



**USF** UNIVERSITY OF  
SOUTH FLORIDA

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# Climate Action Plan 2010

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OFFICE OF  
**SUSTAINABILITY**  
*for a cleaner, greener USF*

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## Executive Summary

The recent rapid rise in the emission and accumulation of greenhouse gases (GHGs) in Earth's atmosphere have had, and will continue to have, profound impacts on climate change and climate related phenomena including drought, sea level rise, and storm intensity. As significant contributors of GHGs to the environment, colleges and universities around the globe have taken steps to document and mitigate their impact. As of May, 2010, 685 leaders of institutions of higher education from around the world have signed the American College and University Presidents' Climate Commitment, including President Judy Genshaft of the University of South Florida (USF) who signed the accord in April, 2008. The agreement requires schools to inventory their GHG emissions, take immediate action steps to decrease those emissions, and develop a long-term plan to reduce—and eventually eliminate—the production of GHGs, especially carbon dioxide. This document represents the latter step, USF's Climate Action Plan.

The University of South Florida is a large, metropolitan, multi-campus institution, enrolling over 55,000 students each year with an annual operational budget over 1.8 billion dollars. A relatively young institution (founded in 1956), the university has grown significantly over time, with recent growth focused on research, development, and application. In conjunction with this growth, the university's energy needs have increased dramatically in recent years and its waste stream has burgeoned.

Since the implementation of the 1995 Tampa Campus Master Plan, campus growth, energy use, and waste production have been addressed through various mechanisms, largely stemming from the combined efforts of Facilities Planning and Construction and Physical Plant. To organize and expedite sustainability initiatives at USF, a Sustainability Initiative Steering Committee was formed in 2008 and an Office of Sustainability was created in 2009. These groups have worked together, along with numerous other campus units and organizations, to make USF a cleaner, greener place to live and work. In 2010, a School of Global Sustainability was established to spearhead academic initiatives in sustainability at the university.

The USF Tampa campus is minimally responsible for the annual emission of over 250,000 metric tons of GHGs, the vast majority of which compose carbon dioxide. When USF-Health and the auxiliary units and direct support organizations are included in this assessment, it is estimated that the entire campus generates close to 400,000 metric tons. Most emissions fall within EPA Scope 2 (electricity use) and Scope 3 (commuting and air travel). On-campus stationary sources including natural gas use, direct (fleet) travel, and refrigerants and chemical emissions, comprise a smaller portion of the output of GHGs.

By the year 2050, USF will emit 80 percent less carbon dioxide than it did in 2007. On the way to meeting this goal, USF has three critical benchmarks: 10% reduction by 2015, 20% reduction by 2025, and 50% reduction by 2040. Beyond 2050, and with the aid of carbon offsets, USF will be “climate neutral” by 2070. To reach this goal and benchmarks along the way, USF will emphasize certain strategies to reduce carbon dioxide emissions over time. These strategies are aligned with specific scopes of GHG emissions to better leverage and focus institutional strengths and to set periodic (five-year) priorities for resource allocations. These strategies will collectively focus on improvements to the designed and built environments (including water management), transportation, energy, and consumption (waste and recycling).



## Introduction

### *Climate Change, Sustainability, and the Role of the University*

Since the beginning of recorded geological history, average temperatures on Earth have fluctuated significantly between warm epochs and periods of glaciation, alternating about every 250 million years. Climate change over the past century, however, has been far more dramatic than at any other time in Earth's history. Scientists have convincingly demonstrated a causal relationship between warming of the climate system and the increase of greenhouse gases in the atmosphere, especially carbon dioxide emanating from the combustion of fossil fuels. The [Intergovernmental Panel on Climate Change](#), a global consortium of climate change experts, warns that many natural systems are being—and will continue to be—severely impacted by regional climate changes, specifically land and sea surface temperature increases and associated alterations to hydrological systems including sea level rise and storm intensity.

Increasingly since the publication of the United Nations Brundtland Report in 1987 and, more directly, the establishment of the Kyoto Protocol in 1997, numerous governments, industries, corporations, and other organizations have taken steps to curb the emission of greenhouse gases and to sequester atmospheric carbon dioxide. In 1990, administrators in higher education drafted and signed the [Talloires Declaration](#), a 10-point action plan for incorporating sustainability into teaching, research, operations, and outreach at colleges and universities. More recently, university leaders have focused their commitment to addressing climate change by signing the [American College & University Presidents' Climate Commitment](#) (ACUPCC), which requires signatories to complete a greenhouse gas emissions inventory, set target dates and interim milestones for becoming “climate neutral,” take immediate steps to reduce greenhouse gas emissions, integrate sustainability into curriculum programming, and ensure that all of these efforts are documented and transparent to the public. At present, 685 institutions of higher education from around the globe have made this commitment.

In April, 2008 University of South Florida (USF) President Judy Genshaft signed the ACUPCC. The action plan outlined on the following pages represents the initial efforts by USF to comply with the ACUPCC. This plan represents a “living document” designed to be revised and updated annually by the USF [Office of Sustainability](#). As an institutional member of the [Association for the Advancement of Sustainability in Higher Education](#), the [U.S. Green Building Council](#), and a charter member of the [Sustainability Tracking, Assessment & Rating System](#), USF holds a deep commitment to making its campus and community a cleaner, greener place to live and work.

## USF Institutional Overview

The University of South Florida was founded in 1956 to serve the needs of a growing metropolitan region in the southeastern United States. Today, the University of South Florida System is a multi-campus national research university composed of two separately accredited institutions, USF and USF St. Petersburg. USF consists of the main research campus in Tampa, which includes USF Health, and two regional campuses: USF Sarasota-Manatee and USF Polytechnic (in Lakeland). The USF System serves more than 55,000 students annually and offers 228 degree programs at the undergraduate, graduate, specialist, and doctoral levels, including the doctor of medicine, through its 11 colleges. The USF System has over 238,000 alumni representing all 50 states and 124 nations.

The USF System has changed significantly over the past five years. Student enrollment has grown by roughly 6 percent, and there have been corresponding increases in USF's operating expenditures and total building space on the Tampa campus, where most growth has been concentrated. In 2004, there were approximately 52,000 total (full and part time) students enrolled, while in 2009 there were more than 55,000 students (Figure 2.1). Of these numbers in 2009, only 4,923 (or 8.9 percent) students live on the Tampa campus. Thus, commuting is a major source of carbon dioxide emissions for USF.

In a 2010 survey by *Forbes Magazine*, the Tampa Bay urbanized area was ranked as the worst region in the United States for commuters, largely because of the low numbers of people who

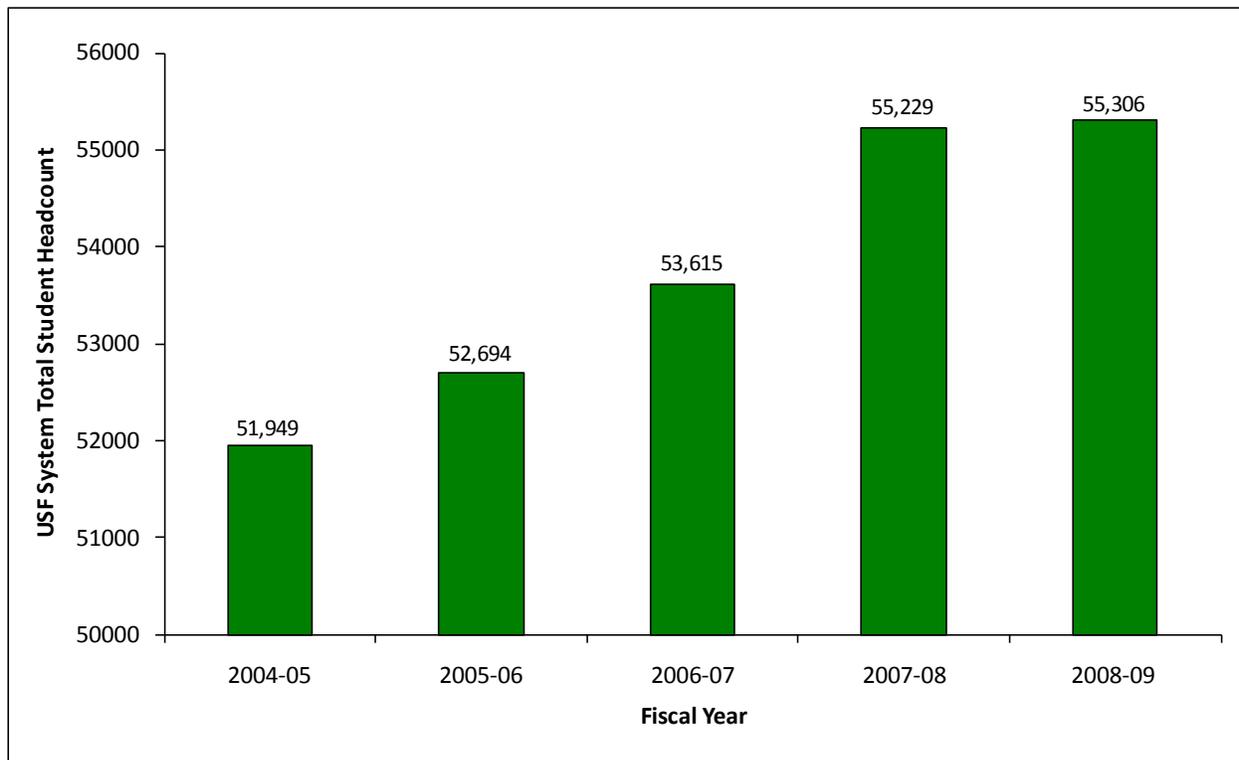


Figure 2.1. Total (full and part-time) student headcount over time.

walk, bike, or use public transit. While Tampa is ranked higher than cities such as Atlanta and Miami that are notorious for long commute travel times and delays, Tampa received the worst overall rank, because of the lack of transportation options compared to driving one's personal vehicle. More travel options, such as public transit, ridesharing, and bicycling would mean fewer motor vehicles on the road and lower greenhouse gas emissions.

Along with student enrollment growth, the USF System's operating budget has grown 27 percent, from \$1.32 billion dollars in the 2004-2005 fiscal year, to \$1.81 billion dollars in the 2008-2009 fiscal year (Figure 2.2). This growth in expenditures has come at a time when state allocations have declined significantly. Over the past two years, the USF System has had to cut roughly \$50 million from its annual budget. One way in which the university is making up for the shortfall is by growing its research funding through external grants and contracts. With a 213 percent increase between 2000 and 2007, no other American university grew its federal research enterprise at a faster rate than the USF System, according to the *Chronicle of Higher Education*. In the academic year 2008-2009, USF reached a new high with \$380.4 million in research grants and contracts. According to the National Science Foundation, this level of research-based revenue places USF 43<sup>rd</sup> in total research expenditures and 36<sup>th</sup> in federal research expenditures for public universities in the United States (FY 2008). Correspondingly, USF is classified by the Carnegie Foundation for the Advancement of Teaching in the top tier of research universities (RU/VH), a distinction attained by only 2.2 percent of all universities.

