

University of Miami Climate Action Plan 2009



UNIVERSITY
OF MIAMI



Composed by

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*This Document is dedicated to the
Memory of Alan J. Fish an individual who
gave his heart and soul the University of
Miami and the Green U program.
Without his help none of this would have
been possible.*

January 15^h, 2010

**More information on the university's
efforts as well as a downloadable
hardcopy of this report can be found at:**

www.miami.edu/greenu

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Executive Summary

On April 18, 2007 President Donna E. Shalala signed the Talloires Declaration of the Association of University Leaders for a Sustainable Future and the American College and University Presidents Climate Commitment. This historic signing demonstrated the University of Miami's dedication to sustainability. As part of these commitments in January of 2009 the University of Miami completed its first Greenhouse Gas Analysis for the years of 2005 to 2007. This report met the current requirements outlined within the American College and University Presidents Climate Commitment; *"Within one year of signing this document, complete a comprehensive inventory of all greenhouse gas emissions (including emissions from electricity, heating, commuting, and air travel) and update the inventory every other year thereafter."*¹

As a continuation of the practices outlined by the Presidents Climate Commitment, University's are required to *"Within two years of signing this document, develop an institutional action plan for becoming climate neutral."* Consequently the University of Miami through the Green U program has produced this 2009 Climate Action Plan as a way to outline possible scenarios to reduce the greenhouse gas emissions of the University within a given time frame. Over the next 2 years the recommendations within this report can be further explored with key stakeholders and a more detailed plan of action can be drawn up.

The 2009 University of Miami Climate Action Plan is the first of its kind there for it will be necessary in the future (each year or every other year) to update the climate action plan as new and additional insights will become apparent as data is honed in, understanding improves, further dialogue is created, and implementation of programs advances. The University of Miami, via this

¹ <http://www.presidentsclimatecommitment.org/about/commitment>

report, is taking its first steps towards carbon neutrality by recommending a time frame for which to reduce emissions levels by 2020, despite a growing university. As time goes on and this process spreads throughout the university specific interim targets will be implemented to progressively lower emissions until great reductions are made towards the ultimate goal of neutrality.

Introduction

The University of Miami's 2009 Climate Action Plan is a proposal of logical steps to further analyze over the next year in order to fulfill long-term goals of greenhouse gas emission reductions. Future scenarios, accomplishments, recommendations, and all important interim steps are detailed in the following sections of the Report.

- The History of The University of Miami's Commitment to Sustainability
- Sustainability Accomplishments
- Green House Gas Baseline (2004-2007)
- Green House Gas Reduction Proposal
- Short Term Reduction Goals
- Funding Possibilities for Reductions
- Climate Education & Outreach
- Climate Neutrality

As sustainability continues to be implemented further into the practices of various departments it will be essential to keep the climate action plan and emission figures updated (on a yearly or every other basis). This will ensure that the plan can evolve with changes in the university and address issues not addressed in initial reports. These updated reports will continue to involve more individuals and departments in the sustainability planning process at the University of Miami. Consequently, this report provides initial recommended timelines, goals, and possible scenarios. The next edition of the report will provide more comprehensive targets and action items.

The University of Miami's Commitment

The University of Miami has long been cognizant of human's impact on the environment, through teaching and research the university has strived to educate future leaders while conducting ground breaking research. In 2005 the University launched Green U, under the direction of Alan J Fish (The Vice President of Business Services at the time) in order to officially categorize the numerous sustainability efforts of the university. Green U aims at making UM: *"a community leader in the acquisition of environmentally responsible products and the practice of ecologically sound maintenance and operations procedures."*²

The main goals of the Green U program are coordinated through the Environmental Health and Safety department (EHS). This department falls under and corresponds with the Business Services department, as it is head of the many branches of the school revolving around sustainability including: Auxiliary Services, Document Services and Solutions, Parking & Transportation, Risk Management, Travel Management, and Purchasing.

In particular the head of the EHS department, Ken Capezzuto, whose mission is "To help the University continuously improve its compliance with safety and environmental regulation", has played an instrumental role in Green U. As Director of EHS he has been involved in many of the compliance programs. Specifically, Mr. Capezzuto is heavily involved in the recycling program and has a passion for making the campus more energy efficient.

² <http://www.miami.edu/ftp/umgreen/about.html>

*Through its teaching and research endeavors, as well as the operations of its overall enterprise, the University of Miami is committed to the safeguarding of the environment. Innovative programs in schools and colleges, interdisciplinary centers and institutes, and events and activities throughout the University address issues involving a wide spectrum of environmental concerns.*³

During 2006, students from the Sustainable U organization, including leaders Josh Braunstein, Matt Hoffman, and Jenny Burrows, presented President Donna E. Shalala and Provost Thomas J. LeBlanc with the Talloires Declaration and asked on behalf of the student body for the University to join the effort. On April 18, 2007, in the presence of student environmental groups (Earth Alert, Sustainable U, Greenpeace, Surfrider, and others) and key people at the university, President Shalala signed the Talloires Declaration of the Association of University Leaders for a Sustainable Future and the American College and University Presidents Climate Commitment.

³ <http://www.miami.edu/ftp/umgreen/about.html>

Figure 1- President Shalala signs as student leaders look on



The Talloires Declaration (pronounced Tal-Whar) is a ten-point action plan committing institutions to sustainability and environmental literacy in teaching and practice.⁴ A requirement of this commitment is that a complete and comprehensive inventory of all greenhouse gas emissions (including emissions from electricity, heating, commuting, air travel, and other categories) be taken and updated every year or every other year after. The University of Miami completed this inventory for the years of 2004-2007 in January of 2009.

The Presidents Climate Commitment is a project developed by the Association for the Advancement of Sustainability in Higher Education (AASHE), to which the University belongs. The commitment provides a framework and support for America's colleges and universities to become climate neutral. As a

⁴ http://www6.miami.edu/UMH/CDA/UMH_Main/0,1770,2593-1;54616-3,00.html

member of the elite Leadership Circle, President Shalala is one of the original signatories.⁵

“The University of Miami is recognized for preparing students to be environmental thinkers and responsible citizens of the world... Now we are making a commitment to a sustainable future by broadening our approach to educating students on environmental sustainability and by fostering a culture of environmental awareness at the University.”

- President Shalala on her historic signing (April 18th, 2007)⁶

As a result of rising demands of the Green U program the University hired Ian McKeown as Sustainability Coordinator in August of 2008. Mr. McKeown completed his undergraduate degree in the University’s *Ecosystem Science and Policy* program, with a second major Economics, and a minor in Meteorology. During this time he was an intern for the Green U program, researching the school’s carbon footprint (critical steps that led to the completion of the January 2009 inventory). Mr. McKeown also completed a Masters degree in Management of Technology within the Industrial Engineering School in August of 2009. There is also a Green U task force of students, faculty, and staff from diverse areas who work as a team to tackle diverse environmental issues.

This Climate action report will be used a will be used to identify contacts and methods of data collection. In addition, weak points in the data formatting can be determined in order to create a university-wide method for gathering appropriate data to determine greenhouse gas emissions in the future. Using the best available data collected, the inventory allows the University to formulate a plan to reduce the environmental impact, given current benchmarked measures, and reach neutrality in the future. By doing so the University will generate a culture of sustainability that students will bring with them as they go forth into the world and become leaders of tomorrow.

⁵ http://www6.miami.edu/UMH/CDA/UMH_Main/1,1770,2593-1;54616-3,00.html

⁶ http://www6.miami.edu/UMH/CDA/UMH_Main/1,1770,2593-1;54616-3,00.html

Green U Mission Statement 2009

THE UNIVERSITY OF MIAMI is deeply committed to reducing its impact on the environment. Green U is the culmination of all efforts to increase sustainability throughout the University while educating the community to be stewards of the environment. From Transportation solutions to recycling programs public-awareness campaigns to research initiatives, Green U is helping the University of Miami grow greener every day. Every step each University community member takes to reduce their environmental impact propels this community mission and helps create a “Greener U”.

Green U Accomplishments

Buildings and Construction

The University of Miami has adopted a formal **Sustainable Building Policy** stating the following; all new buildings shall be designed and constructed in a manner to attempt to reach a minimum standard of LEED Silver rating, Projects will strive to achieve a higher level than LEED Silver whenever possible, Major renovation of existing buildings where major portions or floors of the facility and infrastructure are upgraded shall be designed and constructed in a manner to attempt to reach a minimum standard of LEED silver rating, Minor renovations shall follow good sustainable design practice and shall comply with the University of Miami Building Components Standards, University of Miami Building Component Standards shall be updated regularly to include the latest green building components and standards deemed acceptable by the University, and Contractors and Architects shall employ whenever possible, LEED accredited staff to assist in the management and documentation of design and construction activities for LEED certification.

The University of Miami is home to the first high-rise in South Florida that was constructed using green principles- residential or commercial. **The Clinical Research Building**, opened in late 2006, is home to clinical trials and other medical research at the UM Miller School of Medicine.

- The Clinical Research building is designed and built for energy efficiency and sustainability: Built using LEED principles and practices; reflective “Energy Star” roof reduces heat gain; double-pane argon gas windows insulate building; curtain wall fins reduce solar heat; raised floor system provides for better indoor air quality and energy efficiency (first high-rise in South Florida with this technology); floor vents reduce ductwork improving air flow and efficiency; all lighting is low-energy fixtures; automated light and

alarm timing save electricity; chilled water loop system provides more efficient cooling ; permeable pavers improve run off; carpet and other internal materials are certified green and are recyclable; modular floors, walls, carpet, outlets and vents are easy to reconfigure; close proximity to Metrorail and buses; Wellness Center showers and lockers for cyclists and public transit users; and a landscaped river walk on Wagner Creek.

