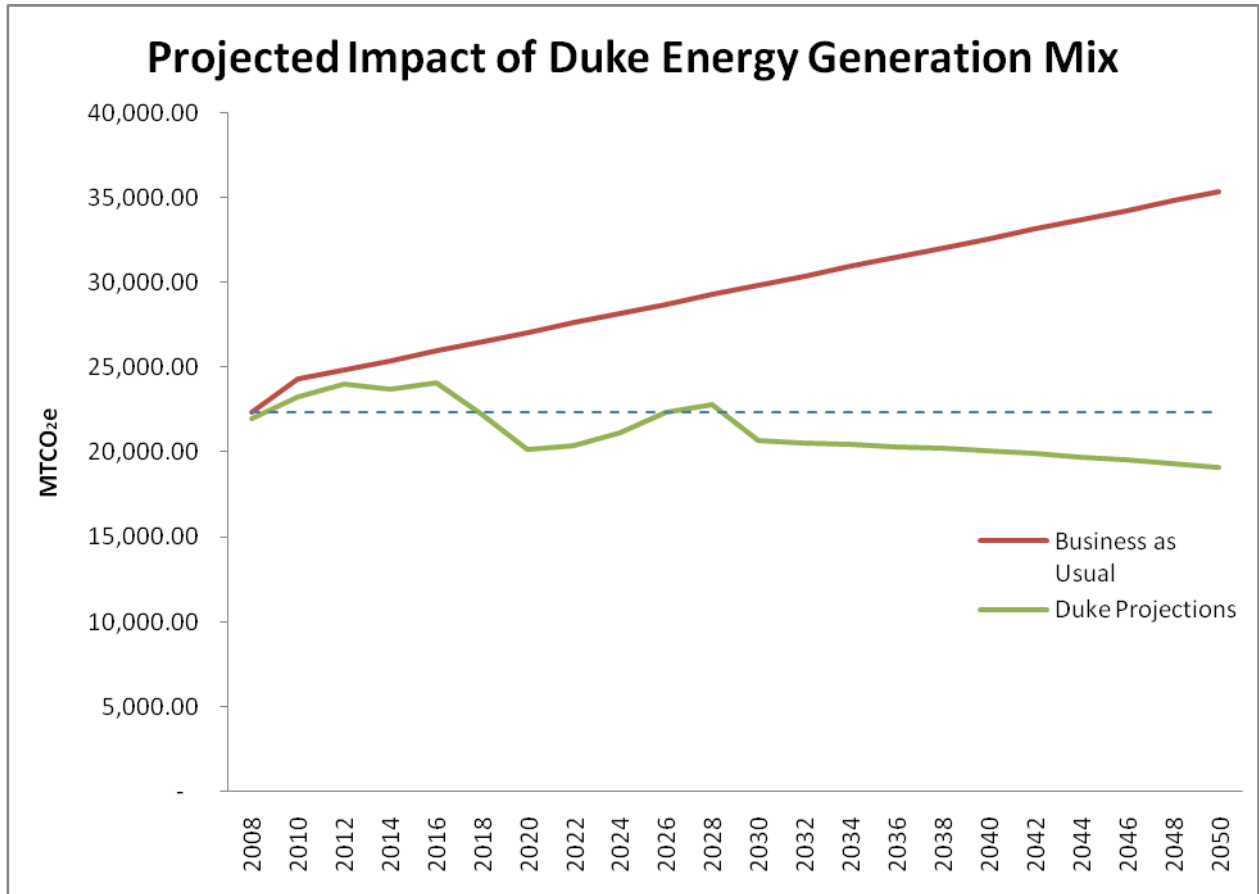


Figure 1.4: Projected impact of Duke Energy generation mix, changes versus business-as-usual





### Background

The Transportation category covers GHG emissions from the categories of Air Travel (4 percent), Commuting (1 percent), and Grounds and Fleet (1 percent). The most difficult piece to reduce will be institutional air travel, due to the amount of professional development, recruiting, and other important activities that students, faculty, and staff undertake. However, we have identified several strategies by which to make transportation at Davidson more sustainable.

These objectives focus not only on direct GHG-emissions reductions, but also restructuring cultural norms on campus to promote sustainable travel outside of the scope of Davidson's GHG emissions. This plan aims to take a holistic look at the way Davidson students, faculty, and staff get from place to place in and around Davidson as well as beyond.

### Analysis and Recommendations

#### *Air Travel*

The initial consideration with air travel is tracking and recording data. Currently, Davidson does not track the miles travelled by air in any fashion. It is clear that the manual estimation method used for the initial GHG-emissions inventory is inconvenient and probably not very accurate. However, there is some concern that with the adoption of tracking measures, our footprint may increase, and that any reductions we accomplish will merely mitigate our more detailed tracking.

#### **Objective 2.1: Initiate a Mileage Tracking program.**

This program will reside within Business Services and will be a part of the travel reimbursement process, to encourage accurate reporting of mileage. To ensure that miles are recorded reliably, there will be no reimbursement for expenses unless the miles travelled are included. Participants must distinguish between air and vehicle miles travelled. Mileage for varsity athlete buses and other student activities will also be recorded. Once detailed records have been established, it may also be possible to identify groups and individuals who can carpool or combine trips in the future.

#### **Objective 2.2: Increase use of technologies that reduce the need for air travel.**

Davidson has teleconferencing technology, as well as the ability to view Webinars and host virtual meetings. The Instructional Technology department will promote the use of these tools to communicate with colleagues, conduct initial interviews for first-round job candidates, and participate in professional development opportunities. While these technologies should not replace face-to-face interaction with peers and colleagues across the country, there are many applications that could prove useful to Davidson faculty, staff, and students.

#### **Objective 2.3: Encourage a better carbon mentality about institutional travel.**

- Make employees aware of the carbon-intensity of their travel.
- Make employees aware of alternative and less carbon-intensive travel options.

Our faculty, staff, and students travel for many reasons—from professional development to recruiting—that cannot be replaced with technology or other means. Therefore, it should be made clear on the travel reimbursement form (see Objective 2.1) the carbon-intensity of each mile travelled. Additionally, information about alternatives should be publicized among employees, such as combining multiple activities into a single trip. A report will be issued to departments annually on the carbon-intensity of their employees' travel, so that vice presidents and



department heads can continue to promote sustainable travel.

A stepped driving zone within a reasonable driving distance of Davidson, from six to eight hours, should be publicized to encourage faculty and staff to consider foregoing air travel. As seen in Figure 2.1, many major cities can be reached from Davidson in eight hours or less. Additionally, there are train and bus options to many of these cities.



Figure 2.1: Stepped “driving zones” within six and eight hours’ drive of Davidson

### *Grounds and Fleet*

Davidson has already begun making sustainability improvements in its grounds and fleet vehicles. Motor Pool has prioritized hybrid vehicles for all new vehicles. Davidson’s diesel storage tank is 20 percent biodiesel. However, there are several areas in which to make improvements.

#### **Objective 2.4: Shift to less greenhouse-gas-intensive vehicles.**

- Formalize the policy that all new Motor Pool vehicles should be hybrid vehicles.
- Investigate electric car technology, including plug-in hybrid electric and solar recharge, as an alternative to hybrid vehicles.
- Replace gas golf and utility carts with electric carts at a rate of at least one per year until the entire fleet is converted.
- New vehicles and equipment for which there is no hybrid alternative should be diesel, to increase the potential for using biodiesel.
- Designate that frequently used vehicles, such as the Vamanos Van and Campus Police cruisers, be hybrid or able to run on biodiesel.