The university has also increased its building space to accommodate increased demands for space by a growing student body (Figure 2.3). The university expanded from approximately 4.4 million square feet to 6.1 million square feet in the last five years (during the 2009-2010 academic year, the campus grew an additional half million square feet). In addition, the amount

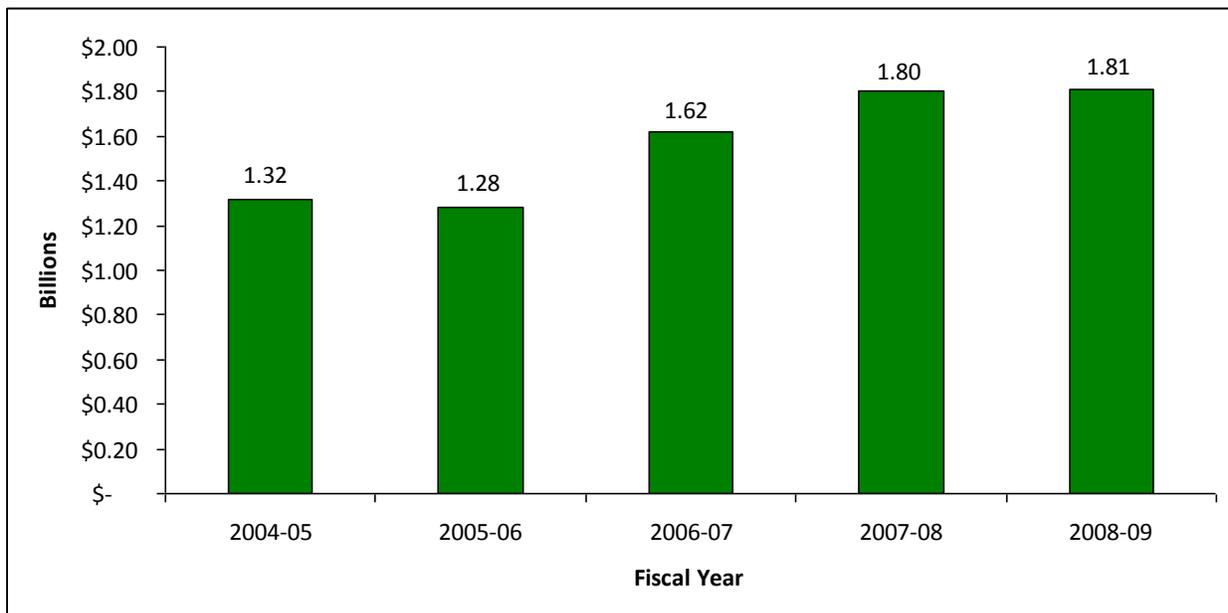


Figure 2.2. USF System budgeted expenditures over time.

of space devoted to research has increased from 297,297 square feet to 360,198 square feet over the same time period (Figure 2.4). This change amounts to a 28.2 percent net total building space increase and a 17.4 percent increase in research space over five years.

The rapid growth in research facilities at USF is important, because these facilities use significantly more energy (measured in Btu per square foot per year) than other academic and residential buildings on campus (Figure 2.5). The higher energy consumption for research buildings is necessary to maintain laboratory equipment and accommodate high building use as well as to maintain air quality standards. While USF must balance its needs to ensure a high quality educational experience, the challenge USF will face in the coming years will be to conserve and recover energy as well as to explore ways to increase its use of renewable energy sources.

At the same time the university increased its building space, the university also experienced an increase in the number of cooling and heating degree days. The number of cooling degree days has gone from 3,386 in FY 2004-2005 to 3,537 in FY 2008-2009, a 4.3 percent increase, while the number of heating degree days as increased from 476 to 508 (6.3 percent). Combined with the increase in building area, this change has led to an increase in electricity and natural gas usage. The total kilowatt-hours used by the entire Tampa campus (academic buildings, USF-Health, and the auxiliary units) went from 163,372,041 in FY 2004-2005 to 178,682,563 in FY 2007-2008, an 8.6 percent increase.

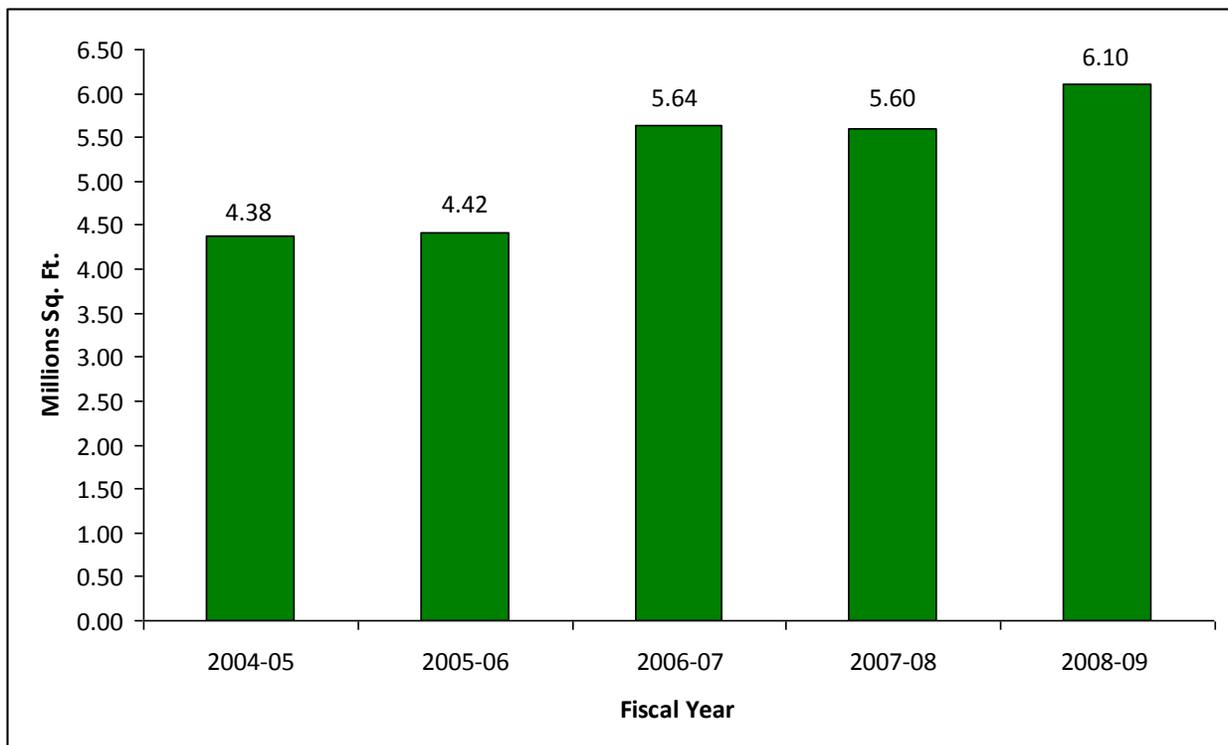


Figure 2.3. Building space over time.

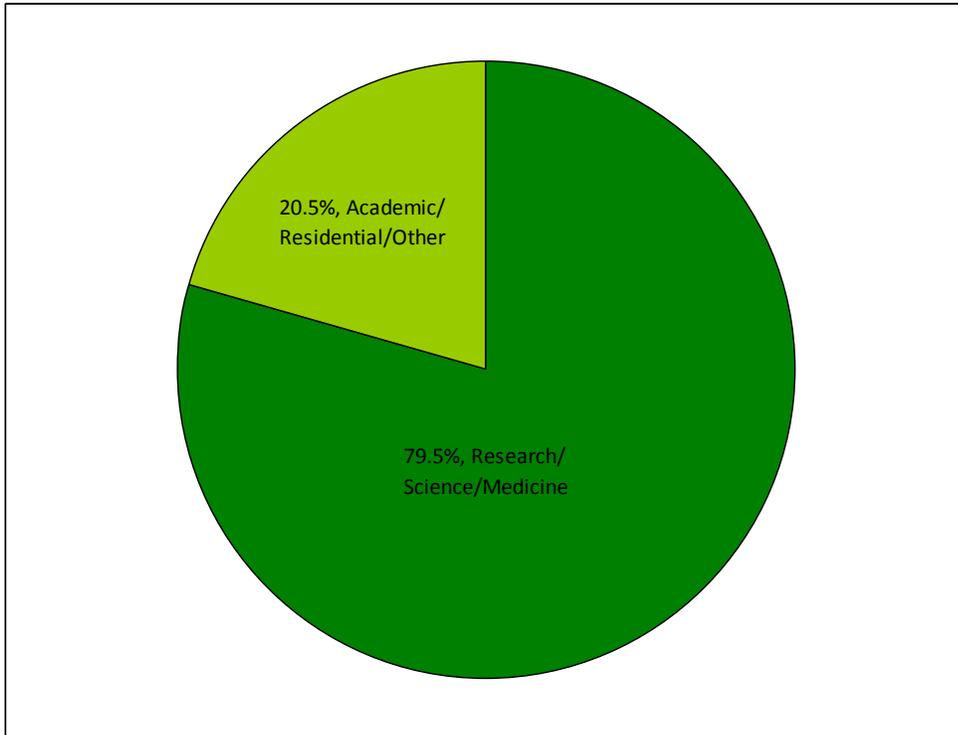


Figure 2.4. Building space growth by building type, Fiscal Year 2004-2005 to 2008-2009, representing 1.72 million sq. ft. of space added over time.

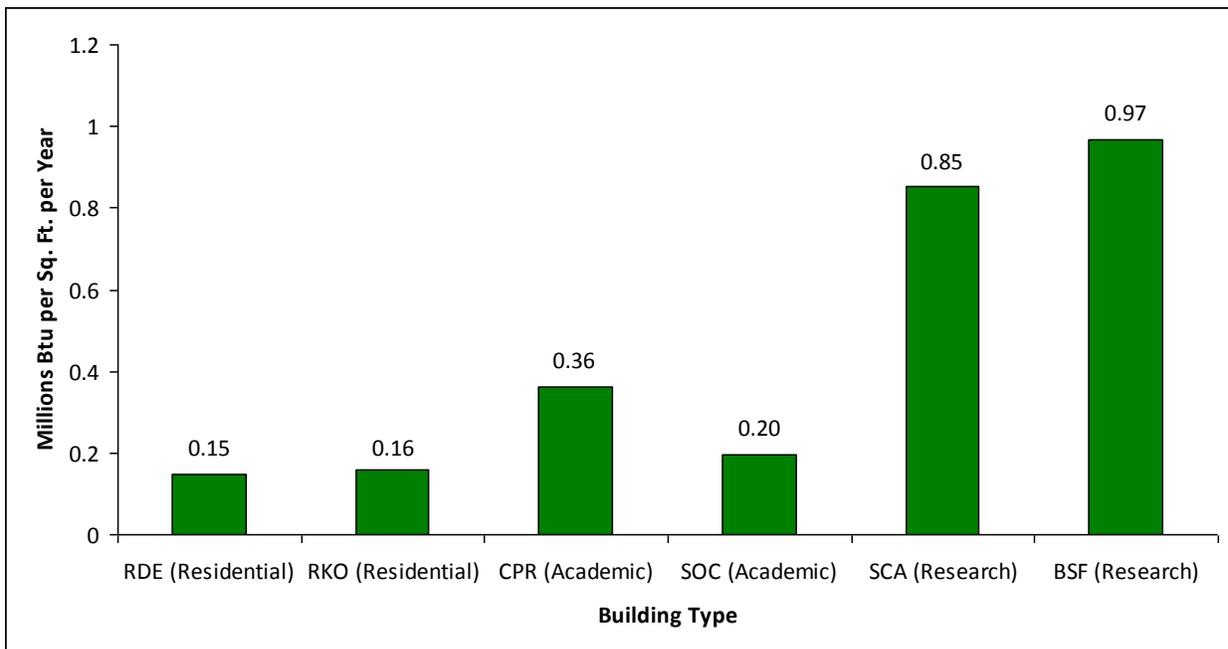


Figure 2.5. Examples of energy consumption by building type.

## *Brief History of Sustainability Initiatives at USF*

While the university has expanded over the past decade to accommodate greater numbers of students, faculty, and staff, it has continually sought to set and improve upon sustainable goals and practices, which have been described in the USF Tampa Campus Master Plan and its continuing updates since 1995. The commitment to sustainability extends to the off-campus community as well. In order to provide continued enrollment growth, the Campus Master Plan embraced Smart Growth, an important concept in sustainable design and building. The plan promoted using infill development, increased density, and parking lots as development sites in order to reduce sprawl, traffic, utility extensions, off-campus light pollution, and to minimize increases in impervious areas while preserving undeveloped land. In addition, a 125-acre cross-campus greenway was created to protect wildlife, link habitat islands, provide for passive recreation, and aggregate stormwater for ponds.

In the first 10 years of the 1995 plan, the university planted over 2,000 trees. To reduce off-campus traffic congestion, the university implemented a free off-campus shuttle system (powered by biofuel technology), negotiated free regional transit use for students, and substantially increased the quantity of on-campus residence halls. The university has consistently worked to construct bike lanes and sidewalks to improve on/off campus pedestrian and bicycle access and safety. In the past 10 years, over 4 miles of sidewalks and 4 miles of bike lanes have been constructed. USF has also been an active member of the New North Transportation Alliance since 1994, a transportation management organization that promotes alternative transportation options to reduce traffic congestion and improve air quality. And, in addition to increasing the number of recycling containers in campus buildings, USF has provided a community recycling center since 1990, available to everyone on the campus perimeter.