The **Biomedical Research Building** is a LEED-certified Biomedical Research Building which is home to laboratories for medical research at the UM Miller School of Medicine. The building is anticipated to open within the next year

- The Biomedical Research Building is designed and built for energy efficiency and sustainability: The building is registered for Leadership in Energy and Environmental Design (LEED) certification; bike storage, lockers, and showers for those using alternative transportation; restoring green spaces in lieu of parking lots; water saving irrigation system; removing heat islands with landscaping at paved areas; reflective “Energy Star” roofing; reuse of A/C condensate for flushing toilets and urinals; low-flow plumbing fixtures; A/C energy recovery system to reduce energy consumption; use of recycled and locally manufactured materials for interior finishes and construction; use of green products for interior finishes and furniture; carbon dioxide monitoring; low emitting materials for better indoor air quality; natural lighting for 75% of the interiors; flexible and reusable laboratory case work and office partitions to reduce future waste; and an insulated argon glass façade reduces heat.

The **Field House** is a LEED-GOLD certified 30,000 SQF multi-purpose & practice facility with courts, work out space with restrooms, adjoining a multi-purpose/pre-function/marching band practice space with a capacity for 1,000 with public restrooms. The building is located on the Coral Gables Campus.

- The Field house is designed and built for energy efficiency and sustainability: LEED Certification of the UM Fieldhouse was based on a number of green design and construction features that positively impact the project itself and the broader community. These features include: High reflectance roofing materials and pavers, High efficiency plumbing fixtures with hand sensors to reduce water use, Moisture sensors to reduce potable water use for irrigation, Energy efficient lighting, insulated glazing and high efficiency air conditioning aimed at reducing the building's energy cost based on the Florida Energy Code, The use of recycled, refurbished, salvaged or reused materials, as well as the use of regional materials processed and manufactured regionally, Paints, coatings and adhesives with low emitting gases content, All lighting systems are occupancy motion controlled, and Preferred parking for low emitting and fuel efficient vehicles.

The University of Miami has five more green building projects one currently under construction when these are completed the University will have eight LEED certified buildings totaling approximately 1, 338,400 GSF of space. The University also uses these buildings as educational tools for those in and outside the University of Miami.

In September of 2009 The Smathers Four Fillies Farm, a residential community of 30 single-family homes built for the University of Miami faculty and located in the Village of Pinecrest, south of the University of Miami campus took the top prize of a regional award that recognizes sustainable development, the Urban Land Institute's (ULI) Woolbright Dream Green Reality Award. Awarded by the institute's Southeast Florida/Caribbean district, the honor recognizes projects that have a minimal environmental impact and improve the comfort and health of residents through strategies such as low-impact and regenerative site development, energy and water conservation, use of sustainable or renewable materials, and improved indoor air quality.

Getting Around Campus

GEM Neighborhood Electric Vehicles: Road ready with speeds up to 35mph. The University is test-piloting GEM vehicles with hope to replace all golf carts on campus with GEMs. The University currently has nine GEM vehicles

Electric Segways: The Department of Information Technology purchased two Segways to reduce driving on campus. UM Police Department also has five Segway scooters, all outfitted with sirens and blue lights.

Electric Hummer: A new electric golf cart with a HUMMER look was given to the University's student spirit organization, Category 5, as a gift for the Momentum Campaign by Ed Williamson, who owns Williamson Cadillac, a Cadillac-Hummer dealership, and who is a member of the Board of Trustees. It's painted with UM colors, is adorned with stickers, and uses electricity instead of gasoline. The electric vehicle is used in lieu of a gasoline car at spirit events such as pep rallies, meet and greets, and during the Cane Kickoff.

Hybrid Parking Discount: Student initiative prompted parking services to offer 50% discount on parking to hybrid owners. In the second year, 33 people have taken advantage of this parking discount.

HurryCane Shuttles: In a continuing effort to become more environmentally friendly, the nine Hurry' Cane shuttles will be using a soy-based B20 blend of biodiesel in a pilot program. The soy-based B20 blend, which is 20% biodiesel and 80% petroleum diesel (B20), can be used in conventional diesel engines without modifications. The shuttles are expected to use about 1,000 gallons of soy-based B20 blend biodiesel weekly. Each year, Hurry 'Canes shuttles transport more than 850,000 passengers on the Coral Gables campus and on additional shuttle service to the Rosenstiel School of Marine and Atmospheric Science, the Shops at Sunset Place, Coconut Grove's Coco-Walk, Crandon Park in Key Biscayne, and the University Centre shops.

Public Transportation Passes: University of Miami employees can take advantage of a new environmentally friendly initiative that addresses some of the challenging transportation issues in our community. Effective on June 1, 2008 faculty and staff with annualized salaries greater than \$35,000 but less than \$100,000 can receive a 50 percent savings on the monthly cost of public transportation passes. Staff earning less than \$35,000 annually will receive free monthly public transportation passes.

Zipcar: Imagine being able to have a vehicle at your disposal without having to buy or lease. Beginning on August 22, 2008, the University of Miami students, faculty, and staff were given access to a car-sharing program created in partnership with a company called Zipcar. The new program allows members to reserve fuel-efficient cars online, via phone or mobile device, for an hourly rate of \$8 that includes gas and insurance. That's especially helpful for freshmen residents at UM, who are not able to bring their cars to campus for the first time this fall. The new regulation reduces the number of cars at the university and on South Florida roads by approximately 500.

Ubike, and other human powered transportation methods. The University of Miami is promoting healthy habits that are both eco-friendly and economical by encouraging members of the university community to use bicycles to get around. The novel program called Ubike began on August 22, 2008 and includes selling bicycles and helmets at the bookstore at a discounted price to students. Registered students will also have access to free bike locks that can be picked up at the UM police station. As part of this initiative, the university has widened sidewalks, and added bike racks and pump stations to the Coral Gables campus. The University of Miami also welcomes the use of skateboards, inline skates, scooters, and other human powered transportation.

Walking Canes, The University of Miami is promoting healthy habits that are both eco-friendly and economical by encouraging members of the university community to walk to get around campus. The Walking Canes 10k-a-Day

program uses a pedometer (step counter) to help participants quantify their physical activity on a daily basis. Each participant wears their pedometer from the time they wake-up in the morning to the time they fall asleep at night. The goal is to increase the number of steps accumulated daily. A computer database will keep track of each participant's weekly steps, weekly goals, and total points. At the end of the 12-week program, awards will be given to the top ten finishers and to all of those who successfully completed the program by checking-in each week. Bus stops also provide "Walking Canes" information to educate folks on walking distances across campus and health benefits.

Green Partnership and Business Contracts

Cleaner copies: Renewed University-wide Lanier copier contract to include more energy efficient machines and a comprehensive recycling program for toner cartridges.

Recycled Computers: All computers at UM are recycled for parts.

Recyclable Carpet: All new carpet and other internal materials are to be certified green and recyclable. New contracts state that old carpet must be recycled and new carpet must be recyclable. Carpet contracts were also stated that new carpet must comply with LEED standards as well as green carpeting standards.

Light bulbs: All light bulbs are environmentally friendly and energy efficient.

Mercury-free medicine: All mercury-based medical instrumentation will be removed from the Miller School of Medicine campus and Jackson Memorial Hospital

Paperless HR: One of the Human Resource Departments on the UM Miller School of Medicine campus has gone 100% paperless. Many other departments at UM are working to implement similar programs.

Cleaning Products & Equipment: All cleaning products used on all campuses are environmentally friendly; HEPA filters are used in vacuums.

Landscaping: An initiative is in place to use only native plants in future landscaping products. Native plants require less irrigation. Alternative irrigation methods are being initiated to reduce water use on campus. The University of Miami also has the Gifford Arboretum in which many educational events occur.

Green Seal Program

The University of Miami retained Green Seal, Inc., to assess and rate the University's current status in regard to the environmental aspects of its purchasing and facilities management. Green Seal is a non-profit organization dedicated to environmental improvement through identifying and promoting more environmentally responsible products and services, purchasing, production methods, and operations. Green Seal has worked with other large institutions on "greening" their procurement and facilities, and it has instituted a certification program to recognize institutions that have green procurement or green facilities operation and maintenance programs.

With its Green U program, the University of Miami started its university-wide goal to be "a community leader in becoming more sustainable through the procurement of environmentally responsible products and environmentally sound maintenance and operations procedures for existing and new buildings". Meeting this goal requires the active participation of the entire University community, but the purchasing department has a particularly important role to play.

Energy and Water

Led Light Project: On April 16th, 2009 the University of Miami joined the Cree LED University™ Program, by installing new LED pole lights to improve walkway illumination on the main campus and retrofitting LED lighting at various interior locations. Twenty BetaLED™ LEDway fixtures now

illuminate walkways on the main campus in Coral Gables, providing much-improved visibility and safety. In addition, the university is evaluating LED lighting for interior applications such as conference rooms, hallways and classrooms. LED lighting pilot installations are saving as much as 70 percent on energy used for lighting conference rooms and hallways. “With new LED lighting on our main campus, we achieve far better area illumination--enhancing visibility and safety at night,” said Humberto Speziani, vice president, business services. “The LED lights are more energy-efficient than other technologies, reducing our carbon footprint in line with the state’s aggressive goals. The University of Miami is working toward ‘greener’ facilities, and we continue to evaluate new technologies, such as LED lighting, for both interior and exterior applications. The university intends to monitor the performance of LED lighting and other sustainable technologies as they continue to advance.”