Due to rapid technological developments in the transportation sector, diversification of vehicles is an important component of reducing the GHG-emissions impact of Davidson’s fleet. Davidson has the potential to invest in new technologies as they come online, which will help invigorate the market for these vehicles and establish Davidson as a leader.

### **Objective 2.5: Increase biodiesel use on campus.**

There are two biodiesel options: install a biodiesel production facility on campus, or develop a relationship with a biodiesel production plant to trade waste vegetable oil for B100 biodiesel. Either program would use fryer oil from on-campus dining facilities to make biodiesel, which will primarily be stored in the diesel fuel tank at the Physical Plant shops. The highest level of biodiesel feasible for our vehicles should be achieved. Additionally, Davidson will investigate the possibility of using biodiesel in the boilers as an alternative to #2 fuel oil.

Should the campus decide to pursue trading used fryer oil for biodiesel, there are several biodiesel plants near Davidson's campus. Based on the quality of used fryer oil at the two main dining facilities on campus, a trade of 1 gallon of B100 biodiesel for every 4 gallons of fryer oil could be made with a biodiesel production company. At the current rate of used-fryer-oil production, Davidson could receive 1,400 gallons of biodiesel per year, displacing about 50 percent of Davidson's current diesel fuel use and reducing GHG emissions by 14 MTCO<sub>2</sub>e per year. This project has great cocurricular potential, and could be a part of courses, internships, or work-study positions. We will consult Middlebury College and Furman University, two campuses with successful biodiesel production programs.

### *Commuting*

A 2008 survey of faculty and staff showed that many, particularly faculty, walk and ride bikes to campus on a regular basis. However, carpooling and public transportation are not frequently used. Many of the respondents who do frequently drive to campus, but live close enough to walk or bike, indicated that they might need their car in cases such as a sick child or a need to run errands immediately following work. Student commuting is a de minimus source of emissions, as at least 90 percent of students live on campus, and most of those who live off campus are within walking distance of campus.

### **Objective 2.6: Reduce the number of student vehicles on campus.**

- Do not allow first-year students to bring cars to campus.
- Move parking areas to the exterior parts of campus.
- Increase the cost of student parking permits.
- Permit each parking lot separately.

Some of these strategies are part of Davidson's Master Plan, which will be implemented over the next several years. Increased parking permit fees could be used to augment sustainability funding for various other projects.

### **Objective 2.7: Provide alternative transportation options.**

- Institute a car-sharing program.
- Improve the existing Community Bikes program.

Car sharing, such as ZipCar, would provide numerous benefits to campus. Students, faculty, and staff would have ready access to a vehicle for a reasonable fee. This would allow faculty and staff who walk or bike to use a car during the day if they needed to. It would also give students who do not bring cars to campus access to area shopping and off-campus social opportunities.

There are possibilities to partner with local businesses to create a significant ZipCar network. Such an arrangement would provide several vehicles for Davidson faculty, staff, or students to use during the week, while a fleet of vehicles would reside at the partner organization. On the weekends, the entire fleet would be on the Davidson College campus, to be used by students for shopping, dining, and travel. Davidson will investigate these options further as it works with ZipCar to develop a program.

Changing the current Community Bike program, which is free, to a rental program would both increase its functionality and reduce damage to bikes by increasing use responsibility. Bike racks with CatCard readers should be installed at key campus locations, including all parking lots, Chambers Building, the Alvarez College Union, Baker Sports Complex, and groups of dorms. Students would pay an annual membership fee, which would give them access to the bikes. Students would use their CatCards to release the bike from the station, and park it in another station when finished. The student's ID number would be recorded, so those responsible for missing or damaged bikes could be identified.







## Chapter 3: Consumption and Waste Disposal

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### Background

**C**onsumption of materials and resources has both direct and indirect environmental consequences. Consumption involves extraction of natural resources, packaging, transportation, and disposal—and every aspect has an impact. While not all consumables are directly tracked or recorded in Davidson’s GHG emissions inventory, it is nonetheless important to investigate these issues.

Additionally, it is important to begin a cultural shift in the way we think about consuming resources. In many cases, the initial instinct is to buy new. Davidson first needs to shift to reduce the amount of consumption overall, then reuse products before purchasing new ones, and finally recycle those products that can no longer be used.

Currently, Davidson has several programs in place to reduce consumption and waste. Davidson reuses and repurposes computers and other electronics, typically multiple times, before recycling them. Additionally, Davidson has been switching high-volume documents to electronic resources over the past two years, resulting in significant reductions in paper use.

Students have been very active in the reduction of waste on campus. For example, the food waste composting program that was proposed by students in 2008 is diverting roughly 33 cubic yards of food waste from the land fill each semester. Additionally, Davidson has reduced the amount of recyclables in the trash by more than 40 percent.

### Analysis and Recommendations

#### *Consumption*

After becoming an ACUPCC signatory, Davidson’s first tangible action was to implement an Energy Star procurement policy. The next action was a purchasing policy that required recycled-content paper. The purchasing department strives to make sustainability a priority when choosing vendors and products, but there is no coordinated effort to make sustainable purchases for campus operations.

#### **Objective 3.1: Centralize green purchasing policies.**

- Partner with vendors and suppliers who have active sustainability programs.
- Ensure that all copy and print paper purchased with college funds is at least 50 percent recycled, post consumer waste content.
- Develop a green office-supplies shopping list for both faculty and staff purchases, as well as for students.
- Ensure that all appliances purchased with college funds are Energy Star-rated. This includes, but is not limited to, printers, copiers, multi-function devices (MFDs), refrigerators, stoves, air conditioners, and microwaves.
- Create an incentive program to encourage students to bring only Energy Star-rated appliances to campus for residence hall rooms. Further, encourage students not to bring appliances to campus at all. Where possible, encourage the use of community refrigerators, printers, and other electronics in public areas of residence halls and other campus buildings.
- Centralize the purchasing and placement of printers, copiers, and MFDs to conserve energy, reduce equipment purchasing, eliminate unnecessary desktop printing, and to ensure the practice of duplex printing and copying.
- Ensure that duplex printing is the default setting on all copiers and printers.
- Purchase furnishings which are built using environmentally sound materials, recycled content (where applicable), and ergonomic design.

A group of established policies about purchasing is needed to guide the faculty and staff members who make purchases on campus. Education around these policies is similarly important, beginning with simply making faculty and staff aware of them. This can be achieved through new employee orientation, information sessions for current faculty and staff, and online resources.

**Objective 3.2: Promote more sustainable behavior among faculty and staff.**

- Turn off appliances and electronics when dormant.
- Increase use of intracampus envelopes.
- Reduce unwanted bulk mail through an opt-out registry.
- Increase the use of reusable beverage containers.

An educational campaign to promote more sustainable behavior by faculty and staff should include information in new employee orientation, as well as seminars and resources for current employees. Intracampus envelopes should be redistributed to departments regularly to ensure that employees have adequate access to them. The bulk mail opt-out registry should reside in Central Services and online, and be available to employees at all times. Reusable mugs already offer discounts at dining facilities on campus, and these should be promoted more actively.

**Objective 3.3: Develop a more sustainable food system.**

- Increase the share of food products bought from local farms.
- Increase the share of food products bought from farms that employ sustainable practices in raising crops and livestock.
- Develop and implement a system to evaluate the ability of a local or sustainable producer to meet the volume, quality, and sanitary requirements of Davidson's dining program.
- Investigate ways to reduce food waste, especially at the all-you-can-eat dining facility.