Energy conservation has also been a major priority since the early 1980s, from replacement of light bulbs to major central plant chillers. Over the past decade, USF has saved approximately \$10 million with the Greenlights (now “Energy Star”) replacement program and, despite continued growth in high energy demand research facilities, electrical consumption has been reduced by approximately 3 percent over the past six years for the entire Tampa campus. The average monthly kilowatt-hour per square foot has dropped from 1.833 in FY 2004-2005 to 1.607 in FY 2008-2009 (12.3 percent) while the therms per square foot has also dropped from 0.042 in FY 2004-2005 to 0.026 in FY 2008-2009 (38.1 percent).

More recently, USF St. Petersburg completed construction of a new Science & Technology Building, which has been awarded LEED GOLD certification. In addition, USF anticipates several buildings to be LEED certified on the Tampa campus, including the Dr. Kiran C. Patel Center for Global Solutions (under construction), the Interdisciplinary Science Building (under construction), the Wellness and Nutrition Center (in design), and the Athletics Basketball Arena (in design). Finally, all of the buildings for the newly designed USF Polytechnic Phase I Lakeland Campus are planned for LEED certification.

In 2006, Provost and Executive Vice President Ralph Wilcox hired Dr. Linda Whiteford (Professor of Anthropology) to serve as Associate Vice President for Academic Affairs and Strategic Initiatives, identifying campus and community sustainability as one of the key target areas for development and investment. In 2007, Dr. Whiteford convened a Sustainability Initiative Steering Committee consisting of 30 faculty, staff, and students from across the university serving on 14 different subcommittees engaged in a wide array of sustainability initiatives on campus. To date, these subcommittees have made significant strides in areas such as waste management, recycling, smart purchasing, energy conservation, water management, green building, greenhouse gas emission reductions, and food service improvements. The Steering Committee was integral to nurturing the development and implementation of several university-wide “green” initiatives that have continued annually since 2007. These included the ‘Conversation on Green Building’ (a public forum sponsored by the School of Architecture), the ‘Going Green Tampa Bay EXPO’ (a business EXPO with over 4000 attendees annually), ‘ConservaBull’ (a student housing energy challenge that resulted in over 40 percent energy savings in some residence halls), and several community-based research projects (partnering with the City of Tampa, the Lykes Corporation, and the East Tampa Redevelopment Office).

The Steering Committee was also a key player in advocating that USF join the ACUPCC and that it develop an Office of Sustainability, the latter recommendation emanating from a 2006 class project in the College of Business led by Sharon Hanna-West. In April, 2008, USF President Judy Genshaft signed the ACUPCC during the first annual Going Green Tampa Bay EXPO. The Office of Sustainability was subsequently created by Provost Wilcox in July, 2009 to manage USF’s climate impact assessment and reporting, as well as to serve as the single point of contact for sustainability programs and activities for USF. Dr. Christian Wells (Associate Professor of Anthropology) became the inaugural Director of the Office of Sustainability on August 6, 2009.

### *Overview of the USF Climate Action Plan*

Our university climate action plan describes the institutional and policy structure, including specific planning processes, that we will use to develop and implement a long-term climate change mitigation strategy. In addition to regional and global climate change benefits, we anticipate that our action plan will generate broader benefits to the campus and community. For example, energy efficiency programs lower costs while reducing greenhouse gas emissions. Increasing carpooling and public transportation reduces pollution and traffic congestion in addition to reducing carbon dioxide emissions. And reforestation and tree planting not only sequester carbon, but also reduce the amount of energy used for cooling buildings. In the development of our action plan, we consulted with stakeholder groups from across campus, analyzed and considered the scope of our greenhouse gas emissions, set goals and derived specific objectives to reach those goals, and established priorities for policy promulgation, action steps, and assessment. After a review of our greenhouse gas emissions inventory and an overview of our climate commitment, this document provides details on our strategies to enhance sustainability in five major categories: designed environment, built environment, transportation, energy, and consumption.



## Greenhouse Gas Emissions Inventory

### *Background*

In accordance with the ACUPCC, from 2008 to 2009, members of the Greenhouse Gas Emissions Subcommittee of the Sustainability Initiative Steering Committee undertook a year-long study of USF's greenhouse gas emissions based on data from FY 2007-2008. This effort was accomplished with the input of several key committee members including Robert Brinkmann, a faculty member in the Department of Geography; Jaclyn DeVore, an undergraduate student in Environmental Science and Policy; Sharon Hanna-West, a faculty member in the Department of Management; Sara Hendricks, a Senior Research Associate with the Center for Urban Transportation Research; Toufic Moumne of USF's Physical Plant; and Amy Stuart, a faculty member from Occupational and Environmental Health. In addition, key input was provided by several employees and students at USF, including students in Amy Stuart's class; Lisa Bonilla, Travel Manager, University Controller's Office; Lisa Corley, Financial Reporting, University Controller's Office; Nainan Desai, Assistant Director, Physical Plant; Donna Everhart-Reno, Travel Coordinator, Center for Urban Transportation Research; Rick Fallin, Transit Manager, Parking and Transportation Services; Deryl Wagner, Facilities Planning and Construction; Ed Hillsman, Senior Research Associate, Center for Urban Transportation Research; Brian Ippolito, Technology and Systems Manager, Physical Plant; Reena Raturi, Federal Grants Coordinator, Center for Urban Transportation Research; and John Shahbazian, Technology and Systems Analyst, Technical Services, Physical Plant. The efforts of these individuals were voluntary. No one was paid any extra dollars to complete this work and it must be noted that many individuals put in a significant effort to collect the data needed to complete the report.

Greenhouse gas inventories by their very nature are data driven. As the subcommittee went through this process, we found that the biggest problem in conducting the inventory was getting the full range of data needed to conduct a comprehensive inventory. Never in the history of USF would one imagine that we would need to keep records on the amount of fertilizers used on campus or the air travel miles of study abroad students. Thus, we must note that our inventory is not comprehensive. There were pockets of information we were unable to obtain. We make specific recommendations on how to improve data collection for subsequent inventories in the coming years.

Another problem we encountered is associated with the size and complexity of the campus. For example, USF has not only academically oriented organizations such as the various colleges and academic departments, but it also has several auxiliary offices such as Athletics (including the Sun Dome), Student Housing, Parking and Transportation Services, Food Service, the Post

Office, the Bookstore, the Credit Union, and the Research Park. Many of the records for auxiliary operations are kept separately from the main campus data and thus were not included in some of the details. In addition, the university keeps very different records between the main USF budget pool of dollars and USF Health. To keep this first inventory simple, we did not engage with USF Health in this process. The campus also has 85 acres sub-leased to entities such as Moffitt Cancer Center, Shriners Hospital, Pizzo Elementary School, and others that were not included. In addition, the university has four main campuses and additional off-campus operations. These operations were not included in this report. Instead, we limited our focus to the main Tampa campus to help ensure that we conducted a solid estimate of greenhouse gas emissions there while noting data collection problems in order to improve in future years.

Nevertheless, we were able to obtain a significant amount of information, particularly on energy consumption and travel to and from campus, traditionally the two big producers of university greenhouse gases. It comes as a surprise to many that student and faculty commuting is one of our biggest producers of greenhouse gases. While there is no doubt that we emit a significant amount of emissions due to energy use, the biggest impact to greenhouse gas emissions would be to significantly reduce faculty and staff automobile commuting. New plans, beginning in 2010, for the construction a regional light rail system with a connection to the Tampa campus promise to help significantly in this regard.

We have motivated individuals throughout the university who are thinking about the impact of USF within the overall discussion of how to reduce greenhouse gases globally. Thus, while this inventory does not provide a comprehensive review of all emissions, it does provide a starting point for future inventories. We provide several suggestions to improve data collection and management.

The inventory tool we used is the [Clean Air-Cool Planet](#) inventory tool suggested by the American College and University Presidents' Climate Commitment. It is an excellent tool for the construction of a comprehensive inventory. There have been some revisions to the database model over time and we used the most current model (version 7). The model is broken down into three emission categories called "scopes" in the model. Scope 1 consists of on-campus sources including cogeneration power plants, transportation, refrigeration, and agriculture. Scope 2 includes purchased energy and steam. Scope 3 includes indirect sources such as commuting and waste. It also includes offsets. Several categories within each scope are broken down into more detail. For example, commuting is broken down into several categories, such as student car and bus commuting, and faculty and staff car and bus commuting. Not all elements of the model were applicable to USF. For example within the commuting area, USF students, faculty, and staff do not commute using rail (yet!). Thus, this element of the model is left empty. Furthermore, several elements could not be determined. For example, we were unable to obtain a good figure on air travel by faculty, staff, and students, so we used the University of Maryland statistics as an estimate. Again, while we could not obtain appropriate data for some areas, we recognize that the intent of this first inventory is to conduct as good of a review as possible and to determine how to improve upon future greenhouse gas inventories.

## Emissions Sources

Several sources of emissions went into the development of the Clean Air Cool Planet model. Each is discussed below.

### Scopes 1 & 2: Electricity, Heating, and Cooling

USF purchases electricity and uses natural gas to provide air conditioning and heating on campus. The amount of electrical and natural gas use varies year by year and month by month. The amount of electricity purchased and the amount of natural gas used is shown in Table 3.1 and Figures 3.1 and 3.2. Note that there is a 15% increase in electrical use and an 8% increase in natural gas use over a five year period. It is interesting to look at the data monthly (Figures 3.3 and 3.4). It is clear that the warm summer months require the greatest energy use, with the more temperate late fall, winter, and early spring months requiring the least amount of electrical use. In contrast, the university uses the most natural gas in the winter months.

Table 3.1. Electricity and Natural Gas Used from 2003-2008.

<b>Fiscal Year</b>	<b>Electrical Use (KWH)</b>	<b>Natural Gas Use (Therms)</b>
2003-2004	150,433,616	3,507,443
2004-2005	162,293,405	3,770,267
2005-2006	167,992,627	3,638,174
2006-2007	163,800,943	3,683,523
2007-2008	177,334,805	3,827,309

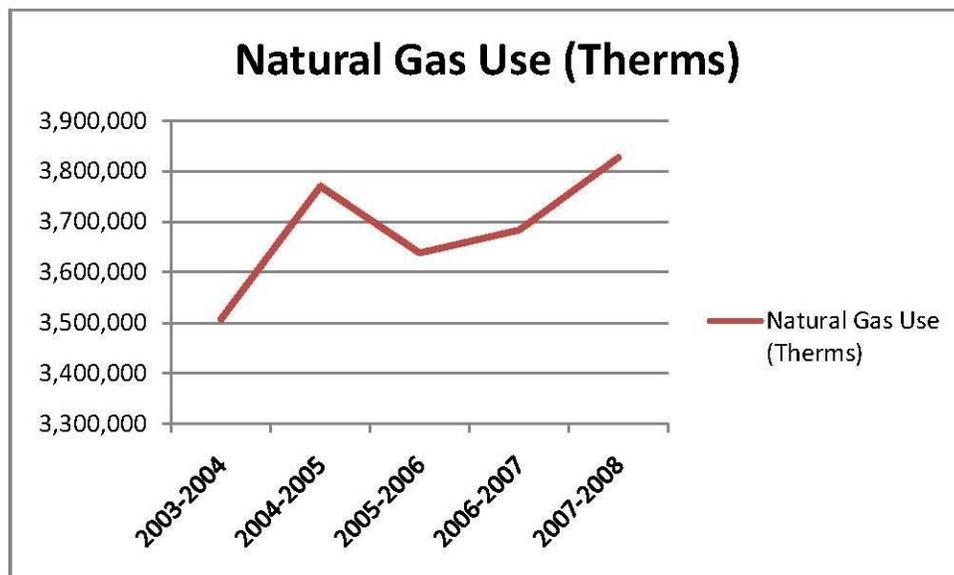


Figure 3.1. Electrical use at USF, 2003-2008.