RSMAS (Marine School Initiatives): In the task of reducing the University’s reliance on energy derived from fossil fuels, the Facilities Administration staff at the Rosenstiel School has embarked on a number of initiatives to minimize the carbon dioxide emissions required to conduct daily operations. The team has spent more than four years greening buildings, assessing the usage of energy in research labs, and developing ways to reduce the Schools carbon footprint.

As an international leader in environmentally focused research, the School is dedicated to preserving and protecting the natural world. Beginning in 2004 Director of Building Facilities, Ramon Alfonso, spearheaded a campaign to address energy waste, and in turn showcase the benefits of improvements made to the campus. By replacing fluorescent lighting, providing local on-demand water heaters instead of a large centralized system, reducing excessive exhaust of air-conditioned air from laboratories, and transferring lighting and research based sea-water pumps from 24-hour operation to more regulated levels, the School reduced its annual energy consumption in 2008 by 20% over what it was in 2004

the equivalent of 2.5 million+ pounds of carbon dioxide, at a cost of nearly \$190,000.

Collaborating with Florida Power & Light Company and nearly a dozen other community partners in 2008, Alfonso and his team accomplished the Schools greatest energy saving project yet: the replacement of an antiquated ammonia refrigerant thermal storage plant with a traditional high efficiency conventional chiller. Housed on-campus in a newly renovated containment space, the two new chiller units cool and circulate water to air handling components or fan coils where the chilled water is converted to cool air. The cooled air is then supplied to the nearly 300,000 square feet of research laboratories, classrooms, and administrative offices that comprise the Rosenstiel School campus on Biscayne Bay, an improvement which has resulted in an average of 30% in energy savings since January 1, 2008.

The Rosenstiel community has embraced these environmentally friendly improvements with open arms, recently establishing the RSMAS Green Committee, a collective of divisional representatives that will provide input into future campus improvements and help to keep the rest of the community engaged with energy saving techniques, upcoming projects and the schools newly expanded recycling program. Even with a proven record of accomplishments behind them, the School still has a way to go before achieving its goal of reducing net reliance on fossil fuels to zero. With a targeted list of projects and the support of the entire Rosenstiel community, the School is working hard to provide a more environmentally friendly environment for the development of cutting-edge research and world-class eco-scientists.

Chiller Loop Projects: Chiller loop projects on both the Gables and Medical Campus have greatly reduced the energy use and costs associated with certain systems.

Light Bulb Retrofits: The University of Miami has many different projects to reduce energy use across campus by retrofitting existing light bulbs to more energy efficient CFL and LED lights. This also includes an outdoor solar lighting project for a walk way area.

Power Down initiatives: There are many different initiatives that are currently being expanded to save energy and water. These include updating important systems across campus, improving behavioral components, and introducing signage and sensors that assist users in reducing resource use.

Sensors and Motion Detectors: Many buildings across all campus areas have implemented motion sensors and water sensors to reduce energy use to prevent unneeded use of fixtures. This initiative is currently being expanded with the audits being conducted on campus.

Fuel Cell on Campus

The University houses a fully operational fuel cell on campus through a cooperative research agreement with FPL. The fuel cell demonstration project provided research to FPL in this emerging field of clean energy technology. The fuel cell provides back-up power for Building twenty two on the Coral Gables campus.

Green U initiatives

Making a commitment: President Donna Shalala signed, on behalf of the University, the Talloires Declaration and The Presidents Climate Commitment on April 18, 2007. As part of The President Climate Commitment the University of Miami was required *to initiate two or more tangible actions to reduce greenhouse gases while the more comprehensive plan is being developed from a list provided on the commitment.* As a result the University has initiated the following plans.

- Establish a policy that all new campus construction will be built to at least the U.S. Green Building Council's LEED Silver standard or equivalent.

- Adopt an energy-efficient appliance purchasing policy requiring purchase of ENERGY STAR certified products in all areas for which such ratings exist.
- Encourage use of and provide access to public transportation for all faculty, staff, students and visitors at our institution.
- Participate in the Waste Minimization component of the national RecycleMania competition, and adopt 3 or more associated measures to reduce waste.

Greenhouse Gas inventory: In January 2009 the University completed its first benchmark carbon footprint analysis for the years 2005 to 2007 and for the three main campus areas (Coral Gables, Medical, and Marine)

Student Initiatives: A student group is actively pursuing a university-wide culture of sustainability.

Recycle Mania: Students from Earth Alert and Sustainable U, two active student environmental organizations on campus, have come together for Recycle Mania since 2007. A 10-week contest on school campuses nationwide sets out to encourage recycling and to promote sustainable principles and practices. Statistics on UM recycling efforts are reported on a weekly basis.

Student Orgs: There are more than fourteen environmental related student groups. These organizations have put countless events on over the years greatly contributing to the University's Sustainability efforts.

Recycle Canes: In addition to paper and bottle programs, students have initiated battery recycling in the student residential colleges on campus. Students are working with the facilities department to put more recycling containers on campus. Recycling has increased tremendously on campus and waste minimization is being aggressively targeted.

Tray-less Dining Halls: The two main dining halls on the Coral Gables Campus have gone Tray-less. This program was developed in cooperation with Student Government and Dining Services. The purpose of this program is to

reduce food waste and water/energy use associated with the use of dining hall trays.

Green Events: The University is looking into ways to green its events as it did during the 2008 and 2009 Homecoming, by displaying alternative vehicles in the parade and ensuring recycling was available. The university also hosted other events such as a green job fair through the Toppel Carrier Center. Al Gore and other keynote speakers have come to the University to address global environmental concerns. Every year the University of Miami hosts a week long earth week celebration with multiple awareness and social events.

Academics

Scholarships: The FPL Endowed Student Scholarship Fund will award \$250,000 in scholarships to engineering students in the departments of mechanical, industrial, and electrical and computer engineering who are interested in pursuing a career in the emerging fields of alternative energy and fuel cell technology.

Research Institutes: The Clean Energy Research Institute at UM, led by T. Nejat Veziroglu, Ph.D., a distinguished leader in the alternative fuel technology field and professor of mechanical engineering at the University of Miami, focuses on issues surrounding global dependence on non-renewable sources of energy and the need to shift towards alternative energy sources.

Renewable Energy Research Lab: The UM College of Engineering houses the Renewable Energy Research lab. Under the leadership of Hongtan Liu, Ph.D., assistant professor of mechanical engineering, the lab focuses on energy storage and fuel cell technology. This lab was the first to unify the electrochemical kinetics and fluid transport in a fuel cell and developed the first Computation Fluid Dynamics-based PEM fuel cell model- a significant contribution to the fuel cell technology industry.

The Center for Ecosystem Science and Policy (CESP): The CESP creates innovative, interdisciplinary initiatives that bridge the gap between science and

environmental policy. The Center is the nexus for a new and flexible undergraduate program that gives students the opportunity to learn in a problem-solving context and gain substantial field experience. The Center's research agenda will constantly evolve to accommodate new faculty thinking and initiatives. The Center encourages and supports projects that adopt an ecosystem-wide focus, and are developed by faculty teams across disciplinary lines.

The Pew Institute for Ocean Science: Located at the UM Rosenstiel School the institute undertakes, sponsors, disseminates, and promotes world-class scientific activity aimed at protecting the world's oceans and the species that inhabit them.

The Climate Studies Group: The Climate Studies Group at the UM Rosenstiel School involve faculty members from all six Rosenstiel School divisions (Applied Marine Physics, Marine and Atmospheric Chemistry, Marine Affairs and Policy, Marine Biology and Fisheries, Marine Geology and Geophysics, Meteorology and Physical Oceanography). Research and course work are designed to address fundamental questions about the Earth's climate and its impacts on society using a broad range of approaches.

Classes: In 2004, University of Miami seniors from Mechanical, Electrical, and Computer Engineering were chosen to participate in the *Hydrogen Fuel Cell Green Car* senior design project. Those students and successive groups of incoming students have used the resulting vehicle garaged at the UM College of Engineering, to acquire first-hand knowledge of fuel cell automotive technology. Students continue to use this model car to work out the kinks in the design of fuel cell automotive technology. Multiple other classes conduct sustainability research from Green Dorms to water use. Even freshman business school classes have completed unique PR and educational campaigns for Green U. At the University of Miami sustainability is increasingly becoming a truly interdisciplinary field.

Academic Experts: The University has faculty researchers working on various aspects of environmental issues. UM is home to world-renowned experts on global warming, alternative energy, sustainable fisheries, ocean policy, and issues relating to Everglades restoration. For a full list of experts see:

www.miami.edu/experts

Green House Gas Baseline

This inventory was completed in January of 2009 and performed using standards set forth by the Association for the Advancement of Sustainability in Higher Education (AASHE), World Business Council for Sustainable Development and the World Resource Institute (WBCSD/WRI), and the American College & University Presidents Climate Commitment (ACUPCC). In accordance with these standards and generally accepted methodology among universities the report data was collected and analyzed using Clean Air - Cool Planet's Campus Carbon Calculator version 5.0.⁷

The data shown below is important excerpts from the original baseline report. In order for the reader to gain a full understanding of the original report this section describes the inventory methodology, emissions definitions, profiles of each campus areas, and the final total University of Miami Carbon Footprint.