While food is not currently included in Davidson's GHG-emissions footprint, we consider it to be a significant issue on campus. Additionally, methods to track and report food-related GHG emissions are currently being developed, and will be employed by Davidson when they become available. Davidson plans to create a more sustainable food system in the near future.

Davidson currently uses a major national food distributor as its primary vendor. While pursuing sustainable food through small and medium local and regional farms, Davidson should also take advantage of any and all local buying relationships that its primary vendor has already established.

The Office of Sustainability and Dining Services should partner in efforts to educate students, faculty, and staff about the costs and benefits associated with purchasing food from other regions of the country. These partnerships will raise awareness about local and seasonal dining. Dining Services should promote local and seasonal food options to customers wherever possible, including with catering customers.

Finally, Davidson has only one all-you-can-eat dining facility, but it sees considerable food waste daily. Reduction of food waste begins with the consumer, and can take many forms. Davidson's Dining Services department should seriously consider equipping the facility to eliminate trays, as this type of change has been shown to reduce food waste considerably. While this may not be an easy change, it should save Davidson money and reduce our footprint.

**Objective 3.4: Continue to replace paper documents with electronic wherever possible.**

Davidson has successfully developed electronic versions of many paper documents, including monthly budget reports, Physical Plant work orders, pay stubs for salaried employees, room selection documents, course catalogues, and report cards. But further reductions can be made. The telephone directory is currently avail-

able online, but employees can request a print copy; these could be eliminated completely. Other documents that could be converted are bill payment, direct deposit reimbursement notifications, and hourly and student employee pay stubs.

**Objective 3.5: Expand the PawPrint management system to the entire campus.**

- PawPrint should be installed on all printers in student computing labs.
- Implement a printing quota, over which students must pay for printing.

PawPrint, Davidson's print management system, is active in several of the main student computing labs on campus. This program has been shown to reduce paper use by 25 percent, simply by requiring students to swipe their ID card at the printer before releasing print jobs. This eliminates accidental printing, excessively long documents, and forgotten print jobs. PawPrint also allows ITS to track printing habits among students. This information should be used to develop a printing quota for students.

**Objective 3.6: Centralize printing for each office or department.**

Many employees have desktop printers, which should be phased out as equipment becomes eligible for replacement. Centralized, networked printing will reduce paper consumption, and high-speed multi-function devices also save energy. The PawPrint management system, currently in use in student computing labs, could be implemented in faculty and staff offices, as well. This would further reduce paper consumption, allow departments to track paper usage, and identify areas of waste.

*Waste Disposal*

**Objective 3.7: Purchase office equipment with waste prevention in mind.**

Davidson should work with its vendors to ensure that efficient products are available at competitive prices. Several strategies can be used, such as electronic interfaces, duplex printing capabilities, sourcing and purchasing durable products, and multifunction equipment. These products make it easy for users to operate them in a sustainable way, increase their lifespan, and reduce the need for multiple pieces of equipment.

**Objective 3.8: Expand the food waste composting program.**

- Include faculty and staff offices and student dorms.
- Hire a staff person to run the composting program.

Davidson's food waste composting program currently diverts 33 cubic yards of food waste per semester from the landfill, creating roughly 95 cubic yards of compost for use on campus. The current GHG emissions reductions being realized by this project are about 93 MTCO<sub>2e</sub> per year. This program should be expanded with a full-time staff member, split between Dining Services and Physical Plant. A staff person devoted to the compost program would allow us to increase the capacity of the system, further reducing landfill waste and increasing compost output. Part of this person's responsibilities would be pulping pre-consumer food waste at Vail Commons, which currently accounts for much of the volume of food waste entering the composter. Pulping this waste would reduce its volume by 80 percent, effectively increasing the capacity of the composter to allow for expansion of the program.

## Chapter 4: Curriculum, Research, and Student Outreach

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### Background

**A**s stated in the ACUPCC, signing institutions will “take actions to make climate neutrality and sustainability a part of the curriculum and other educational experience for all students.” The CAP incorporates the current components of our curriculum that include climate neutrality and sustainability, as well as plans to expand these opportunities for all students. We used *Education for Climate Neutrality and Sustainability: Guidance for ACUPCC Institutions* to guide and shape our discussions. In the ACUPCC guidance document, the ACUPCC Academic Guidance Working Group proposes that a sustainable future will include “operating on renewable energy, creating a circular production economy where the concept of waste is eliminated because all waste products are raw materials or nutrients for the industrial economy and living off of nature’s income, not its capital.”

Educating students to live and lead in a sustainable future will require curricular and cocurricular development around these concepts and practices. Working within the framework of the ACUPCC document, we evaluated our curricular, cocurricular, and extracurricular offerings from three perspectives: the context, content, and process of learning as identified by the ACUPCC Working Group (Appendix B). We began by surveying programs at other institutions and assessing our current curricular and cocurricular offerings. This assessment prompted further discussion identifying weaknesses in our current curriculum.

Davidson’s curricular and extracurricular offerings have included numerous ties to sustainability, especially recently. In December 2007, the Davidson College faculty approved the Environmental Studies Concentration (Appendix C). The concentration requires six courses, including an interdisciplinary, team-taught introductory course and an interdisciplinary, team-taught capstone course. Some of these courses are community-based or include a service-learning component, which falls under an experiential pedagogy that combines direct service with course learning goals to meet a community-defined need. Faculty work independently and with the community service office to design community-based learning assignments. In spring 2010, the faculty added an Environmental Studies major, the college’s first interdisciplinary major. Courses are now being developed and the major will be available beginning with the Class of 2014.

In spring 2009, Davidson welcomed the inaugural Thomson Distinguished Visiting Professor of Environmental Studies, Michael Branch of the University of Nevada, Reno, a specialist in environmental humanities. In fall 2009, we welcomed the second Thomson Distinguished Visiting Professor of Environmental Studies, Mart Stewart of the Western Washington University, a specialist in environmental history. In spring 2010, the college named Annie Ingram as the inaugural Thomson Professor in Environmental Studies, a position generously endowed by Todd and Melissa Thomson, both of the Class of 1983. A grant from the Associated Colleges of the South and the Mellon Foundation has allowed Davidson to hire a postdoctoral fellow in Environmental Studies, Julianne Mills, who received her Ph.D. in June 2009 from the Ohio State University’s interdisciplinary program in Evolution, Ecology, and Organismal Biology.

In addition to academics, the college coordinates or advises numerous extracurricular (e.g., outside the regular academic curriculum) and cocurricular (e.g., a complement to the academic curriculum that includes intentional learning goals) experiences that include a focus on sustainability. A generous gift by Wallace “B” and Nancy Millner supports environmental programming on campus. In 2008–09, the Millner Fund supported Janisse Ray’s visit, a student-initiated project to develop honeybee hives on campus, and the stipends for two Environmental Interns. Prof. Cindy Hauser, the campus Environmental Fellow (a position first developed with funding from the Associated Colleges of the South and now funded by Davidson College), manages the Millner Fund and supervises the Environmental Interns. For 2008–09, Prof. Hauser and the interns developed a biweekly electronic newsletter, *EnviroNews*, which collated information about environmental and sustainability issues and opportunities on campus.

The primary recommendations include establishing a sustainability competency requirement and an Environmental Studies major, expanding the Office of Sustainability, and allocating appropriate resources to successfully



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Kinetic energy from your workout is converted to DC power, stored in the form of capacitors and sent to the building.



The device will store energy from the DC output until it is needed to power the building's electrical systems.



The energy is then sent back to the building's electrical grid.

We're converting your workouts into energy savings!