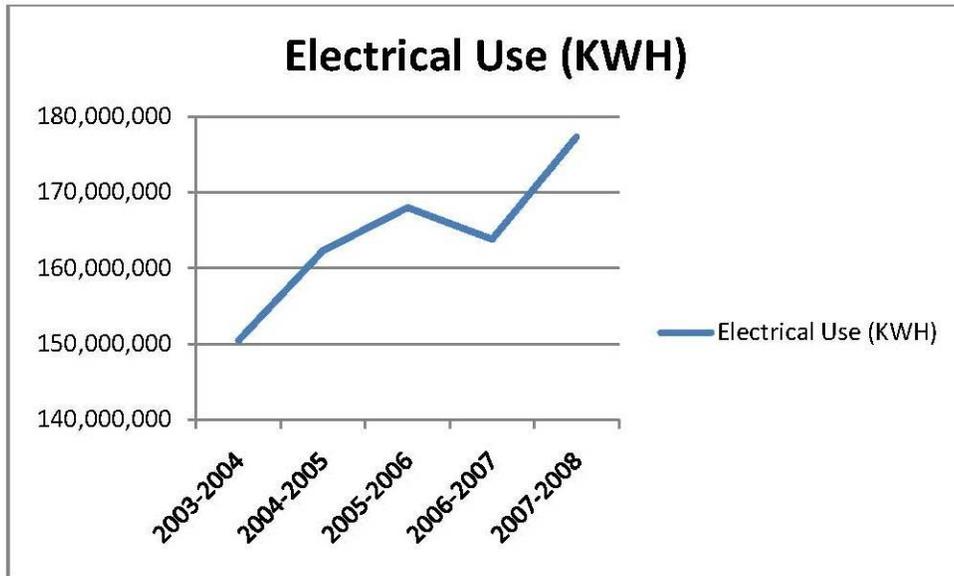


Figure 3.2. Natural gas use at USF, 2003-2008.

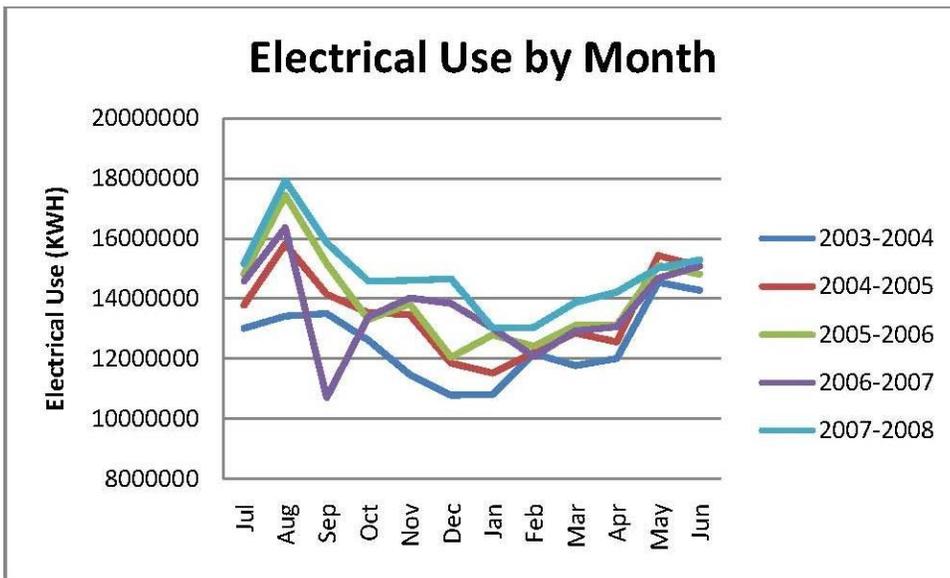


Figure 3.3. Electrical use by month on the USF Tampa campus, 2003-2008.

Scope 1: University Fleet Vehicles

While the university does not have a centralized fleet service, it does provide gasoline, diesel fuel, and biodiesel fuel for vehicles owned by a variety of campus departments. In 2007, the university fueled its vehicles with 83,819 gallons of unleaded gasoline, 15,262 gallons of diesel fuel, and 27,144 gallons of biodiesel fuel.

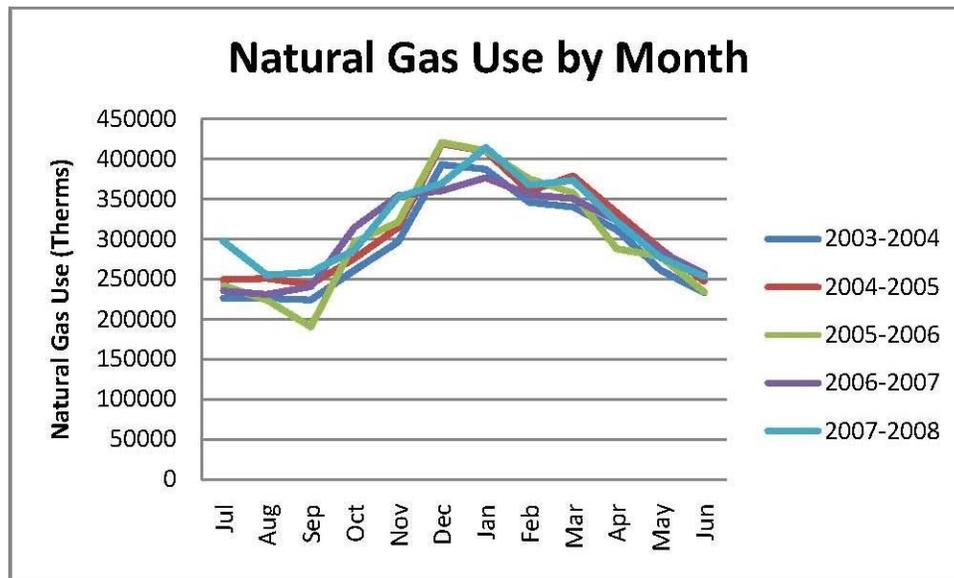


Figure 3.4. Natural gas use by month on the USF Tampa campus, 2003-2008.

Scope 1: Refrigerants and Coolants

As part of a graduate seminar, Dr. Amy Stuart’s class conducted a review of greenhouse gas emissions on USF’s campus from refrigerants and chemicals used on the main campus. The students were Angela Gilbert, Bridget Pullin, and Steffanie Wickham. The results of their work can be found in Table 3.2, which shows that the greatest impact is currently HCFC coolants.

Scope 1: Fertilizer Applications

USF has been reducing the fertilizer applications on the main campus. In 2007, 37,500 pounds of 18-0-10 fertilizer and 38,000 pounds of 9-0-24 fertilizer were applied. In contrast, in 2008, 2,500 pounds of 13-3-13 and 38,000 pounds of 9-0-24 were applied (Table 3.3).

Table 3.2. Refrigerant and Coolant Use on the USF Tampa Campus.

Fiscal Year	HFC-134a (lbs)	HFC-404a (lbs)	HCFC-22 (lbs)	R12-CCI2F2 (lbs)	HCFE-235da2 (lbs)	R11-CCI3F (lbs)
2004-2005			2500			600
2005-2006			2500			600
2006-2007	53		1916	4		400
2007-2008	14		2137	4		
2008-2009	2000	2	3034	4		

Table 3.3. Fertilizer Applications on the USF Tampa Campus.

<b>Fiscal Year</b>	<b>18-0-10 fertilizer (lbs)</b>	<b>9-0-24 fertilizer (lbs)</b>	<b>13-3-13 fertilizer (lbs)</b>
2007-2008	37,500	38,000	
2008-2009		38,000	2,500

Scope 2: University Sponsored Air Travel

USF air travel data were in a form that could not be used to compute air travel passenger miles; however, the University of Maryland air travel estimates were selected as a stand-in to provide a ball park figure to use in the model.

Scope 3: Faculty and Staff Commuting

One of USF’s largest contributors to greenhouse gas emissions is student, faculty, and staff commuting. While it is difficult to obtain precise figures on the exact number of miles our stakeholders commute each day, some general numbers can be calculated using data collected from the 2005 USF Master Plan, the 2007 Parking and Transportation Survey, and the 2007/2008 faculty and staff profile. The percentage of faculty/staff that drive alone is 83.7. The amount that carpools is 8 percent. On average, the percent of faculty and staff that use regional transit service provided by Hillsborough Area Regional Transit (HART) is 0.4. Computation for part time faculty/staff miles traveled uses similar figures except the trips per week is assumed at 7.5 trips per week (faculty and staff leave campus for lunches, shopping, etc., two to three times per week) with a round trip average of 15.4 miles. Even with accounting for two weeks of vacation, this totals 46,173,000 miles traveled in 2007.

Scope 3: Student Commuting

Student commuting numbers were derived from the 2007 Parking and Transportation Survey for the USF Tampa campus conducted by USF’s Center for Urban Transportation Research. Interestingly, 50% of students move their vehicle some time during the day before leaving campus for the day, 43% of students leave campus during the day to eat, and another 12.8% leave campus during the day to shop. Based on an assumption of 1.5 trips per student and 5 days per week, this computes to 7.5 trips per week. These trips can be derived over a 44-week per year academic calendar of 16 weeks for both Fall and Spring semesters and 12 weeks for Summer semester. On average, students drive 15.4 miles per round trip. Putting this together, the students drove an estimated 148,678,000 miles in 2007.

Scope 3: Outsourced and Study Abroad Travel

Unfortunately, we were unable to obtain clear information on outsourced and study abroad travel. USF is currently transitioning from a paper to an electronic data system. The travel office is behind on processing travel reimbursements and was not able to spend time providing the

data in a format we need. However, in the future, the new system should allow easy querying of data in order to obtain information on faculty, staff, and student travel. We know that air travel is a significant component of the greenhouse gas emissions. However, as a placeholder, we are using the 2007 travel figures from the University of Maryland at College Park, a similar-sized university. Their campus faculty, staff, and students flew an estimated 60,000,000 passenger miles. We believe that this is a conservative estimate for USF but is within the magnitude of what would be expected at a campus our size.

### Scope 3: Solid Waste

In 2007, USF produced 3,063 tons of waste and in 2008 we produced 3,135 tons of waste. Since most of USF's waste is transferred to an off-site waste-to-energy facility, the University has a modest net carbon reduction due to the fact that energy is produced from USF's waste.

### Scope 3: Wastewater

The University produced approximately 140 million gallons of sewage wastewater in 2007 and 128 million gallons in 2008. The wastewater is transferred to the City of Tampa wastewater treatment facilities where it undergoes anaerobic digestion.

### *Offsets*

USF has some parcels of land that could be used for carbon offsets. However, at this time, this land has not been officially designated as a carbon reservoir by the university. In addition, the university has not purchased carbon credits or developed any program for carbon offsets.

### *Limitations to the Model*

As mentioned previously, there are several limitations to this model. We have not yet examined cumulative lifetime emissions, for example. Another shortcoming is that we have not been able to track emissions from the transportation of waste, the emissions related to the construction of new buildings and other similar projects, or emissions associated with food production and distribution. At the micro level, we have not examined paper, ink, and printer toner usage.

Finally, the boundaries of this study were limited to the Educational and General Buildings of the Tampa campus; USF Health was excluded, as well as non-proximate properties and locations, including the Ecological Research Area, meeting space, and off-site research venues. The Ecological Research Area is important to consider in future planning because it is heavily forested and will provide offsets to some of the university's carbon emissions.

## Summary

In summary, the Tampa campus is *minimally* responsible for the annual production of 257,566 metric tons of greenhouse gases (Table 3.4). When USF-Health and all the auxiliary units are included, it is possible that the Tampa campus would be responsible for closer to 400,000 metric tons. Most emissions are within Scope 3, particularly within the realm of commuting and air travel (Figure 3.5). On campus stationary sources including natural gas use, direct (fleet) travel, and refrigerants and chemical emissions make up a smaller portion of the output of greenhouse gases (Figure 3.6). It must be noted that this is an estimate of the greenhouse gases produced. As this is the first year that we have collected data, we have found that there are areas, particularly travel, where data collection is quite difficult.

Table 3.4. Summary of Greenhouse Gas Emissions.