Inventory Methodology

Given the excel spread sheet format from Clean air cool planet the following is a description of the Procedure for Data collecting and input that is required by the calculator to quantify all sources of Green House Gas emissions for each of the three campus areas identified above. Here is what was used and what was not used to calculate our Green house gas emissions as well as a bit of information on each. As a result of needing reliable data, the analysis for The University of Miami Green House Gas Emissions is for the years 2004 to 2007. 2007 was the latest year for this report thus this information is presented in this report.

Institutional Data: Financial Budget information, student numbers, faculty/ staff numbers, and total building square footage was required to define the overall campus for the Campus Carbon Calculator.

⁷ <http://www.cleanair-coolplanet.org/>

- a. Total building square footage and research Square footage was used given the definitions provided in each campus section later in this report. This is important to define the campus areas and emissions For the purpose of this study leased space has not been included, because in the future proper definitions will be set as to how to account for such information. The physical size includes south campus and building defined as part of the main medical school campus by the medical facilities department. In the future leased space and hospital buildings may be included. For now we will limit the space to the immediate medical buildings that are not shared or staffed by different facilities' within the hospital. Data for research space could not be located for before 2001 thus it is shown as such.

Purchased Electricity, Steam and Chilled water:

- a. Most of all the electricity for the University of Miami is purchased from Florida Power and light. FPL data was found for each campus provided by facilities and Energy offices. The information was provided for 2002 -2007 the buildings and FPL data used is defined within each campus section by the total building space. The data is provided in kWh and is entered into the calculator using the southeast's known power mix factor (source of energy production provided within calculator) and the Campus Carbon Calculator converts this to greenhouse gas emissions
- b. No campus areas purchased steam.
- c. Only the medical campus purchases chilled water and this information was inputted into the calculator in tons. Purchased chilled water is used for air condition commonly as it is at the Medical campus chilled water tonnage is a factor in emissions levels in the calculator so data was imputed and information was gathered from facilities departments.

On campus stationary sources:

- a. The University of Miami does not have any cogeneration plants thus it was not input into the calculator.
- b. The University has stationary sources that are for heating cooling, cooking, labs etc. For the Coral Gables and Medical campus this is mostly Natural Gas. Propane is used as the primary source on the Marine campus. Propane info was only available for 2006 and 2007 while natural gas was taken from 2001.

University owned Vehicle Fleet: Each campus area has its own unique vehicle fleet or university owned operations of vehicles. For this information was taken from budget information regarding gasoline and diesel purchased. For many campus areas this information is more recent and still being organized properly as each department has purchasing processes. In the future this system will be analyzed for more accurate analysis. The university has used many electric vehicles to reduce gas needed however these are charged on power grid so goes into the KWH used by school overall. Additionally, bio diesel bus information will be included in later reports for 2007 and 2008. Also the Green U bike program was created this year allowing bikes to be purchased cheaply this will reduce overall bus loads and use leading to a more eco friendly healthy campus. For the Rosenstiel campus we do not have complete fleet vehicle information except for propane and this will increase the overall campus emissions when we add this data in future. Additionally, diesel info was not available for the Medical campus but will be introduced in future.

Air Traffic: Air traffic is a major source of emissions and a very difficult one to catalog. For this travel documentation and services within the Business services department had information on expenditures on both faculty and staff business travel and school sponsored air travel. Commuting travel of students

was not included as it is not included within the calculator. Only school-sponsored travel is. The data was collected from contacted travel agencies, travel management system, and “ghost card” (travel card) payment system. Because the information is only provided in dollar amount the conversion accepted by most universities was done in the following manner. The standard provided by the Association for the Advancement of Sustainability in Higher Education (AASHE) provides is that 80 percent of the travel expenses were on air travel according to a random sample. Additionally, the air transport association of America indicates that the price per passenger mile in 2006 was 13 cents. Taxes also mean that cost per passenger mile should be increased by 20 percent. Thus calculations were as follows: (total expenditure per year *.8)/ (.13 *1.2).⁸

Commuter Traffic: This is the most difficult and least defined data of the report. The campus carbon calculator’s goal is to quantify GHG emissions with annual miles traveled to and from campus by the University Community. (This includes students, faculty, & staff). As of this report there was no transportation surveys, or information on commuting preferences (frequency, carpool, etc.) Thus each campus was separated as follows and realistic estimates were plugged into the calculator in order to get an estimate of commuting GHG emissions. For each campus little if any carpooling was assumed. An overall percentage of individual’s mode of transport was assumed from parking pass information from each campus and Metro Rail pass purchases for each campus. Distance estimates were made by logical assumptions of worker and student distance from each campus given natural borders and the city layout. For this calculation on the Coral Gables Campus resident students were not included but will be in the future as a new zip car and no freshman resident parking program was created for 2008. This greatly reduces the number of vehicles on campus and will be quantified in later reports as resident driving behavior is studied. Shuttle bus use is included in diesel fuel purchase in university owned vehicles. Metro rail or bus use and distance was estimated based on location of campus (for instance no train runs to

⁸ <http://www.aashe.org/node/2981>

the marine school (RSMAS) thus the distance bus from train stop was used for metro passes. While this methodology is not refined it is an important estimate to include. In the future these will be revised and quantified in a more efficient manner, as they are an important aspect of emissions. However we omitted this in the Climate Action Plan for reasons specified later.

Agriculture: Agriculture information according to the calculator consists of fertilizer usage and animal agriculture. The university of Miami fertilizer use and kind and percent nitrogen was obtained from the contracted maintenance company UNICCO. Fertilizer can release nitrous oxides into the environment so it contributes to overall GHG emissions. The university of Miami does not have measurable animal agriculture/ or husbandry .

Solid waste: the Campus Carbon Calculator version 5.0 does not include recycling this will be put in future reports and as revision of recycling efforts currently in place will reduce total landfill waste figures. Waste management currently only has landfill waste with no CH₄ recovery (methane) a contributor to global warming. Reliable data for all campus waste amounts was provided by waste management for each campus area going back to year 2004 with reliable data.

Refrigerants and other chemicals for Greenhouse gasses: This is important information for total GHG emissions however given the difference in data and need to analyze it further this information was not included in this report because a need to properly obtain all data exists.

Other Considerations not included: Water use is not included in this report, as Clean Air Cool Planet's version five calculators does not account for Water. In the future this is an important consideration both financially and for the universities overall environmental impact as newer calculators will account for such data.

Emission Types

The categories of green house gas factors for the University of Miami listed above are analyzed given three general categories to assign a sphere of influence and define their source. Thus emissions are broken up into three different “scopes” of emissions as defined by the World Resources Institute (WRI) along with the World Business Council for Sustainable Development (WBCSD) standards for boundaries regarding Green House Gas reporting and accounting practices. The three scopes are as follows and are also illustrated in [Figure 2](#).

Scope 1, Direct Sources (produced on campus):

- *“Including (but not limited to): production of electricity, heat, or steam; transportation, materials, products, waste, and community members; and fugitive emissions (from unintentional leaks).”⁹*
- *For this report at UM this would be primarily University Fleet and agricultural activities, and the excluded Refrigerant and other chemical information*

Scope 2, Indirect Sources (produced off campus but imported on):

- *“Includes GHG emissions from imports of electricity, heat or steam – generally those associated with the generation of imported sources of energy.”¹⁰*
- *For this report at UM this would primarily be purchased electricity and purchased chilled water*

Scope 3, Indirect sources (produced off campus but related to institution):

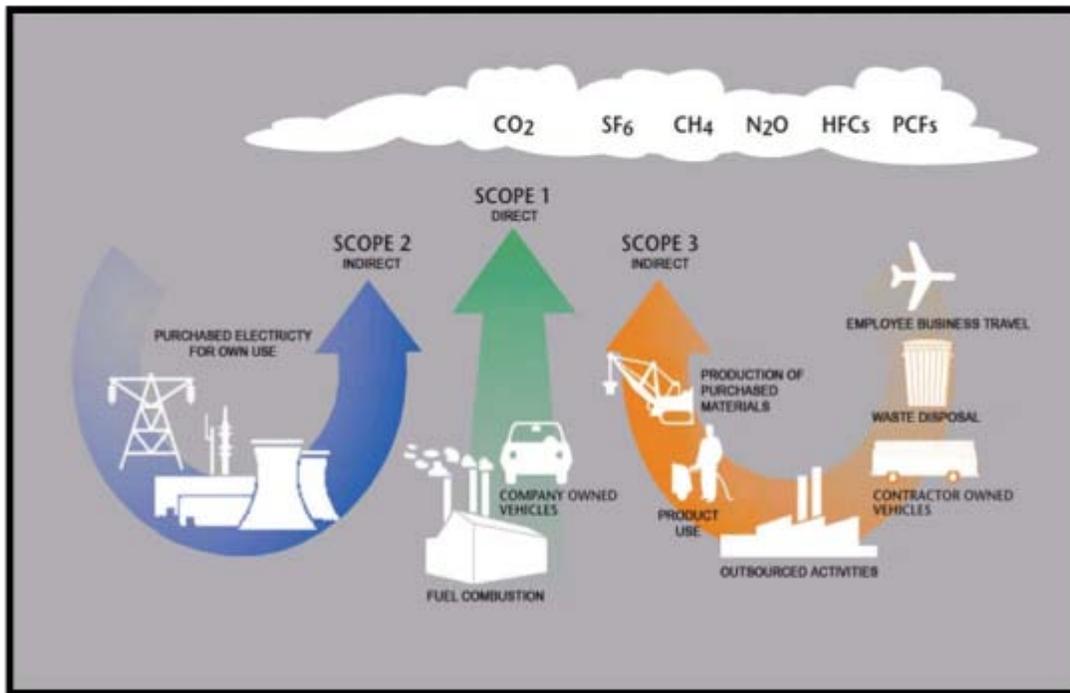
- *“These result from the institution’s activities, but occur from sources owned or controlled by another company. Includes: business travel, outsourced activities and contracts, emissions from waste generated by the institution when the GHG emissions occur at a facility controlled by another company, e.g. methane emissions from land-filled waste, and the commuting habits of community members.”¹¹*
- *For this report at UM this would primarily be community commuting, air travel paid for by the university, and landfill emissions.*

⁹ WBCSD/WRI, <http://www.wbcsd.org/web/publications/ghg-protocol.pdf>

¹⁰ IBID.