## Your energy adds up.

A typical 30-minute workout produces 50 watt hours of clean, carbon-free electricity. That's enough electricity to run:

- Laptop computer 10 minutes
- Desktop computer 15 minutes
- Television 7 minutes
- Refrigerator bulb 22 minutes
- CPUs bulb 1 hour and 10 minutes

Real energy...fed back to the electrical grid.

Work harder, create more electricity.

Your use of specially marked equipment will convert your workout energy to electricity, sending it back to the facility's grid.

Join the Renewable Energy Revolution!

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A gym environment is the ideal setting to capture large amounts of kinetics in an efficient and cost-effective way and convert it into renewable energy.

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implement these recommendations. Also included in this document, as required by the CAP guidelines, are plans for integrating ACUPCC implementation strategies into the college's curriculum and communicating the institution's efforts toward meeting the goals of the ACUPCC.

## **Analysis and Strategies**

### *First Year Experience*

The successful implementation of the college's CAP will require behavioral changes among the student body.

**Objective 4.1: Expose students early in their Davidson experience to sustainability issues through a "Davidson 101" or correlative experience, Orientation presentation, W-course offerings that incorporate sustainability, Odyssey trips, or experiential learning opportunities.**

New Student Orientation is typically loaded with activities and information, and there are many other worthy programs that do not have a dedicated place in its schedule. However, to establish a norm of sustainable behavior among students, including sustainability topics in Orientation is imperative. Failure to acknowledge the place of sustainability in the student experience at Davidson during Orientation suggests that it is of peripheral importance to the lives of our students.

There are opportunities to wed the service component of Orientation with sustainability through projects like home weatherization or stream clean-ups. This would use an established Orientation activity to encourage sustainable behavior. Other ways to include sustainability involve weaving the topic throughout various Orientation speakers and activities, such as Baker Night and the President's address.

**Objective 4.2: Focus on institutional goals for GHG emissions and sustainability and use partnerships in delivery of information/use the campus as a classroom.**

For example, a panel presentation/discussion to include Environmental Studies faculty, Director of Physical Plant, Sustainability Fellow, Director of Dining Services, etc.

**Objective 4.3: Establish a mentoring/advisory system that informs students early on of curricular opportunities about sustainability topics.**

For example, talk to first year students in their second semester so they know about the options and can self-select into these courses or the Environmental Studies major; advertise through the Crier; and offer personalized as well as classroom presentations.

### *Curriculum Expansion and Enhancement*

Integration of sustainability in the First Year Experience is an important but insufficient short-term objective. Successful implementation of a Sustainability competency will require additional curricular offerings that educate students about sustainability issues and provide the skills to address current and future challenges.

**Objective 4.4: Expand the number of courses incorporating sustainability concepts within the curriculum, including adding an interdisciplinary Environmental Studies major.**

Plans for the major should include a timeline for completion and a list of resources necessary for successful implementation.



**Objective 4.5: Promote new courses relevant to sustainability issues.**

Courses should be in areas such as Development, Public Health, and Globalization, which could lead to additional curricular options such as majors, minors, and concentrations. These curricular initiatives will require that new courses be developed and existing courses be offered more regularly.

**Objective 4.6: Offer more community-based learning courses that meet community-defined needs and pay particular attention to sustainable, adaptable course assignments and community partnerships.**

These courses teach important skills that are difficult to learn in a traditional classroom setting. Some benefits of community-based learning include communicating with the public, working in groups, and experiencing what it is like to see a project idea through from beginning to end.

**Objective 4.7: Use the campus environment as a learning laboratory to research and implement institutional needs as they apply to sustainability goals.**

As Davidson develops resources on campus, it is important to consider their implications for hands-on learning. Not only that, the campus could be used to further interaction with outside groups, such as area elementary and high schools.

**Objective 4.8: Encourage the use of collaborative, case-based, and other experiential assignments through the development of a resource database.**

**Objective 4.9: Provide opportunities for students to connect/reflect on extracurricular experiences (volunteer, internship, leadership) in the context of sustainability.**

**Objective 4.10: Develop and implement a sustainability competency requirement.**

To further advance our institutional objectives of climate neutrality and sustainability education for all students, the faculty should consider instituting a sustainability competency. The successful implementation of a sustainability competency as a graduation requirement will require enhanced curriculum and faculty support as outlined below.

A competency requirement incorporates a content and process component where students are exposed to the various concepts of sustainability both in the classroom and in the community. This competency can be fulfilled in a variety of ways, including course offerings, internships, study abroad, W courses, community-based learning courses, library exhibits, gallery exhibits, sponsored lunch discussions, public lectures, Bonner Scholars activities, and programs by many organizations, including the Dean Rusk International Studies Program, Chidsey Leadership, Davidson Outdoors, the Community Service Office, the Eco-House, EcoTeam, the Environmental Action Coalition, etc. It is recommended that the requirement be fulfilled by the end of the junior year or with clear indication of how it will be fulfilled in the senior year. It is also recommended that the competency have an assessment component.

*Curriculum/Faculty Support*

The Vice President for Academic Affairs office pledges continued support through allocation of resources to support team-teaching, regular offerings of ES courses, and development of new courses in sustainability at all levels in the curriculum. Additional sources of support include:

**Objective 4.11: Prioritize current funding (or creating new/special funding) for student, faculty, or student-faculty research related to sustainability issues and global climate change (e.g.,**

**designate a certain number of Davidson Research Initiative grants for these topics).**

**Objective 4.12: Provide resources for new faculty hires and positions that prioritize sustainability areas as desired primary or secondary field.**

**Objective 4.13: Expand the current Office of Sustainability to include: a Director of Sustainability Education, who has both administrative and teaching responsibilities; full-time staff member; and a fellow.**

An Office of Sustainability is essential for organization, communication, and coordination of programs, public image, and awareness. It will illustrate that the college has made a significant and serious commitment to sustainability. This office will serve as a resource for the seamless Integration of Sustainability into Curriculum Support Centers, including the Center for Teaching and Learning, the Center for Civic Engagement, the Vann Center for Ethics, etc., and should have an annual plan/proposal and reporting requirement for sustainability programming. One programming example would include Curriculum Development Workshops for faculty interested in developing courses in sustainability and global climate change.

This office will also be responsible for centralizing programming (design, coordination, and implementation) to communicate and publicize sustainability efforts among students, faculty, staff, and the community—in courses, events, activities, operations, etc.

**Objective 4.14: Establish a permanent Sustainability Committee composed of faculty, staff, and students.**

This committee will reside in Business and Finance, and be made up of faculty, staff, and students who have particular experience or interest in sustainability. The charge of the group will be to advise the president on issues of sustainability. This committee will evaluate sustainability project ideas based on their economic, social, and environmental impacts, and determine which are feasible. For example, groups with an idea to promote sustainability on campus may approach the committee with their proposal, which will be reviewed by the committee. Additionally, this group will manage sustainability funds until the Office of Sustainability can be expanded to include a permanent sustainability director.

**Objective 4.15: Create new faculty positions that fulfill identified gaps in the current curriculum, which include geology/climatology and geography/demography.**

**Objective 4.16: Continue to consider and broaden funding opportunities for leave time for faculty “retooling” in sustainability-related fields and/or provide incentives/rewards for this kind of professional development.**

This would allow faculty to take a leave (of up to a semester) in order to learn and refresh skills in pedagogy and content in the area of sustainability. Many programs exist throughout the country that would expand faculty knowledge and skills in sustainability education. Professors who take advantage of these types of opportunities could also share materials and techniques with others upon their return.