	2007	Energy Consumption	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	eCO <sub>2</sub>
		MMBtu	kg	kg	kg	Metric Tonnes
<b>Scope 1</b>	Co-gen Electricity	-	-	-	-	-
	Co-gen Steam	-	-	-	-	-
	Other On-Campus Stationary	368,352.0	19,432,682.7	1,943.1	38.9	19,488.9
	Direct Transportation	15,939.3	882,202.9	170.0	61.1	904.2
	Refrigerants & Chemicals	-	-	-	-	1,694.7
	Agriculture	-	-	-	143.1	42.4
<b>Scope 2</b>	Purchased Electricity	-	98,643,690.7	1,114.5	1,337.4	99,065.2
	Purchased Steam / Chilled Water	-	-	-	-	-
<b>Scope 3</b>	Faculty / Staff Commuting	259,422.0	18,190,805.1	3,638.7	1,252.4	18,645.2
	Student Commuting	839,032.1	58,841,688.8	11,731.7	4,039.7	60,307.3
	Directly Financed Air Travel	236,400.0	46,414,178.4	457.0	525.3	46,580.2
	Other Directly Financed Travel	-	-	-	-	-
	Study Abroad Air Travel	-	-	-	-	-
	Solid Waste	-	(112,300.5)	-	-	(112.3)
	Wastewater	-	-	47,155.2	228.8	1,152.3
	Paper	-	-	-	-	-
	Scope 2 T&D Losses	137,589.1	9,755,969.4	110.2	132.3	9,797.7
	<b>Offsets</b>	Additional				
Non-Additional						-
<b>Totals</b>	Scope 1	384,291.3	20,314,885.5	2,113.1	243.1	22,130.1
	Scope 2	-	98,643,690.7	1,114.5	1,337.4	99,065.2
	Scope 3	1,472,443.2	133,090,341.2	63,092.8	6,178.5	136,370.3
	All Scopes	1,856,734.5	252,048,917.5	66,320.4	7,759.0	257,565.6
	All Offsets					-
						<b>Net Emissions:</b>

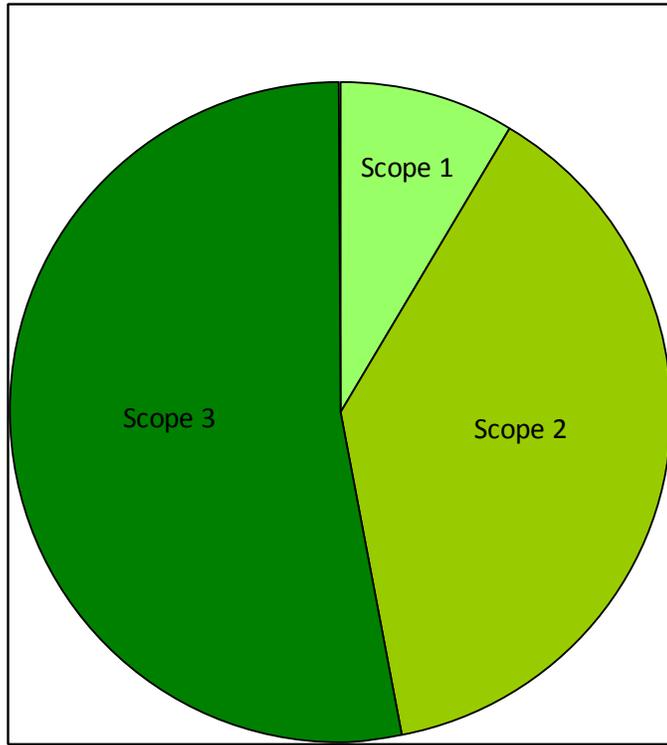


Figure 3.5. Distribution of greenhouse gas emissions by scope.

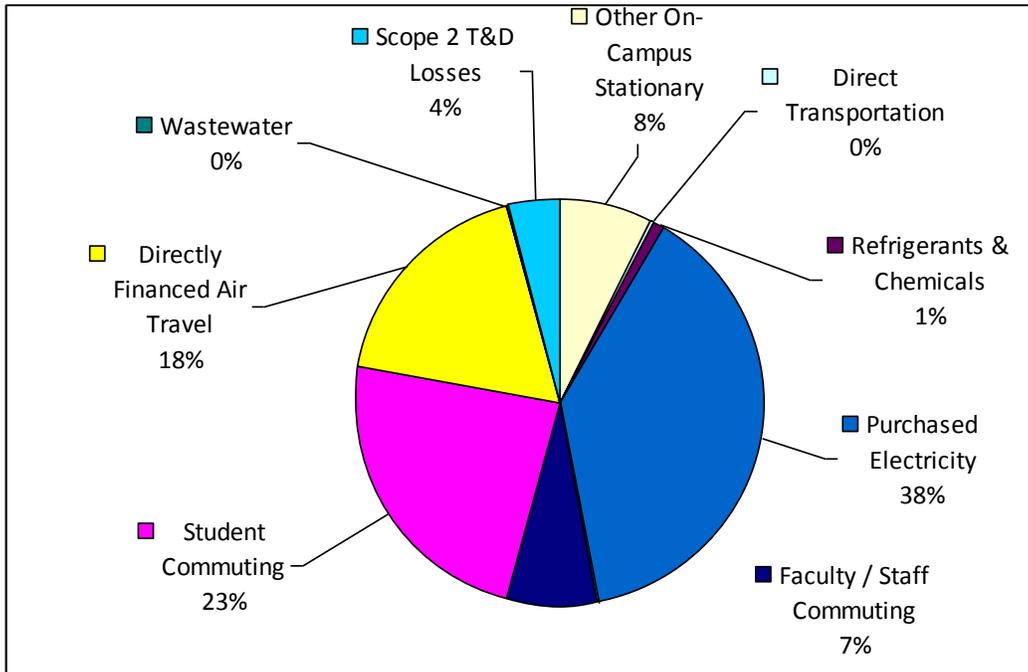


Figure 3.6. Distribution of greenhouse gas emissions by source.



## Impact Mitigation Strategies

### *Strategic Goals*

By the year 2050, the University of South Florida will emit 80 percent less carbon dioxide than it did in 2007 (Figure 4.1, Table 4.1). On the way to meeting this goal, USF has three critical benchmarks: 10% reduction by 2015, 20% reduction by 2025, and 50% reduction by 2040. Beyond 2050, and with the aid of carbon offsets (representing purchased RECs [renewable energy certificates], carbon offsets [CRTs, or carbon reduction tons], and increased carbon sequestration through the expansion of a long-term Greenway project), USF will be “climate neutral” by 2070.

Given uncertainties in developing renewable energy technologies, such as the burgeoning photovoltaics industry, as well as expected continued budget cuts by the State of Florida, it would be unwise to include complete reduction (elimination) of carbon dioxide in our model. As a result, we anticipate the need to use RECs and CRTs. It is unclear at this time in what ways and to what extent such offsets will be phased into the model.

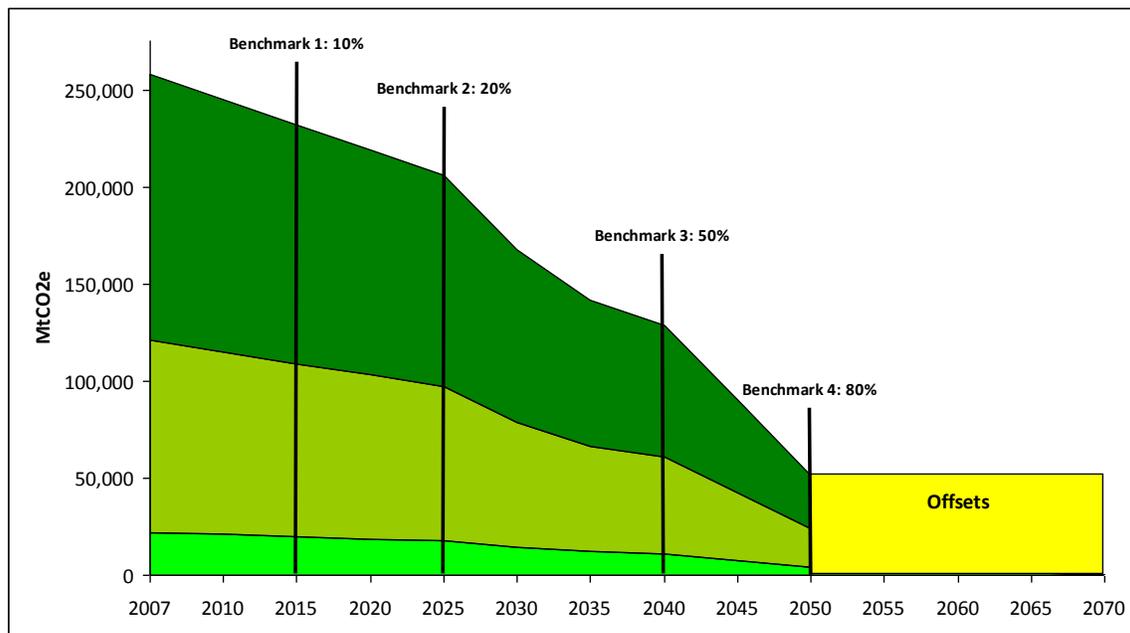


Figure 4.1. Long-term reduction plan for carbon dioxide emissions for USF Tampa (E&G).



## *Recent Accomplishments*

Since 2007, USF has made great strides in reducing its greenhouse gas emissions and making the campus and community a cleaner, “greener” place to live, learn, and work. Specific accomplishments are outlined in sections 5-9. Some of these accomplishments include:

- ♻️ USF and HART offer fare-free bus service on the HARTLINE system for USF students and reduced fares of \$0.25 for faculty and staff.
- ♻️ USF provides fare-free mass transit on and near campus with its vehicles fueled by bio-diesel, purchased from a vendor. To date, nearly 9 million riders have used the service, which is almost 1 million per year.
- ♻️ USF introduced a car sharing (“WeCar”) program on the Tampa campus in 2009.
- ♻️ USF was designated a “Best Workplace for Commuters” by the EPA.
- ♻️ USF has completed a high efficiency Green Lights program (now called “Energy Star”) on all campuses and in all buildings. All new construction is required to follow this standard.
- ♻️ USF has installed energy meters in each building for all utilities including electricity, gas, water, chilled water, and heating water to allow for monitoring and energy accounting, as well as for measuring success of energy management systems. The annual student competition, “ConservaBull,” pits student residence halls against one another to see who can conserve the most energy and water.
- ♻️ USF is replacing traffic signals with high efficiency LED systems.
- ♻️ USF has installed computerized irrigation systems with rain water sensing to optimize the use of irrigation water. At the same time, new landscaping emphasizes the use of local/native drought-tolerant plants.
- ♻️ USF collects its stormwater and spent water from cooling towers in ponds. Some stormwater is reused for landscape irrigation. Rainwater will be harvested for dual-plumbing in the new Patel Center for Global Solutions.
- ♻️ USF students can grow vegetables in their own plots at USF’s Botanical Garden, which also serves as the hub for numerous courses on sustainability, environmental literacy, and green building, many of which will become affiliated in USF’s new School of Global Sustainability.
- ♻️ USF re-roofing projects include increased roofing insulation and installation of a white cap with an SRI of 93 for high reflectivity and energy efficiency.
- ♻️ USF has a photovoltaic solar system for charging some electric golf carts. Retrofit kits for gas-powered carts are being modeled and tested.
- ♻️ USF has over 2,000 office containers and over 500 64-gallon containers that collect paper for recycling as well as 350 mixed recycling bins for plastic and aluminum; the university maintains a large scale community recycling center on campus.
- ♻️ USF is a member of the U.S. Green Building Council with numerous LEED accredited professionals on staff throughout the university; four buildings seeking LEED-certification are under design and construction on the Tampa campus.
- ♻️ For the past six years, Housing and Residential Education has contracted with Salvation Army trucks that come at the end of spring semester and park for move

out days in two prominent places in the residence hall areas so that residents can donate furniture, appliances, and clothing to the Salvation Army. In addition, academic departments and administrative offices participate in “furniture swaps” and buy used furniture, especially work stations.

- ♻️ Numerous student groups, such as Emerging Green Builders, Engineers for a Sustainable World, the Student Environmental Association, and Students In Free Enterprise, are actively involved in a range of sustainability initiatives on campus, including the annual Going Green Tampa Bay Expo and the Environmental Research Interdisciplinary Colloquium.

### *Institutional Leadership*

To achieve and implement the strategies outlined in this document, members of a university-wide Sustainability Initiative Steering committee determined that two key tasks must be accomplished if there is to be successful development and implementation of climate action strategies. First, the committee recommended the creation of an Office of Sustainability to organize and oversee the climate action plan and recommended strategies. This was accomplished in August, 2009. Second, the committee recommended that a School of Global Sustainability be created to organize academic and research opportunities for students and faculty. This was accomplished in January, 2010.