¹¹ WBCSD/WRI, <http://www.wbcsd.org/web/publications/ghg-protocol.pdf>

Figure 2- Three Scopes of Emissions ¹²



Coral Gables Campus Boundaries

The Coral Gables campus, which comprises two colleges and seven schools, is located on a 230-acre tract in suburban Coral Gables. It has 125 buildings occupying well over 4.5 million gross square feet. Since 2000, approximately 815,000 square feet of new facilities have been or are under construction on the Coral Gables campus – the Bank United Center, the Martha and Austin Weeks Music Library and Technology Center, the Fred C. and Helen D. Flipse Building, the David Epstein and Bernie Kosar Faculty Building at the School of Business Administration, the Hecht Athletic Center, the Yaron Field House, Francis L. Wolfson Building at the School of Communication and Cobb Stadium, the Jorge M. Perez Architecture Center, the M. Christine Schwartz Center for Nursing and Health Studies, the School of Communication Student Center, the University

¹² IBID.

Village (the first housing project in over 30 years, which provides 2,359 spaces). Also added to the list of University owned properties recently are the University Credit Union, the Gables One building, and the Mohker Property (leased by the Credit Union).¹³ The Coral Gables Campus houses the School of Architecture, College of Arts & Sciences, School of Business Administration, School of Communication, School of Education, Graduate School, School of Law, Philip & Patricia Frost School of Music, School of Nursing & Health Studies, Continuing and International Education, and the College of Engineering.¹⁴

Rosenstiel School of Marine and Atmospheric Science Campus Boundaries

The Rosenstiel School of Marine and Atmospheric Science (RSMAS) is located on an 18-acre waterfront campus on Virginia Key, Florida, in Biscayne Bay. The campus is part of a 65-acre marine research and education park that includes two U.S. Department of Commerce National Oceanic and Atmospheric Administration (NOAA) research laboratories and the MAST Academy, the Miami-Dade County magnet high school for marine science and technology. The Rosenstiel School is one of the top five marine and atmospheric research and graduate education programs in the U.S. The Rosenstiel School also oversees the operation of an archeological field research and education facility on 112 acres at Little Salt Springs, located in North Port, Florida. (In the future this area will be included as preservation land, however it is not included in this initial study). In addition to this location, much of the school's records include the Richmond Campus with RSMAS. The Richmond campus, established in 2001, is a 76-acre site about ten miles southwest of the Coral Gables campus. The campus houses research facilities for the Rosenstiel School's Center for Southeastern Tropical

¹³ University of Miami, 2007-2008 Fall Factbook, pg. IV.

¹⁴ http://www6.miami.edu/UMH/CDA/UMH_Main/0,1770,30977-1,00.html

Advanced Remote Sensing (CSTARS) and Richmond Satellite Operations Center (RSOC).¹⁵

Leonard M. Miller School of Medicine Campus Boundaries

Medical Campus: The Leonard M. Miller School of Medicine campus consists of approximately 45 acres of owned and leased land within the 100-acre University of Miami/Jackson Memorial Medical Center complex. Other facilities at the medical center, in addition to Jackson Memorial Hospital, include the Miami VA Medical Center and two University-owned hospitals—the University of Miami Sylvester Comprehensive Cancer Center and Anne Bates Leach Eye Hospital, home to Bascom Palmer Eye Institute. Bascom Palmer was ranked the number one hospital in the country for ophthalmology for the fifth year in a row in the 2008 annual survey of “America’s Best Hospitals” published in the *U.S. News & World Report*; three other programs at UM/Jackson were also ranked among the best. Miller School of Medicine faculty conduct more than 2,000 research projects aimed at advances in basic science and clinical care in facilities totaling more than two million square feet of owned and leased space, which is currently expanding. The recently opened Clinical Research Building and Wellness Center is home to more than 300,000 additional square feet for clinical research in pediatrics, clinical pharmacology, and patient safety.

For the purpose of this report all data is related to what is considered university owned medical school buildings. In the future the whole hospital may be analyzed, but certain definitions of University owned facilities would need to be researched. In addition to the Medical Campus, the satellite South Campus area dedicated to research is also included. The 106-acre South Campus opened in 1986 and is located 10 miles southwest of Coral Gables. Its seven buildings provide 58,724 gross square feet for the purpose of conducting research and development projects. In 1997 an additional 30 acres were acquired, bringing the total area of the south campus to 136 acres.

¹⁵ University Of Miami, 2007-2008 Fall Factbook, pg. V.

Overall Campus Green House Gas Emissions

An important part of this report is to get an idea of Greenhouse gas emissions for the entire university. This can now be done effectively because we have defined the three campus areas separately as is present in our original Carbon Footprint report. Thus, it is important to analyze all three main campus areas together for future reduction considerations. As a result the Overall University of Miami footprint will include the Coral Gables Campus, the Rosenstiel School of Marine and Atmospheric Science Campus Analysis (RSMAS), and The Leonard M. Miller School of Medicine (Medical Campus) as defined above. Below is the information that was determined from the 2004 to 2007 carbon footprint report. [Figure 3](#) displays the total CO₂ equivalent of all emissions, [Table 2](#) shows the 2007 emissions break down, and [Figure 4](#) is a pie- chart detail of emissions types by percentage.

Figure 3- Total Equivalent CO2 emissions (2004-2007)

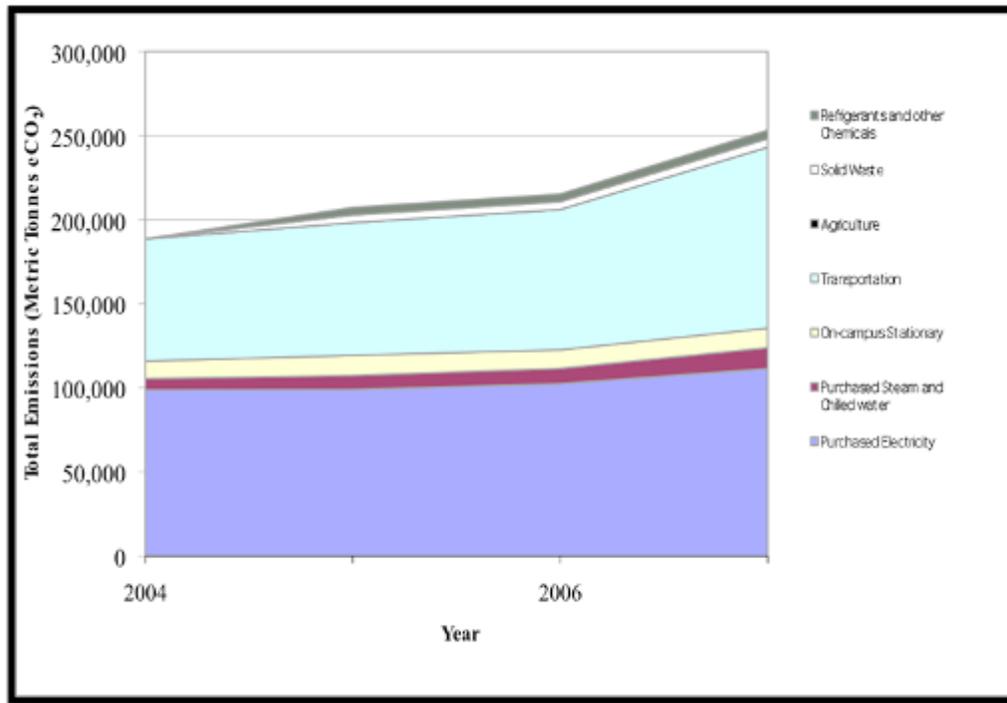
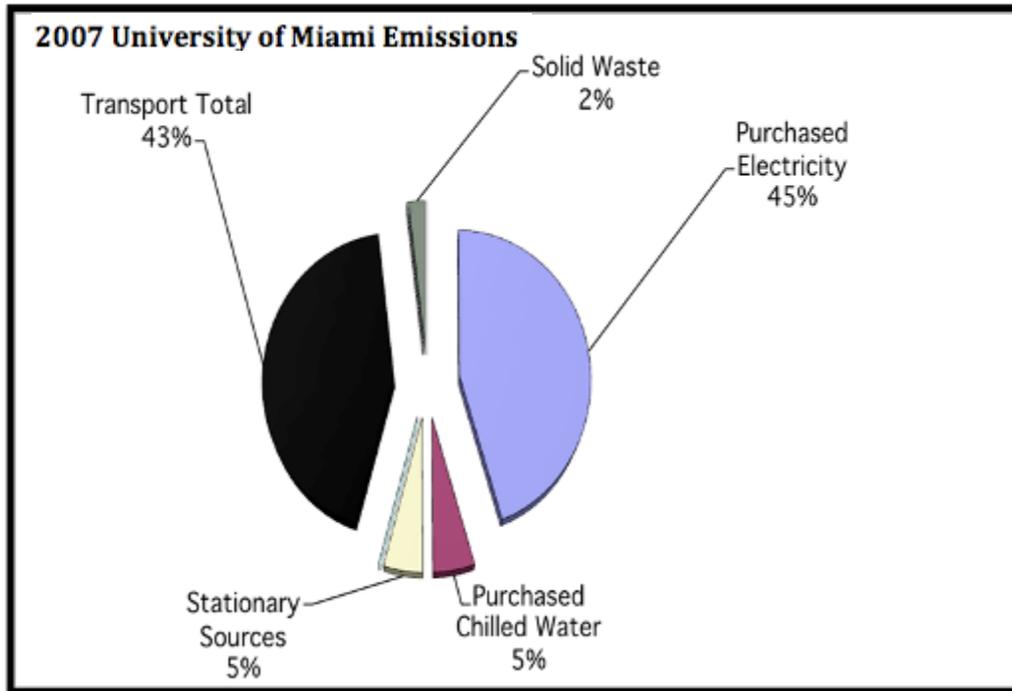