**How will the implementation of the ACUPCC be integrated into the institution’s educational efforts?**

As indicated in the above objectives, implementation of the ACUPCC will be integrated beginning with the institutional panel during the First Year Experience. Additionally, a semiannual meeting of the Sustainability Committee should be used to identify campus needs and goals that can be met using classroom experiences while further promoting integration through the use of campus as a learning laboratory where appropriate

## How will the entire campus community, including alumni, be made aware of the institution's participation and progress toward implementing the ACUPCC?

Communication will be predominantly through electronic modes, including the campus Sustainability Web site, the electronic environmental newsletter (EnviroNews), the Crier, Inside Davidson, informational e-mails to parents and alumni, the *Davidson Journal*, consortium communications including Paladium, the ACUPCC, community news sources including davidsonnews.net and WDAV. Additionally, the Office of Sustainability will be responsible for on-campus informal informational programming, including coffee hours, brown bag discussions, question and answer panels, forums, etc. where faculty, staff, and students can learn about what is going on campus and provide input.

## Student Outreach

### Background

Davidson students have taken a keen interest in environmental and sustainability issues, especially in the last decade. The recycling program at Davidson began with a group of devoted students who collected and transported recycling each week until the administration took notice and formally adopted the program. Several environmentally themed groups exist on campus, including the Environmental Action Coalition, the Eco-House, and the Patterson Court Sustainability Council. These groups, as well as various projects developed in cocurricular and community-based learning courses, work to increase environmental awareness and behavior among students. The recommendations below were developed by and for students to continue raising awareness and changing behavior.

### Analysis and Strategies

#### *Interactive Web Tools*

The current sustainability Web site includes information about upcoming programs and past and present sustainability initiatives. The addition of interactive Web tools would greatly improve this site. Current students, faculty, and staff could benefit from the educational and informational material. An additional audience is prospective families; high school seniors have indicated that environmental issues are among the 10 most important issues they consider when choosing a college. The resources listed below would help illustrate Davidson's commitment to sustainability to prospective families in a fun and engaging manner.

**Objective 4.17: Install sub-metering technology and make real-time electricity consumption information available online.**

Davidson is investigating the feasibility of installing sub-metering technology in each dorm on campus. Not only will this allow facilities to more accurately track electricity use, but also it will allow students to view real-time electricity consumption information. These technologies have been used on other campuses to promote electricity use competitions between dorms with great success.

**Objective 4.18: Write a Sustainability Pledge to which students can commit online.**

This pledge would focus on the student's personal responsibility to the environment, encouraging a commitment to a sustainable lifestyle. Students would be able to sign the pledge online, and then would automatically

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<sup>3</sup>See Appendix D for a matrix of environmental outreach programs and the sponsoring group or department. [www.davidson.edu/sustainability](http://www.davidson.edu/sustainability)

be subscribed to a monthly e-newsletter announcing upcoming environmentally themed events and programs, as well as information on sustainable living topics. In this way, students can become a more active part of institutional sustainability goals.

**Objective 4.19: Create a “green handbook” with sustainable living tips and information about Davidson’s sustainability programs and projects.**

This online handbook would provide an overview of sustainability advances on campus, as well as tools and suggestions for how to live more sustainably. It could be used as a resource for a variety of purposes, including incoming student orientation and the first year experience. Additionally, sections could address topics specific to faculty and staff needs, and could thus be used in new employee orientation or other seminars. Part of this handbook could be an environmental program matrix that outlines what is currently offered, as in Appendix D.

**Objective 4.20: Create an interactive sustainability campus map showing projects Davidson has implemented.**

This map, hosted on the sustainability Web page, would be a fantastic resource for students, faculty, staff, alumni, visitors, and prospective families. The campus map would be re-tooled to display information about various sustainability improvements. The information will likely focus on facilities enhancements, but could also include curricular and extracurricular information.

**Objective 4.21: Develop an online library of instructional videos about facilities and sustainability projects on campus, including:**

- HVAC systems
- Electricity use
- LEED building tours
- Dining Services
- Compost
- Recycling and Waste

These videos will be an online resource for students as well as faculty and staff. Professors will be able to use them in courses, they could become a part of the new student orientation information, and they can provide general information about how Davidson operates. These videos will be produced by students and the Office of Sustainability with assistance from the Office of College Communications.

**Objective 4.22: Make a carbon footprint calculator for dorm rooms available online.**

Carbon calculators are widely available online, but they apply to households and are not relevant to most Davidson students. A group of students at Rice University have developed a carbon footprint calculator for students living on campus. Davidson could use this model to develop one of our own to make available to our students via the sustainability Web site.

*Educational Programs and Behavioral Change*

While many events occur throughout the year to educate students about various sustainability topics, these events tend to involve the same set of students. Davidson needs a more coherent, coordinated effort to educate all students, especially during the early part of a student’s first semester at Davidson. Early action to promote sustainable behaviors is more likely to stick with students through all four years, and beyond.

**Objective 4.23: Institute an Eco Reps program to provide sustainability programming through the Office of Sustainability and the Residence Life Office.**

- Implement a green dorm room certification program.
- Speak to all first year students during hall meetings.
- Act as a resource for Residence Life staff and students living in dorms.

Based on the program that began at Tufts University and has now spread to dozens of campuses nationwide, the Eco Reps program that Davidson will implement will provide a valuable resource by and for students. In this program, each dorm will have one student representative who will work with the Hall Counselors and Resident Advisers on environmental programming in their dorm. Students may or may not live in the dorm for which they are Eco Reps. Student Eco Reps will arrive to campus early for training, and then start meeting with the residents of their assigned dorm to educate about and advocate for sustainable behavior. Eco Reps will be coordinated by the Office of Sustainability with support from the Residence Life Office.

**Objective 4.24: Investigate a system of prompts and rewards for sustainable behavior.**

In a recent survey, students indicated that rewards and incentives would be an effective way to change their behavior. Through a series of focus groups, Davidson will research and develop rewards that can be given for sustainable behavior to continue to influence a cultural shift toward an environmentally conscious campus.

**Objective 4.25: Design and implement a coordinated, branded social marketing campaign about environmental issues.**

- Signs on light switches reminding users to turn them off.
- Signs on electrical outlets reminding users to unplug appliances.
- Signs around all recycling, trash, and compost cans illustrating how to sort waste.
- Viral advertising stunts.

Various groups have attempted several of these ideas already, but never in a coordinated manner. Working with College Communications, the Office of Sustainability, and students, Davidson will develop a coordinated, branded marketing campaign to promote sustainable behavior.

**Objective 4.26: Make products that promote sustainable behavior available on campus at reasonable or subsidized prices.**

The Davidson College Book Store provides several more sustainable alternatives to traditional school supplies at reasonable prices. However, many other simple tools, such as clothes drying racks and smart power strips, can immediately reduce the energy use of students. Offering the types of items that promote sustainable behaviors could expand this program.

**Objective 4.27: Institute a student green fee to fund sustainability initiatives.**

- Develop a program of “offsets” by which students can reduce or eliminate the green fee.

Such a fee would be assessed each semester, and proceeds would fund new and existing sustainability initiatives on campus. An offsets program, while posing administrative difficulties, would provide students with incentives to reduce their consumption. This program could be administered by a combination of the Office of Sustainability, Eco Reps, and RLO staff. Examples of offsets a student could put toward reducing green fees include using Energy Star-rated appliances, having no appliances in their room at all, participating in environmentally themed service projects, bringing a hybrid vehicle to campus, and staying below a printing quota, among others.

## Chapter 5: Tracking Progress

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The timeline and associated targets for GHG-emissions reduction laid out in this CAP are to serve as a road map for Davidson's continued sustainability efforts. We recognize that new technologies are being developed rapidly, and look forward to including them in our CAP as we move forward. This plan will be revisited regularly throughout the process to ensure that sufficient progress toward goals is being made, and to incorporate new technologies as applicable.