### Office of Sustainability

The mission of the Office of Sustainability is to coordinate and build partnerships for university-wide initiatives that advance the University of South Florida's strategic goal of creating a sustainable campus environment (Figure 4.2). To accomplish this mission, the Office actively supports faculty, staff, students, alumni, and neighborhood partners in their efforts to transform the University of South Florida into a 'Green University', where decisions—structural and routine—consider both individual and collective impacts to our campus, community, economy, and environment. As citizen-scholar activists, we share a sustainability ethic that promotes conserving resources, reducing waste, recycling and reusing materials, finding new sources of clean energy, increasing energy efficiency, and diminishing life-cycle impacts and our consumption of greenhouse gas producing materials. We engage in this ethic of stewardship to guide the development and implementation of programs, policies, and other courses of action in the operation and management of the University of South Florida as well as its institutional teaching, research, and service commitments.

The Office of Sustainability contributes directly to the USF Strategic Plan by strengthening and supporting integrated and synergistic interdisciplinary research across disciplinary, departmental, college and campus boundaries (Strategic Goal 1); building a sustainable campus environment at USF (Strategic Goal 2); constructing an up-to-date clearinghouse of information about all the sustainability engagement activities currently occurring at USF and encouraging

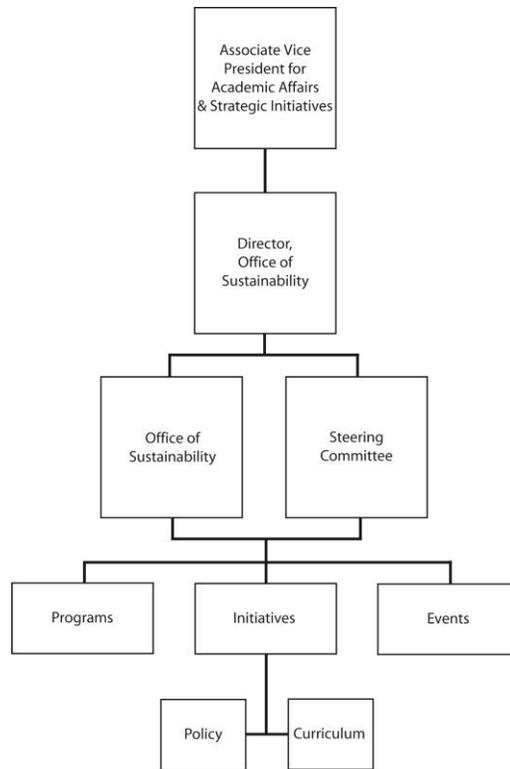


Figure 4.2. Organizational structure of the USF Office of Sustainability.

and rewarding faculty, staff, and student engagement in sustainability initiatives (Strategic Goal 3); and creating a sustainable environment to support an expanded and improved teaching and research mission, a more engaged residential community, and a university-based global village (Strategic Goal 4). Since its creation, the Office of Sustainability has made several important institutional gains:

- ♻️ Initiated the USF Office of Sustainability with a dynamic new website serving as the single point of contact for sustainability activities at the university
- ♻️ Developed a distinguished Advisory Council and university-wide Technical Advisory Board for the Office of Sustainability
- ♻️ Established a “Green Fund” (foundation account) with a gift from the TECO Energy Foundation to develop a sustainable fiscal base for the Office of Sustainability; a major fundraising event—“Go Green, Live Green, Give Green”—took place in 2010
- ♻️ Initiated several new programs to engage campus stakeholders, including a Sustainability Scholars program for undergraduates (co-funded with the Office of Undergraduate Research), a Sustainability Fellows program for graduate students (co-funded with the Provost’s Office), a Sustainability Mentors program to recognize the contributions of faculty and staff, and a Sustainability Teaching Grants program to enhance USF’s sustainability curriculum (co-funded by the Graduate School)
- ♻️ Maintained USF’s compliance with the ACUPCC by reporting a comprehensive GHG inventory

- ♻️ Drafted a formal policy for consideration by the USF President/Chief Executive Officer and the Board of Trustees to promulgate policies and procedures for implementing the recommendations outlined in the USF Climate Action Plan
- ♻️ Collaborated closely with the academic colleges and other units, Facilities Planning & Construction, Physical Plant, campus stakeholder groups (faculty, staff, and students), and community partners on numerous initiatives and activities in sustainability, including: ConservaBull (Emerging Green Builders), Refill-a-Bull (Students In Free Enterprise), and the Water-for-Miches project (Engineers without Borders), among others
- ♻️ Met with Tampa City Mayor and members of her staff and participated in numerous community initiatives to raise awareness about sustainability issues in the Tampa Bay region, including the “Energy, Environment, Economy Summit” and the Sierra Club’s 2010 “Earth Day Tampa Bay” festival
- ♻️ Joined ASU, UCLA, Penn State, and other select universities as a Charter Participant of the AASHE Sustainability Tracking, Assessment & Rating System — a voluntary, self-reporting framework for gauging progress toward sustainability for universities
- ♻️ Provided organizational leadership for the highly successful (ca. 4,000 attendees) 4th Annual Campus and Community Sustainability Conference and Going Green Tampa Bay Expo, which took place at the Marshall Center in October, 2009
- ♻️ Drafting MOUs with community partners to create actionable links between the Office of Sustainability and Tampa’s educational, nonprofit, and business communities
- ♻️ Worked with the Provost’s Office, Graduate School, and other university stakeholders to design the School of Global Sustainability and its inaugural MA degree program in Global Sustainability

### School of Global Sustainability

The School of Global Sustainability is an inclusive and holistic academic unit, based on integrated interdisciplinary research, scholarship, and teaching (Figure 4.3). Its strength derives from the committed involvement of faculty representing natural and social sciences, engineering, business, the humanities, arts, and health. The school is anchored in its E-campus Master of Arts program in Global Sustainability, but the vitality of the school is generated by performances, collaborations, courses, discussions, shared ideas, research, explorations, and engagements from all USF affiliated faculty and students. The School is managed by an Executive Director and staffed by affiliated scholars, some from the University of South Florida System and some from other universities as well as business, industry, government, and the non-profit sector from throughout the world. The initial degree program, in Global Sustainability, focuses on water. Other concentrations—including those dealing with food security and health, the designed and built environments, transportation, gender and ethnicity, global citizenry, climate change, coastal wetlands, the history of sustainable communities, the role of the arts in megacities, and the functioning of civic responsibility are planned for the future.

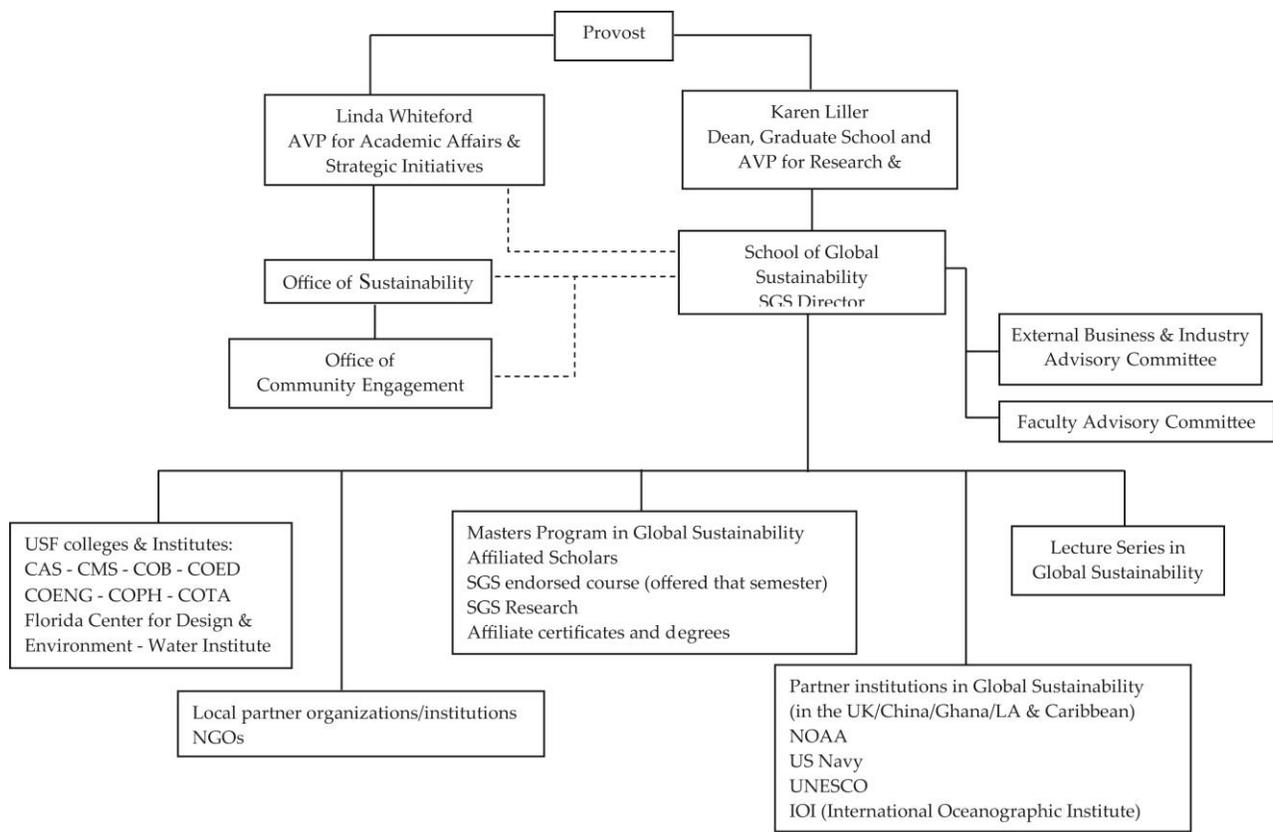


Figure 4.3. Organizational structure of the USF School of Global Sustainability.

In the future, it might be possible to develop a series of dual MA degrees, perhaps an MS degree, and even a doctoral program. It is possible to imagine funding opportunities, such as seed grants for faculty and students to conduct integrated interdisciplinary research, teaching, and creative activities. We hope that outreach to local and global communities will increase and that an External Advisory Board from business and industry will be created in addition to the Faculty Advisory Council. The School might also house post-doctoral appointments, develop university-wide symposia, and host visiting scholars.

Consistent with USF's Strategic goals of increasing Global Impact and Literacy, Interdisciplinary Integrated Inquiry, Community Engagement, and Student Success, the creation of a School of Global Sustainability fulfills the Sustainable Healthy Communities promise that has excited so many USF faculty and students over the past several years. In addition, it leverages USF's existing strengths to build on new opportunities. The recent collapse of the economy and the increasing concern over climate change, water quality and quantity, the experience of urban life, energy dependence, social equity, and environmental contamination and health have created remarkable new possibilities for faculty and students at the University of South Florida to help rebuild both the market and the planet.

The School of Global Sustainability reflects our commitment to transforming educational practice by leveraging existing intellectual capital, geographical location, emerging technologies, and our local and global partners. Key characteristics of the School include:

- ♻️ The School is rooted in our geographical as well as intellectual capital – Tampa Bay’s coastal shorelines, with two thirds of the State of Florida being surrounded by water; Florida has a critical need for fresh water, and a need to sustain our environment
- ♻️ USF offers renowned researchers in climate change, coastal environments, sustainable cities, health and society, STEM areas related to sustainability
- ♻️ The School brings it all together, providing an E-campus MA program, along with an on-campus intellectual center for shared engagement, facilitating the creation of integrated, interdisciplinary research teams
- ♻️ The initial emphasis is on global sustainability and water, but the School will evolve to reflect a broader focus on Sustainable Healthy Communities
- ♻️ FTE generated will follow participating faculty to their respective departments/colleges

Thus, the University of South Florida is poised to make a significant contribution to training students for the new “Green Economy” with a post-baccalaureate degree in Global Sustainability. Allied to USF’s new Office of Community Engagement and the Office of Sustainability, the School will collaborate with other university entities and partners such as USF World/Patel Center, the USF-UNESCO IHE, the USF Water Institute, the International Oceanographic Institute, NOAA, and the US Navy.

### *Academic Programming*

The University of South Florida has an abundance of academic programs that in some way deal directly with sustainability, environmental literacy, or with one of the pillars of the modern sustainability movement (Table 4.3).

### College of Arts and Sciences

There are several departments that explicitly focus on environment and/or sustainability. For example, in the natural sciences, the departments of Integrative Biology, Chemistry, Geology, and Geography all offer relevant courses, and their undergraduate and graduate degrees focus, in part, on environmental topics. In addition, students can major or take a graduate interdisciplinary degree in the Department of Geography called “Environmental Science and Policy.” In the social sciences, the departments of Anthropology, Geography, and Government and International Affairs each have specific environmental or sustainability research and curriculum themes. Likewise, there are many courses and degrees in the humanities that, in part, focus on the environment. In several departments, there are community based courses with service-learning opportunities and international educational opportunities for students.