Table 1- Total University of Miami Emissions Breakdown for 2007

MODULE		Summary							
WORKSHEET		Overview of Annual Emissions							
UNIVERSITY		University of Miami - Total Campus							
Select Year ->	2007	Energy Consumption	CO ₂	CH ₄	N ₂ O	Other Chemicals	eCO ₂	eCO ₂	
		MMBtu	kg	kg	kg	kg	Short Tons	Metric Tonnes	
Purchased Electricity		1,459,718	111,014,599	1,198	1,438		122,870	111,468	
Purchased Steam/Chilled Water		196,934	12,295,313	1,549	72		17,616	12,352	
Stationary Sources		219,541	11,594,595	1,213	23		12,819	11,629	
	Non Co-Gen	219,541	11,594,595	1,213	23		12,819	11,629	
	Co-Gen Electric	-	-	-	-		-	-	
	Co-Gen Steam	-	-	-	-		-	-	
Transport Total		705,555	106,831,686	4,214	2,166		118,574	107,570	
	University Fleet	11,401	800,504	143	50		902	819	
	Student Commuters	87,000	6,131,088	1,168	405		6,920	6,278	
	Faculty/Staff Commuters	153,990	10,866,868	2,027	705		12,260	11,122	
	Air Travel	453,164	89,033,226	876	1,007		98,491	89,351	
Agriculture Total		-	-	-	154		50	46	
Solid Waste		-	-	219,486	-		5,565	5,048	
Refrigeration		-	-	-	-		-	-	
Total		2,581,748	241,736,193	227,661	3,853		273,493	248,113	
Offsets									
	'Green' Electric Credits						-	-	
	Composting						-	-	
	Forest Preservation						-	-	
Net Emissions							273,493	248,113	

Figure 4- 2007 University of Miami Overall Emissions Pie Chart



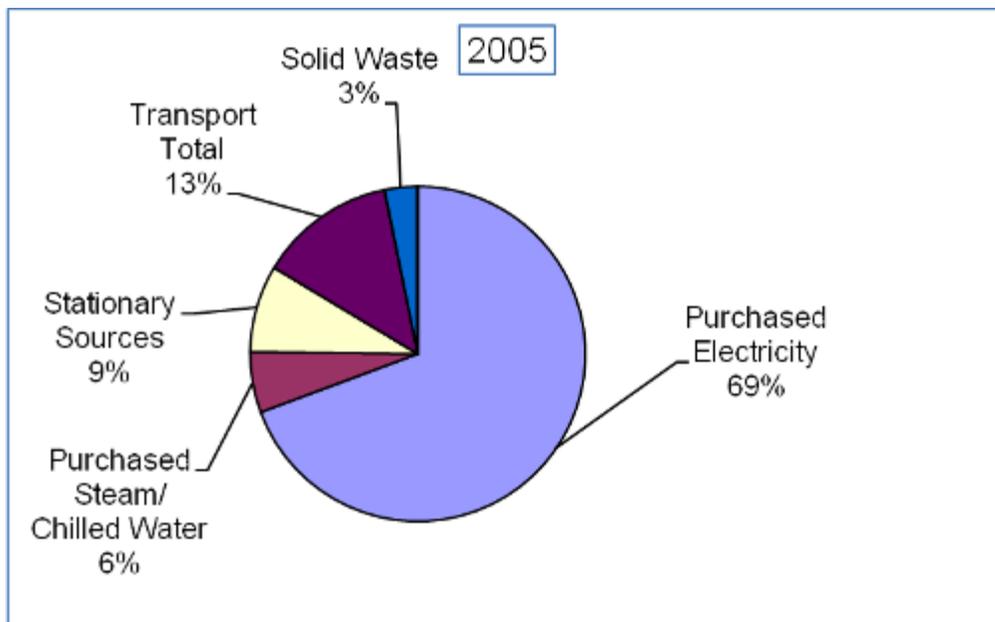
Green House Gas Reduction Proposal

In order to reduce the universities overall impact on the environment the University of Miami will commit to reducing emissions by certain reasonable dates. This proposal shows the possible paths the university could take to reduce emissions and some recommended target dates. In order to accomplish this, the University of Miami will look towards reducing the emissions levels to **20 % of 2005 levels by the year 2020**. This will be carried out despite a growing and changing University. The 2005 levels of CO₂ emissions for the entire university were defined in the above methodology in the Carbon Footprint Baseline Section of this report. For the purpose of this version of the 2005 carbon footprint air travel is not included in reduction measurements. In the future as our accounting becomes more accurate we will include ways to reduce the effects of air travel. Additionally, the current economic climate, technology, and new university procedures have reduced the need for air travel and this will be reflected in future reports. Thus, the focus remains on the core producers of greenhouse gas emissions from the operations on our campus areas. [Table 3](#), shows the CO₂ equivalent of different emissions by scope and amount for the year 2005. Additionally, [Figure 5](#) shows the 2005 emission levels by the percent contribution from campus operations.

Table 2- 2005 Emission Amounts Breakdown

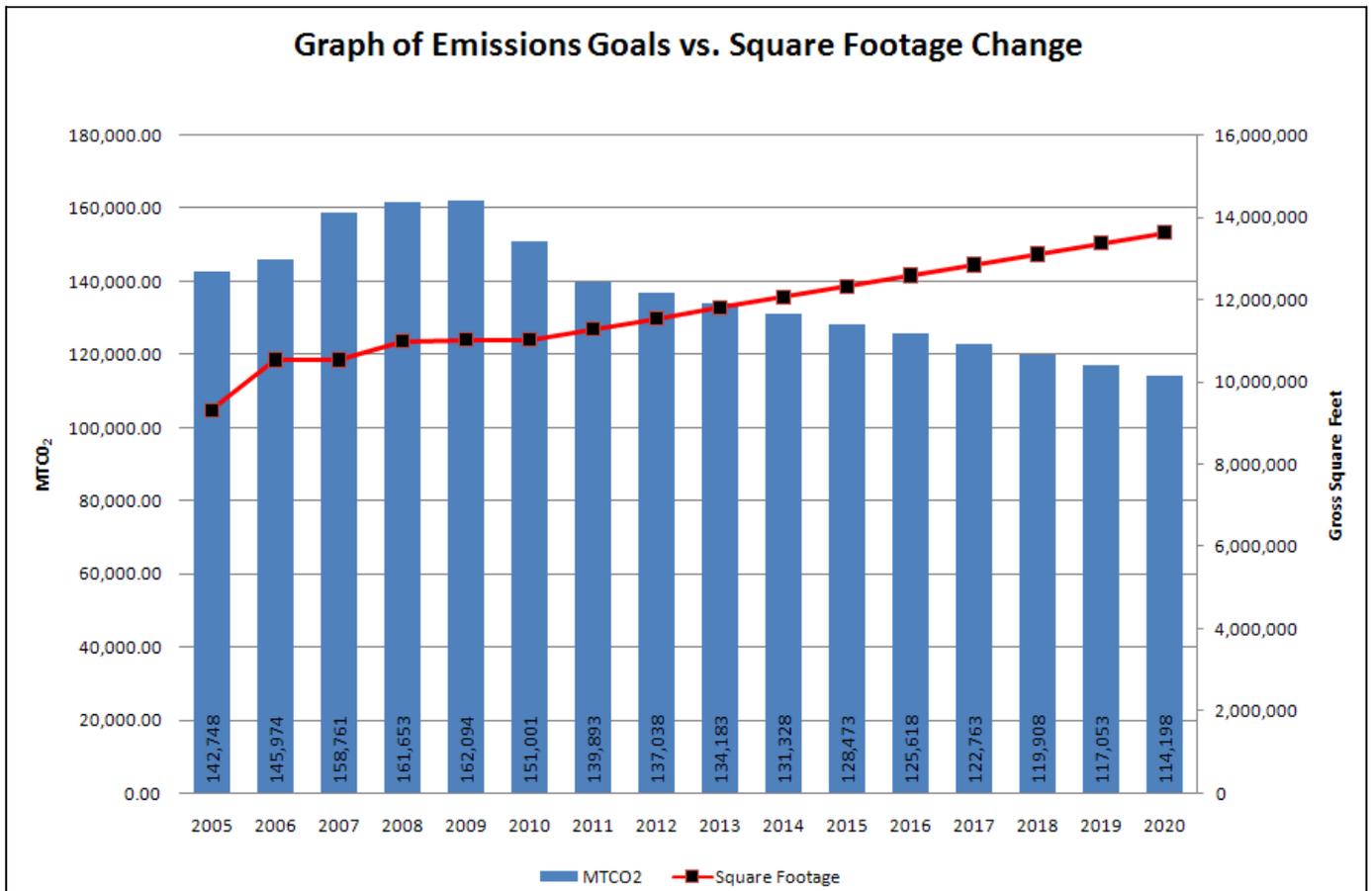
WORKSHEET		Overview of Annual Emissions						
UNIVERSITY		University Of Miami						
Select Year -->	2005	Energy Consumption	CO ₂	CH ₄	N ₂ O	Other Chemicals	eCO ₂	eCO ₂
		MMBtu	kg	kg	kg	kg	Short Tons	Metric Tonnes
Purchased Electricity		1,296,234	98,581,286	1,064	1,277		109,109	98,984
Purchased Steam/Chilled Water		132,949	8,300,489	1,046	48		9,192	8,339
Stationary Sources		226,837	11,975,027	1,197	24		13,238	12,010
	Non Co-Gen	226,837	11,975,027	1,197	24		13,238	12,010
	Co-Gen Electric	-	-	-	-		-	-
	Co-Gen Steam	-	-	-	-		-	-
Transport Total		261,148	18,405,384	3,495	1,212		20,772	18,845
	University Fleet	16,550	1,161,881	232	80		1,313	1,191
	Student Commuters	94,107	6,627,964	1,272	440		7,482	6,788
	Faculty/Staff Commuters	150,491	10,615,540	1,991	692		11,978	10,866
	Air Travel	-	-	-	-		-	-
Agriculture Total		-	-	-	128		42	38
Solid Waste		-	-	197,094	-		4,997	4,533
Refrigeration		-	-	-	-		-	-
Total		1,917,167	137,262,187	203,895	2,689	-	157,350	142,748
Offsets								
	'Green' Electric Credits						-	-
	Composting						-	-
	Forest Preservation						-	-
Net Emissions							157,350	142,748