Davidson also realizes that many of our goals (especially those related to curriculum, research, and student outreach) do not have a measurable effect on our GHG emissions. Nonetheless, we see these goals as crucial to the CAP, to sustainability at Davidson, and indeed to Davidson's mission to prepare our students to be active members of a global community.

### **Missed Targets**

Should Davidson fail to meet any of its current or future GHG-emissions reduction targets, the Sustainability Committee will assess the situation. The committee will determine the reasons for failure to meet the goal, devise a plan to either meet the goal within one year, or revise the CAP to include more feasible goals.







## Appendix A—Members and Acknowledgements

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### Team Members

Jerry Archer	Lucy Hedley '12	Claire Naisby '12
Jonathan Berkey	Carrie Heyl	Chris Paradise
Emily Castle '11	David Holthouser	Amy Pugh '13
Beth Christenbury	Annie Ingram	Stacey Reimer
Jack DeLoach '12	Kristina Johnson '10	Clark Ross
Kealy Devoy '08	Mike Loeb '11	Stacey Schmeidel
Allison Dulin '10	Fuji Lozada	Sam Sheline '10
Mary Eannarino '10	Ian Mangum '11	Richard Terry '81
Donny Edwards	Dave Martin	Leslie Urban '89
Ann Fox	Martin McCann '92	Libby Van Wagenen '10
Mike Goode '83	Julianne Mills	
Cindy Hauser	Mary Muchane	

Additional contributors to the CAP include President Tom Ross '72, Karen Goldstein, Sarah Phillips '01, Kristin Kelly '89, and the members of the Sustainability Council:

Robert Bisanar '72	George House '69	Jeff Mittelstadt '99
William Boehmler	Jeannie Kinnett '12	Jean Phifer
Ann Hayes Browning '79	James Kiser '86	Dee Phillips
James Chandler '72	Kathryn Kross '86	William Ross '69
Ed Daugherty '85	Elizabeth Lusk '85	Ruth Shaw
Matthew De Niar '11	Alex Massengale '04	Christy Shi '96
Tom Earnhardt '68	John McArthur '77	Bill Stanback
Katie Epstein '10	Peggy McKay '10	Joshua Thomas '94

This CAP would not have achieved its final form without the help of College Communications, especially Stacey Schmeidel, Angie Rice-Figueroa, Bill Giduz, and Anna Prushinski. Many thanks to the Davidson College Board of Trustees, especially the Campus and Facilities Planning Committee, for their careful consideration of this plan.

Special thanks to those organizations that have produced guidance documents on the CAP process, including the American Colleges and University Presidents' Climate Commitment, the Association for the Advancement of Sustainability in Higher Education, and Campus Ecology and the National Wildlife Federation.

Many thanks to The Duke Endowment for continued support of Davidson during the college's development of the CAP.

### Education for Climate Neutrality and Sustainability: Guidance for ACUPCC Institutions

Working within the framework of the attached document, we evaluated our curricular, co-curricular, and extracurricular offerings from three perspectives—the context, content, and process of learning, as defined below.

*“The context of learning would make human/environment interdependence, values and ethics a seamless and central part of teaching of all the disciplines, rather than isolated as a special course or module in programs for specialists. Courses and universities would operate as fully integrated communities that ‘practice what they preach’ by modeling economic, social and ecological sustainability with their own operations. They would partner with the local, regional and global communities to co-learn and contribute to helping society become socially vibrant, economically secure and environmentally sustainable.”*

*What are the avenues available for educating “all” students about sustainability?*

*“The content of learning would reflect interdisciplinary systems thinking, dynamics and analysis for all majors and disciplines with the same lateral rigor across the disciplines as there is vertical rigor within them.”*

*What do we want students to learn?*

*“The process of education would ‘teach what it practices’ by complementing formal curriculum with active experiential, inquiry-based learning and real-world problem solving on the campus and in the larger community.”*

*What are the pedagogical methods for teaching systems thinking and the interdisciplinary concepts of climate change and sustainability?*

### Other Institutional Models

#### Middlebury College Environmental Studies Program

Middlebury’s program in Environmental Studies is impressive by any measure, and especially by those of liberal arts colleges. In academic terms, the program consists of an interdisciplinary major that consistently ranks among the five most popular majors at the college. As a model, the program at Middlebury suggests the following:

(1) *Successful ES programs, like Rome, are not built in a day.* The size and sophistication of Middlebury’s program are surely related to its age: founded in 1965, the program has had close to half a century of sustained attention and directed development.

(2) *Size matters.* More than 50 faculty members participate actively in the Environmental Studies program; collectively they offer more than 50 courses (some with multiple sections) that constitute the program’s curriculum. Most departments at the college include at least one faculty member interested in some aspect of environmental studies. It would be worth considering how such a faculty was “grown.” Was it Middlebury’s commitment to ES that attracted them to employment there? Did the college encourage its faculty to develop sub-specialties in environmental studies, for example through research or curriculum development grants? Did the college stipulate that some faculty searches require candidates to have an established interest in environmental issues?

(3) *The Middlebury program, like the River Jordan, runs deep and wide.* The program draws on a remarkably diverse academic program—remarkably so, that is, for a liberal arts college. Among the core departments participating in the program and contributing essential elements of its curriculum are separate departments of Geology and Geography. In addition, the Department of Art and Architecture includes four faculty members (in addition to its art historians, painters, sculptors, etc.), all of whom participate in ES, who are either practicing architects or architectural historians.

(4) *As John Muir said, “When we try to pick out anything by itself, we find it hitched to everything else in the universe.”* That is certainly true of the ES program at Middlebury College. The college’s commitment to the environment and sustainability is visible at almost every juncture. One example: the college hosted more than a dozen lectures

during the fall semester of 2009 on various issues pertaining to the environment. The integration of environmental issues into the curriculum and all parts of the extracurricular program is facilitated by both a Dean of Environmental Affairs and a director of a Sustainability Integration Office.

(5) *The ES program at Middlebury has a Trinitarian structure, which should help it appeal to a Presbyterian school such as Davidson.* Students majoring in ES must concentrate in one of three fields: environmental science, environmental policy and analysis, and environmental “perspectives.” However, they must all take a required introductory course in each of those fields. (And it is worth remarking that none of those three required courses, including that in environmental science, has any prerequisites.) The purpose seems to be (a) to give all students a common grounding in the field, while (b) ensuring that that common ground is firm and substantial, but (c) guaranteeing that no student need be excluded from participation because of a lack of previous preparation.

### **Antioch New England**

“Socially engaged citizenship”

Antioch New England Statement of Purpose: “Antioch University New England provides transformative education through scholarship, innovation, and community action for a just and sustainable society.

Antioch New England believes in ecological stewardship and social justice, cultivating local as well as global perspectives to educate students with diverse backgrounds and opinions to become leaders of change.”

ACTIONS:

2005: ANE set out to examine its achievements, roles and practices in the arenas of Social Justice and Environmental Sustainability.

—formation of the Sustainability and Social Justice Committee

—study performance in providing “transformative education through scholarship, innovation, and community action for a just and sustainable society”





## 1. Social Justice Audit in 2006.

As part of the audit process, the Sustainability and Social Justice Committee looked at a variety of arenas, both internal and external, in which ANE's policies and practices have social justice implications: curricula, policies, procurement and business relationships, Social and Environmental Performance, and Community Relations. An external review board comprised of Hunter Brownlie (Progressive Asset Management), Dean Cycon (Dean's Beans Coffee), Carol Swenson Jue (Monadnock Family Services), and Judy Tso (Aha Solutions) assisted the Sustainability and Social Justice Committee in designing the audit. More than 750 ANE community members (381 alumni, 287 students, and 137 employees) participated in the audit survey, one of the two core elements of the audit process.