Table 4.3. Examples of Academic Programs at USF in Sustainability and Related Topics.

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<b>Degree Programs</b>
<i>School of Global Sustainability, Graduate School</i> MA Program in Global Sustainability
<i>Department of Geography, College of Arts and Sciences</i> B.S. in Environmental Science and Policy B.G.S. in Environmental Policy and Management Graduate Certificate in Environmental Policy and Management M.S. in Environmental Science and Policy Ph.D. in Geography and Environmental Science and Policy Education Abroad Program in Climate Change and Sustainability
<i>Department of Civil and Environmental Engineering, College of Engineering</i> B.S. in Civil Engineering Dual degrees in B.S./M.C.E. and B.S./M.S.C.E. Interdisciplinary Graduate Certificate in Water, Health, and Sustainability Master of Science (M.S.C.E., M.S.E., M.S.E.V.) Master of Engineering (M.E., M.C.E., or M.E.V.E.) Master of Science International Peace Corps Program with Public Health
<i>Department of Management and Organization, College of Business</i> M.S. in Management: Leading Sustainable Enterprises M.B.A. Track in Building Sustainable Enterprise

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#### College of Behavioral and Community Sciences

The College of Behavioral and Community Sciences has a strong community focus at USF, and thus the expertise of many faculty members fits nicely within the community-based focus of sustainability.

#### College of Business

USF's College of Business has several programs focused on sustainability and many faculty are involved with research or teaching on environmental issues. A strong theme within the college is business sustainability and sustainable enterprises, and there are practical projects on which students can work.

### College of Education

The College of Education has a focus on science and environmental education, particularly within secondary education, but also including informal science education.

### College of Engineering

Many faculty in the College of Engineering have a research or teaching interest in the biophysical environment. In particular, the faculty in the Department of Civil and Environmental Engineering are highly active on a number of initiatives given the topical nature of the undergraduate major. There are international and community-based experiences available for students within the degree programs.

### College of Marine Science

The faculty members in the College of Marine Science in many ways focus on and contribute to environmental education and research. In particular, several faculty members have expertise or interests in global climate change.

### College of the Arts

Several faculty members in the College of the Arts have interests in the environment. In addition, several student and faculty projects have involved faculty from other disciplines to explore issues of sustainability and the environment. The Graphic Studio, The Institute for Research in Art, and the Contemporary Art Museum also have strong interests in environmental themes.

### Honors College

Students in the Honors College can take seminars on environmental topics taught by faculty in a number of different disciplines. In addition, many Honors students conduct senior projects that focus on sustainability and environmental issues.

### School of Global Sustainability

While the School of Global Sustainability is new, the school will help to organize the themes of sustainability emerging on campus within a coherent graduate degree.

### *The Road Ahead*

With institutional leadership in place and access to new lines of revenue and other resources, the University of South Florida has the capacity to persist—but cannot do so without the support of its students, staff, faculty, alumni, and neighborhood partners. The action steps

outlined in the remainder of this document emerged from collaborations among such stakeholders. To become effective change agents, these stakeholders will need to remain committed and engaged in the process in the years to come and to train new generations of citizen-scholar activists to continue the charge.

The most immediate need, as we begin to implement the recommended strategies, is to expand the 2007-2008 greenhouse gas emissions inventory with more complete, detailed information. We also need to carefully consider whether or not to include parts of the Tampa campus that have not yet been evaluated, particularly USF Health and the auxiliaries and direct support organizations, such as the Marshall Student Center, the Sun Dome (Athletics), and sub-leased lands and facilities. These units are not administered centrally; however, USF System policies could impact their behaviors. Having an organized, systematic way to monitor our greenhouse gas emissions over time is a crucial first step to enact this climate action plan.



## Action Steps for the Designed Environment

### A. Campus Design

#### *Vision*

The campus will be an interconnected system of open public spaces, quads, courtyards, and pedestrian concourses that are defined by coherent building edges. Progressive increases in campus density by infill with taller buildings and smaller building footprints will enhance campus vitality, conserve limited land resources, and animate the functional connections between areas of the campus. A clear circulation system, including new pedestrian connections, will be established and existing walks, shade trees, and wayfinding signage will be increased.

#### *Accomplishments*

More than half of the buildings constructed over the past decade have been four stories or greater; several are seven stories. Major public spaces, quads, courtyards, and pedestrian concourses that have been built include: MLK Plaza, Sessums Pedestrian Mall, Marshall Student Center Plaza, and the quads at Cooper Hall, College of Education, and College of Engineering. Other road, bicycle, and pedestrian improvements have been on-going.

#### *Opportunities*

Building height can be maximized in order to reduce impervious areas and conserve land. Densification of the overall campus can be achieved by strictly minimizing building footprints through continued infill planning and construction in the campus core. Pedestrian and bicycle connections and improvements can be continued and increased throughout campus and to off-campus systems.

#### *Barriers*

The primary barrier to reaching our goals for campus design is the funding structure. Relatively small increments of funding, often in phases, frequently preclude buildings reaching their maximum height.

#### *Recommendations*

Create a formal procedure to identify specific campus improvements that can be done with each major project to improve campus connectivity.

#### *Assessment*

Facilities Planning and Construction, Campus Development Committee

## **B. Open Space Network**

### *Vision*

While the basic open space network of the campus is defined by streets and buildings, its character and the way that it is perceived are determined largely by the landscape treatment of open spaces. The overall landscape intent will be to create a cohesive network of designed open spaces—both naturalistic greenways and the formal architectonic spaces—that are characterized by simplicity, restraint, and harmony among the various parts of the landscape. Fostering a consistency in landscape materials, form, and organization will collectively result in a coherent and sustainable campus environment.

### *Accomplishments*

The Greenway has been incrementally developed through the phased implementation of the stormwater management plan, the implementation of related landscape improvements, development of built edges through decisive placement of future buildings along the edges of the Greenway, and completion of circulation routes linking one area of the Greenway to another. These efforts have resulted in linking habitat islands, reducing heat islands, improving students' direct relationship with local flora and fauna, and providing increased opportunities for both active and passive recreation and improved pedestrian flow. In addition, parts of the Greenway (especially the forestry reserve, recreational forest, and Botanical Garden) actively sequester carbon dioxide and thus provide offsets for the campus' carbon footprint.

### *Opportunities*

Assure that the specific projects implemented within the campus are consistent with, and contribute positively to the overall development and the larger context of Xeriscaping.

### *Barriers*

The principle barrier is funding as well as continued use of the Greenway for construction staging, temporary parking, and existing paved parking lots.

### *Recommendations*

Create and implement a resolution or policy recognizing that each future development project presents its own set of specific and unique opportunities and constraints, and should therefore be undertaken in context with the local landscape and future planning in mind. Seek to replace existing parking lots in the Greenway with vegetation and water. Create a policy that will effectively preclude the Greenway land from being used for temporary parking and construction staging.

### *Assessment*

Facilities Planning and Construction

## **C. Greenway Expansion**

### *Vision*

The Greenway will be completed by expanding and enforcing the naturalistic parkland, the integration of the Botanical Garden, and incorporating or removing existing breaks, such as parking lots. The Greenway is important for the passive recreational use of students, faculty, and staff. USF needs to be a “must see” for tourists when visiting Tampa, for a beautiful walk to the Botanical Garden through the Greenway.

### *Accomplishments*

Greenway preservation of open space and retention ponds has been partially implemented.

### *Opportunities*

USF is a dense urban campus with the beginnings of a diagonal greenway system. Jogging and walking paths must be extended throughout the completed greenway system. The USF Botanical Garden could serve to anchor the Greenway, creating a biologically diverse environment with which the campus community and public is constantly in contact. The Greenway should be designed in keeping with xeric and native vegetation to limit labor and maintenance demands and be a permanent showcase for environmental sustainability at the university. Eliminate surface parking lots, which impede the completion of the Greenway open space system for the beneficial effects of reducing runoff and heat island effects while increasing the cooling effects of a vegetated landscape with ponds.

### *Barriers*

Currently, funding of non-building projects through infrastructure has consistently been insufficient to meet need. The Greenway is interrupted in several locations by parking lots convenient to certain buildings. There is also a perceived loss of parking capacity, despite replacement in parking structures. Continued use of Greenway for construction staging and temporary parking lots is very destructive to micro-habitats.

### *Recommendations*

Complete the cross-campus greenway system, dedicate as a no-build, no-disturb zone. Policies are also needed to preserve the existing tree inventory. Explore opportunities for the Botanical Garden to cultivate xeric plant and tree material for the Greenway, major projects, and Physical Plant grounds. Dedicate heavily forested areas of campus as conservation preserves for carbon offsets. Study parking inventory to compare parking capacity before the construction of parking garages to determine capacity ratios.

### *Assessment*

Facilities Planning and Construction, Botanical Garden

## **D. Integrated Landscape**

### *Vision*

An integrated landscape framework will be established through a systematic approach to implementation, which emphasizes the formation of the larger campus framework over the independent development of building specific landscape treatments. The highest priority will be given for the implementation of landscape improvements to complete the Greenway, Central Quadrangle, Leroy Collins Boulevard terminus, and Sessums Pedestrian Mall (Master Plan Policy 16.1.1).

### *Accomplishments*

Over 2,000 trees have been planted on campus in the last 15 years. Nearly 180 donated trees have been planted along Leroy Collins Boulevard and other pedestrian paths on campus. The shaded western extension of Sessums Pedestrian Mall from the College of Engineering to the new 1,000-bed residence Hall at Magnolia was completed in the summer of 2009. A total of 13 large live oak trees were saved and relocated from the construction site (a former parking lot) for the new Visual & Performing Arts Building project.

### *Opportunities*

Continue to include supporting landscape with each construction project. Continue to seek funding to reinforce the integrated landscape framework.

### *Barriers*

Funding, and tree removal due to construction.

### *Recommendations*

Continue to seek funding to reinforce the integrated landscape framework. Establish a tree replacement policy when trees must be removed due to construction.

### *Assessment*

Facilities Planning and Construction, Campus Development Committee

## **E. Forestation**

### *Vision*

The existing tree canopy on the campus will be protected.

### *Accomplishments*

Since 1995, over 2,000 trees have been planted. Trees on construction sites are barricaded at the drip line of the canopy to prevent parking and storage of materials underneath. These activities compact the soil and prevent adequate rainwater from reaching the roots.

### *Opportunities*

Limit destruction of campus trees. When unavoidable, require projects to relocate or replace trees.

### *Barriers*

None identified

### *Recommendations*

Develop a tree replacement policy that applies to all entities and projects that cause loss of or damage to trees.

### *Assessment*

Facilities Planning and Construction, Student Environmental Association

## **F. Xeriscape Development**

### *Vision*

The use of xeric landscaping techniques, including the maintenance or installation of selected vegetative species, low or no irrigation, and compact hydrazone concepts will be required for all new building and ancillary facility construction.

### *Accomplishments*

Since 1995, the use of drought-tolerant, native plants has increased. The new Patel Center for Global Solutions landscape design is the first project to fully commit to full xeric and natural plant materials.

### *Opportunities*

Require xeric landscape assessment and implementation on all future projects.

### *Barriers*

None identified

### *Recommendations*

Explore opportunities for the Botanical Garden to cultivate xeric plant and tree material for the Greenway, major projects, and Physical Plant grounds. Require xeric landscape assessment and implementation on all future projects.

### *Assessment*

Facilities Planning and Construction, Botanical Garden

## **G. Waterscape Improvement**

### *Vision*

A sufficient stormwater management system will be provided in a design that is consistent with and enhances the Master Plan, and strive to reduce stormwater outfall volumes (Master Plan Objective 9A.1). The University will identify the stormwater detention and greenway systems as a “no build” zone, except for recreation support facilities (Master Plan Policy 9A.1.1). The stormwater areas reserved in the Greenway will be retained for future ultimate growth needs (Master Plan Policy 8.3.4). The University will affirm a belief that naturalistic parklands are necessary to the quality of urban life and that the institution seeks continuity with the natural communities and processes that support human life. The University will ensure that the Greenway reflects design for the future by connecting to the Ecological Research Area and that adjacent spaces are developed appropriately (Master Plan Policy 8.3.3).