Figure 5- 2005 break down of emissions



2005 is the earliest year that has the most complete and accurate analysis of the University's Carbon Footprint. Consequently, this year will serve as our baseline year for reduction goals. In order to make steps towards neutrality based on an understanding of future sustainability plans, the initial goal for the University of Miami is to reduce greenhouse gas emissions to **20 % of 2005 levels by the year 2020.** This reduction will occur despite growth in the university's built environment. The graph in [Figure 6](#) outlines the emission reduction goals of the university compared to the projected increase in gross square footage.

Figure 6- Emission Goals vs. Square Footage Change



The above graph indicates the University of Miami's reduction goal is to emit 114,198 MTCO₂ equivalent of Greenhouse Gases or 20% less than we emitted in 2005. Given projected numbers of square footage and emissions figures, in 2020 under business as usual circumstances we would be emitting approximately 160,796 MTCO₂. In order to achieve this goal, potential reductions will need to be made through multiple different measures to reach an overall reduction of about 46,597 MTCO₂. An essential first step will be creating a central carbon management system that tracks greenhouse gas emissions of operations. Additionally, such a system will allow us to determine the most cost - sensitive and environmentally effective plans for interim reduction goals. These steps will incrementally move us closer to neutrality. [Figure 7](#) and [Figure 8](#) detail the likely mix of steps by CO₂ reduction and percentages weights the University of Miami will consider in order to reduce greenhouse gas emissions. These figures are based on initial goals of the comprehensive resource use audit and past trends of reductions from current sustainability initiatives. Additionally, as other universities have done, this report operates under the assumption that a portion of the burden of responsibility lies on our power companies to offer more green power sources. The accuracy of this and interim goals will be improved over the next two years as greenhouse gas management and planning becomes more centralized.

Figure 7- Efforts to reduce University of Miami GHG emissions to 50% of 2005 levels with CO₂ amount per initiative.

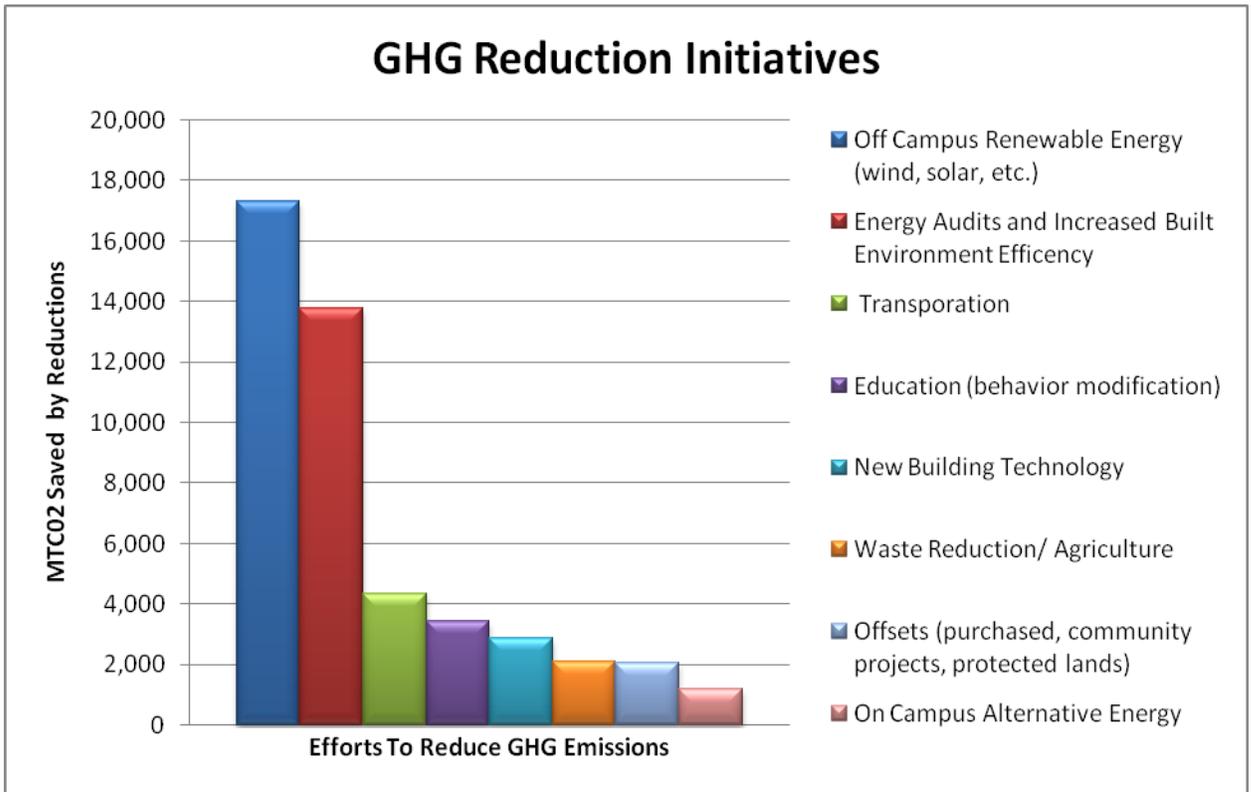
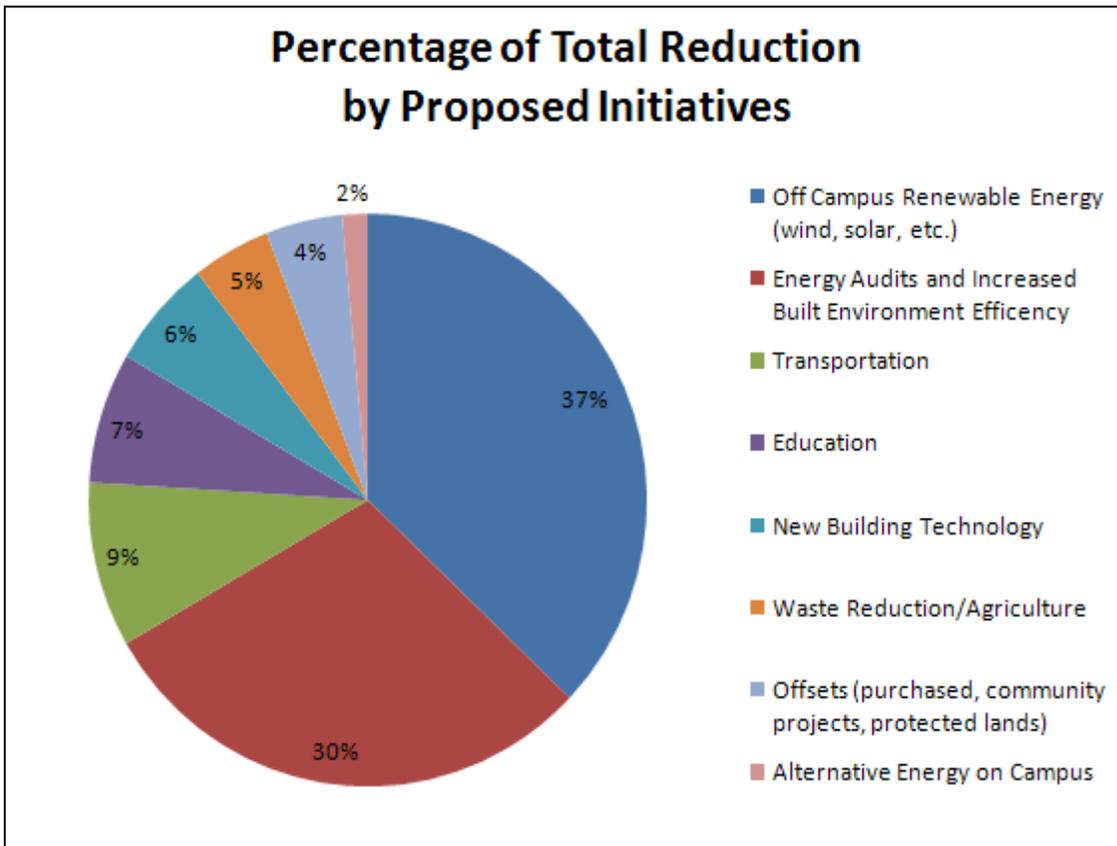


Figure 8- Percent contribution of reduction measures



Short Term Reduction Goals

There are numerous goals and steps currently being pursued that will ultimately steer the way we formulate the next version of our Climate Action Plan. In between now and the next version of our action plan a great deal of innovative solutions will continue to reduce our environmental impact while remaining a leader in environmental education. The following is a list and description of the action items that will help the University of Miami continue to reduce its greenhouse gas emissions.