The Sustainability and Social Justice Committee has developed an action plan, with clear benchmarks to measure progress toward implementing recommendations. Three immediate next steps already achieved are:

- \* the establishment of a campus-wide Student Government to enable students to have a regular voice in the governing process of the school and to sit on committees where decisions will be made that affect them;
- \* completion of two inventories of ANE's GHG emissions, and implementation of energy-saving measures including restroom light occupancy sensors, removal of vending machines and a low-tech light-switch signage campaign;
- \* upgrading our procurement practices, including transitioning to Green Seal-certified cleaning and restroom products and 100 percent post-consumer-waste recycled paper in our copiers and printers.

## 2. Examination of Antioch New England's GHG emissions and developed a plan to achieve carbon neutrality by 2020.

Sustainability is at the core of ANE's mission. A simple definition of sustainability is using the earth's natural resources at a rate slower than those resources regenerate. We view our sustainability challenge as how we meet the needs of the present without jeopardizing the ability of future generations to do the same.

Our approach covers these four action areas:

1. Conservation—Awareness-raising and education efforts; green-building policies; master planning; purchasing and computing policies. See right sidebar for past and upcoming events.  
As part of our efforts aimed at increasing conservation, we have launched the Carbon Counts: You Can Too education and action campaign. This campaign includes regular educational outreach about how to reduce carbon emissions. A first step was implementation, around campus, of "Flip Me Off," a low-tech sign campaign urging building users to turn off the lights when finished using a room. Why do we care? Because if the lights in one classroom at ANE are on for 12 hours a day for 5 days, they account for the emission of roughly 120 pounds of CO<sub>2</sub> per week. That's one classroom! Our campaign is focused on helping ANE to lose that CO<sub>2</sub> weight. We also offer everyone at ANE opportunities to learn more and to take action through our "Carbon Counts: You Can Too" lunch-time series featuring our own in-house experts. See right sidebar for complete list of topics.
2. Efficiency—As a first step, ANE has installed light sensors in our campus bathrooms to reduce energy use, and carbon emissions that come from the generation of that energy, when the rooms are not in use. ANE's other efficiency initiatives include conducting an energy audit to assess the benefits of building retrofits (lighting, windows, insulation); Energy Star appliance/computer procurement; and potentially upgrading heating equipment.
3. Carbon Offsets Purchasing—Starting with the 2008-09 budget, ANE will be purchasing carbon offsets for its electricity, propane and business travel emissions.
4. Renewable Energy—ANE has explored the cost and benefits of switching to wood as a source of heat, and as ANE decides on its future physical plant needs, we will be working to assist in making our campus compatible with green building standards.

Departments/Programs: In one way or another, sustainability and social justice are significant elements of many academic programs across the academic departments. Below are the ones where these play a

defining role.

- Environmental Studies
  - Conservation Biology (MS)
  - Environmental Advocacy and Organizing (MS)
  - Environmental Education (MS)
  - Individualized Program (MS)
  - Resource Management and Conservation (MS)
  - Doctoral Program

\* Organization and Management: MBA in Organizational and Environmental Sustainability

\* Education: MEd—Educating for Sustainability Concentration

## Outreach

When a critical level of interest and expertise comes together regarding a particular topic or cluster of topics, centers are founded and relationships with outside groups are formed, symposia are offered, journals are published. These groups and relationships change the world.

- The Center for Tropical Ecology
  - The Monadnock Ecological Research and Education (MERE) Project
  - The Multicultural Center
  - Antioch Family Therapy and Psychological Services Center
  - The Tomey Center for Organization Development

## Affiliations/Memberships

- Association for the Advancement of Sustainability in Higher Education (AASHE)
- American College and University Presidents Climate Commitment
  - ANE President, David Caruso, Signatory
- Clean Air-Cool Planet
- Energy Star Partner
- Net Impact
- Focus the Nation

## Furman University

“About Furman” [excerpts]: **Engaged learning.** In recent years Furman has been an exemplar of a new type of liberal arts institution. While still grounded in the humanities, arts and sciences, the university has earned a national reputation for its program of engaged learning, a problem-solving, project-oriented, experience-based approach to the liberal arts. Engaged learning encourages students to develop creative ways to put classroom theory into practice and to take a more active role in their education through internships, service learning, study abroad and research. **Sustainability.** As in all areas of university life, Furman’s goal in sustainability is ambitious. Furman strives to be a national leader in the field both pedagogically and operationally. With recent revisions in graduation requirements, all students must take at least one course dealing with human interaction with the natural environment. The goal is to tap into students’ intellectual curiosity and creativity, graduating students with a commitment to environmental citizenship as a way of life.

Center for Sustainability (soon to be renamed the David E. Shi Center for Sustainability)

Dr. Angela Halfacre, Director

Sandy Bryan, Administrative coordinator

Brittany DeKnight, Assistant director

Sustainability Fellow: **Caitlin Kelliher** is our first Bank of America Sustainability Fellow. The 2008–09 academic year is the beginning of a four-year scholarship program providing \$25,000 for Furman students engaged in environmental projects on campus and the Greenville, South Carolina community. Named the Bank of America Sustainability Fellows program, Furman brings one fellow to campus each year who demonstrates ambition or expertise in the areas of environmental science, environmental policy, resource recovery/recycling, green purchasing and investment, food and garden issues, renewable energy, green building and a number of other environmentally related concerns.

**Academics.** On Furman’s campus, we are exploring the concept of sustainability in theory and practice. It’s a way of living and learning that is being practiced right now, a hands-on education that will equip the next generation of leaders. It is an approach to stewardship that influences every decision.

Sustainability is incorporated into Furman’s curriculum in order to better educate students about living sustainable lives, and how they can contribute to a just and sustainable world. Starting with the 2008-2009 school year, all students will be required to take at least one course addressing “humans and the natural environment”(NE).

Sustainability is not just about environmental science. Furman offers courses that examine sustainability issues in a wide variety of disciplines such as business and political science. In addition to majors in Earth and Environmental Science and the Environmental Studies Concentration, many courses focus on areas of sustainability.

### **Get Involved [Student Groups]**

**Sustainable Connections.** 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. **Furman Forward.** One of Furman’s newest student organizations is **Furman Forward**, a student organization that is to Furman what Greenville Forward is to Greenville. **Environmental Action Group (EAG).** EAG is a student-led, non-partisan group committed to environmental advocacy and education. By promoting stewardship of local and global resources, EAG strives to protect the planet for the people of tomorrow. **Furman in the Garden (FIG)** FIG is student organization focused on agriculture and food related issues both on and off campus.