Green House Accounting: The University is currently exploring better methods of monitoring and recording all greenhouse gas emissions. A centralized system of tracking everything from transportation, to waste, to resource use will allow the university to get a more efficient handle on total emissions per campus including water and energy. Such a system will allow the university to get a better cost benefit analysis of the proper reductions needed and timeline to reach neutrality. This will greatly affect the recommendations made in the previous section. Such a program will also be a great educational tool as student projects related to sustainability can be quantified. Additionally, current pilot projects can be analyzed in regards to total economic and greenhouse gas reductions. Additionally, current projects to implement more comprehensive building and transportation monitoring will mesh well with a centralized system. Moreover a comprehensive accounting system will allow open communications between departments about the concept of neutrality.

Resource/Energy Use Audit: As part of the ongoing campus-wide effort to reduce resource use, the Coral Gables campus is undergoing a comprehensive energy analysis conducted by Florida Power & Light Services (FPLS). Within this program a comprehensive building by building resource (water, energy, etc) use audit is being conducted. As a result of this plan a better understanding of the University's Carbon Footprint will be reached. Additionally, the completion of this

audit will result in the formulation of a master plan for the Coral Gables Campus to strategically reduce resource use, and how best to implement alternative or unique energy systems.

Setting targets as a “waste reduction school”: The University of Miami is currently aggressively updating the recycling program, and doing a comprehensive inventory of the amount of waste we produce from our operations. Initiatives such as tray-less dining halls, printing solutions, education, and increased recycling opportunities is allowing the university to quickly change its waste levels. The university is currently setting goals for massive reductions in waste amounts and investigating options such as composting. Reducing our waste will help to engage the University of Miami community while reducing our greenhouse gas emissions.

Offsets: The University of Miami participates in a few activities that need to be quantified as they can serve as reductions of Carbon Footprint. A comprehensive inventory of all land protection and preservation by the University of Miami should be conducted. This protected land can act as a “carbon sink” and thereby reduce carbon dioxide emissions. Additionally, innovative programs are being discussed. These programs may help reduce energy use for those who truly need it in the greater Miami community, while serving as a method of offsetting some of the University of Miami’s emissions. Finally the University also purchases some renewable energy credits specifically for LEED buildings. These credits will need to be accounted for and in the future further investment may be considered for some campus operations.

Funding Possibilities for Target Reduction

The possible methodology listed above to reduce greenhouse gas emissions can create economic return through the reduction of resource use while other more aggressive measures have a cost. Energy conservation and especially renewable energy projects require a great deal of investment from the University. These projects are currently being examined through future planning via the current comprehensive energy audit. The University of Miami realizes the importance of renewable energy and looks for the most viable options to provide economic and educational benefit to the University. Projects that yield the best returns in response to savings in relation to operating dollars spent will be examined first. During the process over the next years through further involvement of multiple departments and lessons learned from the Energy audit the best course of action of the annual expenditure on greenhouse gas reductions will be explored. Currently, the Universities focus is to cut out inefficiencies while improving the quality of the University of Miami experience. The University of Miami fully supports the use of Renewable energy and seeks to find away to incorporate it into campus projects and help reduce Greenhouse Gas emissions while serving to educate the community.

Climate Education & Outreach

The University of Miami is dedicated to educating future leaders and setting an example as a progressive environmentally concerned organization. Through involving the university population, community outreach, academic courses, and research projects the University of Miami is committed to furthering societies understanding of sensitive environmental issues. The following are a few examples of how the University will continue to fulfill its obligations to environmental education & outreach.

- Green U website – Efforts are underway to update the website as it will be an educational tool for the entire university and beyond. Unique videos, guides, links, and other educational material will be added to the site. The Green U website will act as the hub of all sustainability information at The University of Miami. The Green U website (www.miami.edu/greenu) will become a great resource for students and community members to share their environmental stories and efforts through the fascinating medium of online communication.
- Comprehensive resource use audit – The university of Miami main Coral Gables Campus resource audit being conducted by FPL presents many opportunities for student projects and education. As the plan further develops it will be essential to enlist student projects and hold educational seminars so they can gain real world understanding of how the built environment impacts our natural world.
- Educational Campaigns and events- The sustainability coordinator will work with student groups, outside companies, housing department, faculty, and staff to coordinate unique educational programs to encourage the greater community to be more aware of their own impact. This will help reduce the emissions generated by excess resource use from the end user. These messages will be brought to students and community

members in all different departments. The University of Miami understands that it is important for individuals to receive a worldly education and thus environmental awareness should be present in all fields of study.

- Internships and class partnerships. – The green U program will be taking on official interns for different areas of campus sustainability. These interns will gain real world experience while educating their peers. Additionally, these interns will have the satisfaction to make a real difference on their own campus. The Green U program will continue to help incorporate sustainability into the curriculum through student projects that create real solutions as was done in the fall of 09 with the management 100 courses and has been done in many other courses before this.

Climate Neutrality

As an institution that has signed both the Talloires Declaration of the Association of University Leaders for a Sustainable Future and the American College and University Presidents Climate Commitment the University of Miami has displayed its commitment to reach “climate neutrality as soon as possible.”¹⁶ The expression Climate neutrality is viewed by the University of Miami to mean that in the future the University will have a net impact on the climate of zero. In short the University will reduce GHG emissions as much as possible and used carbon offsets or comparable methods to moderate the remaining emissions.

The University of Miami’s first proposed steps towards neutrality is the goal to reduce Carbon Emissions to **20% of 2005 levels by 2020**. Additionally, the University will further show its commitment on this ongoing process by seeking to improve its tracking methods which will allow the school to accurately propose reduction measures. Additionally, with the current comprehensive audits occurring at the university drastic reductions in resource use and an increase in monitoring will also help set future goals for neutrality.

Within the next 2 years the University of Miami will be able to set a revised strategic climate action plan as there will be a better understanding of current emissions levels, international and local commitments, and university growth plans. Through this understanding interim targets will be set that will progressively lower our greenhouse gas emissions until we are close as possible to a climate neutral institution.

The University of Miami will choose a few approaches to reduce greenhouse gas emissions to eventually become “climate neutral”. First the sources of emissions on campus, as we increase effective monitoring, will be strategically reduced to free up capital and reduce our emissions levels. As the

¹⁶ <http://www.presidentsclimatecommitment.org/about/commitment>

University of Miami pursues a more efficient campus we will see initiatives and innovative solutions to reduce resource use for both the systems and from education of the end users. Secondly, the University of Miami is not alone, and the changes others make will directly impact our campus and assist a shift towards climate neutrality. Aside from internal reductions, we believe that we will see the companies that supply our utilities offer lower carbon sources of energy. Because a great deal of our emissions are from purchased electricity this will certainly advance us towards neutrality. In addition, actions in local or national government can provide changes or funding and development of cleaner energy for the University of Miami. The University of Miami constantly monitors any available funding or grant opportunities to assist in reducing resource use. In the next few years as we move towards our 2020 goals we will be able to revise the outlook and time frame in which we will achieve no net impact.

Conclusion

The negative effects on the environment resulting from the quest for technological and societal advancement are increasing in documentation and incidence. Consequently, the factors steering “climate change” have become a more ubiquitous subject in our culture. Accountability for conscientious environmental policy-making has been levied to the institutions that shape and guide our culture. Higher educational institutions have long been at the forefront of technological, scientific, political, and societal movements. Cognizant of its own sphere of influence, the University of Miami has committed itself to become a model of sustainability in higher education.

Determining the greenhouse gas (GHG) emissions inventory of an institution and then producing a climate action plan is still a process in its infancy. Consequently, the completion of this first benchmark inventory and climate action plan are two landmark steps in fulfilling the requirements of the President’s Climate Commitment and Talloires Declaration signed by President Shalala.

This report highlights the need to work between different departments, complete current energy audits, and create a central database of greenhouse gas emission contributors for the University of Miami. Once these steps are complete we can further detail how exactly we will reach neutrality. The first installment of the University of Miami’s Climate Action Plan for 2009 proposes a timeline and various possible methods that can assist us move towards carbon neutrality.

The university is confident that a combination of efficiency, conservation, renewable energy, and education initiatives will allow the institution to reach our 2020 greenhouse gas reduction goal within the appropriate budgetary concerns. Furthermore, The University of Miami realizes the importance of signifying that it is possible to maintain economic progress while safeguarding the environment through efficient business operations.