### Living Learning Laboratories

Cliffs Cottage—*Southern Living*’s first sustainable showcase home is a model of environmentally responsible design, building techniques and materials and energy-saving systems. Furman Farm—Our ¼-acre garden, located adjacent to the Cliffs Cottage, is a hands on experience in sustainable agriculture and small scale food production. The Place of Peace—A former Buddhist temple that was taken apart in Japan and reconstructed on the Furman campus. The Place of Peace is a gift to Furman and the Greenville Community from the Tsuzuki family of Nagoya, Japan. Townes Center for Science—A “living building and laboratory” featuring a solar aquatic treatment facility, solar thermal panels, rainwater collection and day-lighting systems. Home to Furman’s Biology, Chemistry, Earth and Environmental Sciences and Physics departments. Biodiesel—Furman’s small scale operation for turning waste vegetable oil from the Dining Hall into biodiesel fuel. The biodiesel is sold to Facilities Services and is used to fuel the lawnmowers on Furman’s campus. Recycling and Composting—Campus waste reduction and recycling efforts depend on the efforts of everyone in our community. This page contains up-to-date information about the campus recycling program. Furman Lake Restoration Project—The university is continuing with its restoration of Furman Lake in an effort to restore the lake to a more natural, healthy environment. A professional landscape architect specializing in native plants was hired and developed a complete restoration master plan for the revegetation and redesign of the lake’s borders. Phase I, which covers roughly 1/4 of the lake shoreline, was completed in June. 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. Model Green Room (coming soon)

## Sustainable Connections

Sustainable Connections, formed in 2008–09, 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.

Statement of Purpose: To promote cooperation in and facilitate coordination of on-campus efforts, initiatives and events focusing on sustainability in any of its forms.

### Goals and Objectives

- Develop community awareness of sustainability:
  - Identify Potential Community Members
  - Generate and Provide Materials to community members as they pertain to community members' stake
- Develop partnerships with community members for on-campus events
  - Identify liaisons within community groups
  - Maintain sustained collaboration with the community groups through liaisons, events, electronic communication
- Provide support and guidance for on-campus activities
  - Designate periods of time during which affiliate events are encouraged to follow a specific theme designated by Sustainable Connections
  - Identify a Sustainable Connections member to serve as liaison for each event
- Facilitate conversations about Sustainable Connections and promote Community Member feedback
  - Maintain electronic and face-to-face forums through which to facilitate dialog between Sustainable Connections, the Community, and other stake holders.
  - Encourage and promote participation in the forum through events, awareness, and neutral facilitation

To facilitate at least one workshop a year encompassing the Community Members

## Appendix C—Environmental Studies Concentration

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In December 2007, the Davidson College faculty approved the Environmental Studies Concentration. The concentration requires six courses, including an interdisciplinary, team-taught introductory course and an interdisciplinary, team-taught capstone course. Concentrators must take courses in all three academic divisions—humanities, social sciences, and sciences—making the Environmental Studies Concentration the most interdisciplinary of all concentrations currently offered at Davidson. In spring 2010, the faculty added an Environmental Studies major, the college's first interdisciplinary major. Courses are now being developed and the major will be available beginning with the Class of 2014.

CIS 171: Introductory Environmental Studies, the team-taught and interdisciplinary introductory course, was taught for the fourth time in fall 2009 by Cindy Hauser (Chemistry), Annie Ingram (English), and Julianne Mills (Economics; ACS/Mellon Postdoctoral Fellow in Environmental Studies). Previous versions of the course were taught in spring 2007 (by Annie Ingram; Dave Martin, Economics; and Pat Peroni, Biology), fall 2007 (by Tim Beach-Verhey, Religion; Dave Martin; and Chris Paradise, Biology), and fall 2008 (by Annie Ingram; Sanghamitra Padhy, Political Science; and Chris Paradise).



CIS 472: Environmental Success and Failure, the team-taught and interdisciplinary capstone course, was taught for the first time in spring 2010 by Pat Peroni and Lynn Poland (Religion).

A curriculum development grant from the Associated Colleges of the South in the summer of 2006 enabled the development of CIS 171 and CIS 472, and generous funding from The Duke Endowment has supported the team-teaching of these courses.

### Environmental Studies Courses

In addition to CIS 171 and 472, the following existing courses fulfill the ES concentration:

ART 230: Earth Art—From Lascaux to Lutyens (Ligo)  
ANT 265: Food and Culture (Lozada)  
ANT 271: Human Ecology (Cho)  
ANT 325: Environment, Economy, and Culture (Samson)  
ANT 360: Development and Sustainability (Fall 2009; Samson)  
BIO 103: Special Topics in Biology I (var.)  
BIO 104: Special Topics in Biology II (var.)  
BIO 316: Botany (Hay)  
BIO 317: Entomology (Paradise)  
BIO 321: Ecology (Paradise, Peroni)  
CHE 103: Topics in Chemistry (Spring 2009: Community Air Quality; Hauser)  
CHE 107: Chemistry of the Environment (Hauser)  
CHE 304: Topics in Environmental and Green Chemistry (Brown, Hauser)  
CIS 233: The Global Energy Challenge (F'09; P. Hess, Economics and D. Striplin, Chemistry)  
CIS 270: Interdisciplinary Science Writing (Spring 2009; Thomson Prof. Mike Branch)  
CIS 273: Environmental History of US South (F'09; Thomson Prof. Mart Stewart)  
CIS 372: Bioregionalism and Western American Literature (S'09; Thomson Prof. Mike Branch)  
CIS 373: Climate and Culture in American History (F'09; Thomson Prof. Mart Stewart)  
ECO180/CIS175:  
ECO 226: Environmental and Natural Resource Economics (Martin)  
ECO 336 (now 226): Economic Growth and Sustainable Development (Hess)  
ENG 101W: Environmental Writing and Wilderness Leadership (Ingram)  
ENG 389: Studies in Literature and the Environment (Ingram)  
GER 340: Environmentalism on Film (McCarthy)  
HIS 246: Fires, Famines, and Floods: Environmental Disasters in U.S. History (S'10; McMillen)  
PHI 140: Environmental Ethics (S'10; McKeever)  
PHY 103: Physics of the Environment (Cain)  
POL 314: Public Policy: Environment (F'09; Padhy and Thornberry)  
POL 479: Environmental Law and Policy (Padhy)  
REL 247: Food in Religious Perspective (Poland)  
REL 248: Christianity and Nature (Poland)

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# Appendix D—Environmental Outreach Programs Matrix

Organization	Environmental Action Coalition	Patterson Court Sustainability Council	Office of Sustainability	Dining Services	Physical Plant	Grants	Academics	Other Initiatives
<b>Events and Programs</b>	Green Ball: A Contra Dance Fundraiser	Compostable Cups	RecycleMania, Recycling Audit	Vail Commons Vegetable Garden	LEED Silver Policy	Green Grant (Kristina Johnson)	Environmental Studies Concentration (Annie Ingram)	EcoHouse (Donny Edwards)
	EcoTeam: 3rd Grade Environmental Education	Vermicomposting: Worm Compost Pilot Program	EcoReps	Union Café Local Food Initiative	Food Waste Composting	Milner Fund (Cindy Hauser)	Independent Study Courses (Varies)	Student Government Association (Kevin Hubbard)
	Do it in the Dark: Dorm Energy Competition	Sustainable Food Initiative	Compost Facility Tours	Food Waste Composting	Energy Efficiency	Sunshine Lady Fund (Stacey Riemer)	Center for Interdisciplinary Studies (Scott Denham)	Freshmen Orientation (Ali Farr)
	Power, People, Pork: Sustainable Food Celebration	Community Garden: Connor Eating House	Admission Tour Guide Education	Much Ado Catering Local Food Menu	Climate Action Plan	Abermethyl Grant	Lectures (Varies)	
<b>Contact</b>	Cat CUPPS: Reusable Mug Program		Climate Action Plan			Improve Davidson Fund		
	Mike Romano	Lee Dorsey, Abbey Thibeault	Kristina Johnson	Dee Phillips	Leslie Urban	See individual listing	See individual listing	See individual listing



BIG T

BNG.011305

DAVIDSON COLLEGE  
COMMUNITY BICYCLE

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73

WORKER