### *Accomplishments*

Aggregated campus-wide stormwater system is being implemented. Cisterns are being constructed for storage and re-use of water before it goes into the stormwater system. There is currently a pilot stormwater reuse project at the USF Golf Course.

### *Opportunities*

Harvest stormwater from retention ponds to use for irrigation rather than continued off-campus runoff and aquifer depletion.

### *Barriers*

Due to competing needs, Capital funds for implementation are only prioritized when more on-campus retention is required by SWFWMD for continued construction.

### *Recommendations*

Study cost for implementation of rain water harvest systems for irrigation.

### *Assessment*

Facilities Planning and Construction, Department of Civil and Environmental Engineering

## **H. Irrigation**

### *Vision*

Removal of water from the aquifer for irrigation will be reduced.

### *Accomplishments*

An aggregated stormwater retention system has been developed and rain sensor irrigation controls have been installed. The use of xeric plant materials has increased.

### *Opportunities*

Harvest stormwater from retention ponds to use for irrigation. Construct cisterns for additional storage capacity. Require xeric landscape on all projects.

### *Barriers*

Additional funding

### *Recommendations*

Harvest stormwater from retention ponds to use for irrigation. Construct cisterns for additional storage capacity. Require xeric landscape on all projects.

### *Assessment*

Facilities Planning and Construction, Physical Plant

## **I. Conservation**

### *Vision*

The university will be a model for conservation policies to improve the environment and to improve air, water, and open space quality on campus and in the vicinity of the campus.

### *Accomplishments*

The Campus Master Plan emphasizes sustainable practices in land use, energy consumption, conservation, landscape, recycling, transportation, and so on. The construction of new buildings to greater heights has reduced land area consumption by building footprints. Impervious areas and the heat island effect have been reduced with conversion of surface parking lots to building sites and recreation fields by structuring parking.

### *Opportunities*

The University can continue to improve air, water, and open space quality by reducing traffic volume and idle time, increasing water storage and re-use, preserving open space for conservation, and erecting any new buildings compactly so as to consume less land.

### *Barriers*

First cost

### *Recommendations*

Research and create effective policies for reducing traffic volume and idle time, increasing water storage and re-use, preserving open space for conservation, and erecting any new buildings compactly so as to consume less land. Implement a new policy requiring that the design, renovation, and new construction of all building projects must meet LEED standards.

### *Assessment*

Facilities Planning and Construction, Physical Plant, Center for Urban Transportation Research



## Action Steps for the Built Environment

### A. Reuse, Renovate, and Retrofit

#### *Vision*

The carbon footprint contributed by new major construction activity will be reduced by reusing, renovating, and retrofitting existing structures.

#### *Accomplishments*

There have been major renovations to several buildings including Chemistry, Education, Science Center, and Kopp. There are three LEED Accredited Professionals on Facilities Planning and Construction staff. Several roofs (including the library) have been replaced with high insulation and reflectivity values. Sunscreens on southern window exposures continued to be installed along with high efficiency glass. USF is developing an IT networked centralized remote building energy management/control and individual building metering of energy and water use and centralized data collection. The university is conducting Life cycle analysis (Florida Commercial Building Energy Computational Program) on its construction materials and are developing standards in building insulation values for walls, roofs, windows, motor and equipment efficiencies, mechanical systems insulation, and controls for HVAC and lighting.

#### *Opportunities*

Whenever possible, existing structures should be renovated for new purposes rather than building new structures.

#### *Barriers*

One of the primary barriers to implementing green building practices, apart from return-on-investment cost, is the cultural value for preference of "new" over "old," and a "clean slate" approach rather than added complexity of renovation. The campus cultural perspective must change to respect and find value in older structures for historic context and to recapture embedded energy.

#### *Recommendations*

Revise Facilities Planning and Construction "Design and Construction Guidelines" and the USF Campus Master Plan to identify historic buildings for restoration and renovation for reuse and existing structures that can be re-purposed. Develop a "Green Building" policy that favors reusing, repurposing, and retrofitting existing constructions with aesthetically pleasing designs that people will want to take care of and preserve.

## *Assessment*

Facilities Planning and Construction, Physical Plant

### **B. Green Building**

#### *Vision*

Higher green building standards will be adopted for all campus buildings. Buildings will be designed by leading firms with proven records of high performance architecture. LEED certification will be required for all new major construction and renovation projects with the goal of achieving the highest LEED certification possible.

#### *Accomplishments*

USF anticipates several buildings to be LEED certified: Dr. Kiran C. Patel Center for Global Solutions, Tampa Campus (under construction); Interdisciplinary Science, Tampa Campus (under construction); Science & Technology Building, St. Petersburg Campus (under construction); USF Polytechnic Phase I, Lakeland Campus (in design); and Wellness and Nutrition Center, Tampa Campus (in design).

#### *Opportunities*

As a matter of policy, all new building projects must be evaluated on a cost/benefit basis, including sustainability issues in full consideration of longer-term environmental, energy consumption, and maintenance impact. The Facilities Planning and Construction “Design and Construction Guidelines” can be updated to incorporate more sustainable features. Although practices currently are in place to create more energy efficient buildings, renewable energy options/requirements for solar cells, purchased energy agreements, water efficiency practices, and so forth, can be greatly improved. Green building practices must become a part of the campus building program.

#### *Barriers*

Given a choice between more floor space and improved mechanical equipment/building envelope/and other sustainable aspects, more space is typically the priority.

#### *Recommendations*

Adopt sustainable construction practices as a university policy by incorporating the USGBC LEED certification process in the Facilities Planning and Construction “Design and Construction Guidelines.” These practices should include equipment and systems that can be operated, maintained, and replaced with minimal impact to the facility structure and occupancy. Buildings should be designed and constructed for longevity and flexibility. Emphasis should be shifted from maximizing square footage to greater investment on the building envelope as a more permanent legacy (in addition to more practical cost saving in reduced maintenance and repair cost over time, which can then be used to seed further investments in efficiency).

## *Assessment*

Facilities Planning and Construction, School of Architecture and Community Design

### **C. Building Materials**

#### *Vision*

USF facilities will be constructed with low-maintenance, local (within 500 miles according to USGBC LEED), durable, and sustainable materials.

#### *Accomplishments*

The appropriate credits under all LEED registered projects have been achieved. Concrete has been used extensively as a structural material on campus. Locally produced brick and stucco have been used extensively. The university is currently commissioning the building envelop for the Music building. This process eventually will be extended to all buildings on the Tampa campus.

#### *Opportunities*

Many local and domestic materials are available versus using materials that are shipped from great distances. The use of unfinished concrete in campus buildings can be expanded. Other locally produced materials, brick, southern pine, tile, panel systems, insulation, and so forth, should be investigated before ordering. Purchasing locally made products from local vendors would enhance the economic sustainability of the State.

#### *Barriers*

Locally found materials can be of inferior quality. In this case it may be desirable to use a material from a long distance that performs better according to LCA. Longer term life cycle analysis should be based on quantifiable cost rather than on an anecdotal basis. Such analyses need to include long term operation and maintenance concerns.

#### *Recommendations*

Perform a thorough analysis of building material manufactures and producers within a 500 mile radius of Tampa. Use materials from these producers if they are of acceptable quality and are superior based on Life Cycle Assessment. Revise Facilities Planning and Construction “Design and Construction Guidelines” to include sustainable design methods and the use of durable materials. Require the incorporation—to the maximum extent possible—of all passive design opportunities, such as solar orientation, sunscreen, and so on.

## *Assessment*

Facilities Planning and Construction, College of Engineering

## **D. “Smart” Masonry**

### *Vision*

In order to have a campus that reflects the image of a great university, a commitment to materials of permanence and quality is required. This does not mean a lack of concern for economy. Quality construction must mean long-term cost effectiveness over the life cycle of the buildings. Exterior wall materials should provide a cohesive and consistent architectural character. To help unify the campus visually, masonry materials are required to be used in designs for exterior building surfaces. The term masonry includes natural and manufactured materials such as cut stone, architectural concrete, and brick.

### *Accomplishments*

There is an existing character of campus consisting of exposed concrete frame and brick infill. The early 1960s campus buildings, with post and beam concrete structures and brick infill, are relatively low maintenance and have a distinct architectural character considered bland by many. The major buildings constructed since 1990 have incorporated a richer palette of paint, brick, and other materials. Particularly, color has been used to create a base for the buildings at the pedestrian level and also has been used to emphasize entry elements.

### *Opportunities*

Reduce maintenance cost, material cost, and waste using architectural precast with integral color in lieu of painted stucco. Use low maintenance materials such as brick, unfinished concrete, unfinished concrete block, tile, aggregate panels, and other natural metals for exterior surfaces. When stucco assembly must be used, reduce maintenance cost, material cost, and waste using stucco with integral color instead of painting. As buildings become obsolete and need to be replaced, care should be taken to salvage and reuse old materials in new building projects. Buildings can be designed for deconstruction so that old components can be reused in new buildings. Cavity wall construction for masonry has been proven to reduce water intrusion and long term maintenance costs.

### *Barriers*

Many of the high maintenance materials currently used on campus are chosen based on low upfront cost. The upfront cost of some low maintenance materials may be relatively high. Some new materials may have excellent environmental characteristics but may not be preferred because they are unfamiliar or relatively untested. Those in charge of specifying and purchasing must stay informed of the latest materials technologies available and make well informed decisions in consultation with LEED Accredited Professionals. Building materials must be chosen based on Life Cycle Assessment [LCA], which is critical in determining sustainability.

### *Recommendations*

Emphasize in the Campus Master Plan and the Facilities Planning and Construction “Design and Construction Guidelines” the desire for a consistent palate of durable exterior finishes to include masonry products thereby promoting a visually and texturally unified campus. Life cycle cost analysis should be done on building materials and include: first cost, shipping (fuel and

emissions), maintenance, fossil fuel depletion, nonrenewable resource use, global warming potential, water and air pollution, low VOC, and energy efficiency. Particularly when imported materials are proposed, they must be proven preferential based on life cycle cost and carbon neutrality. Based on Life Cycle Analysis, low cost but high maintenance, labor intensive, material intensive building materials like painted stucco should be avoided in favor of low maintenance, durable materials even if the upfront cost is higher (such as cavity wall masonry construction).

#### *Assessment*

Facilities Planning and Construction, College of Engineering

### **E. Materials Conservation**

#### *Vision*

The least amount of material possible will be used for new constructions to minimize the carbon footprint, initial cost, and long-term maintenance wherever appropriate to building type.

#### *Accomplishments*

Stained concrete floors have been used throughout the campus as well as unpainted materials such as brick, concrete blocks, metal, and concrete.

#### *Opportunities*

Floor finishes can be eliminated in favor of stained concrete floors. Alternative (terrazzo flooring) and recycled (carpet) flooring can be installed for new projects. New roofing systems eliminate the need for asphalt. Materials that do not require additional finishing can eliminate the need for painting and regular maintenance. Exposed concrete, brick, tile, non-corroding metals, and architectural concrete with integral color can be used for the exterior walls of buildings. The use of acoustic ceiling tiles can be reduced in new buildings.

#### *Barriers*

Barriers include some building code provisions, as well as the aesthetic desires of the users.

#### *Recommendations*

Revise the Facilities Planning and Construction “Design and Construction Guidelines” to include sustainable design practices focused on materials conservation.

#### *Assessment*

Facilities Planning and Construction, School of Architecture and Community Design

## **F. Materials Recycling**

### *Vision*

The University will recycle and / or salvage construction, demolition, and land clearing waste as practical and possible (Master Plan Policy 9D.2.2).

### *Accomplishments*

Recycling of demolition and construction materials is in place. Recycled content in construction materials are being used increasingly.

### *Opportunities*

Reuse waste concrete as fill substrate. Collect waste gypsum board, acoustical tile, and carpeting for reuse in manufacturing. Collect steel for recycling. Furniture systems can also be recycled.

### *Barriers*

Much of these practices are under the control and supervision of the demolition contractor.

### *Recommendations*

Revise the Facilities Planning and Construction “Design and Construction Guidelines” to include specific requirements of materials recycling. Develop and implement a policy for agreements on materials recycling that must be established between the university and the demolition contractor prior to contracts being confirmed. For example, the university might offer performance incentives to demolition contractors to recycle more than they are required to.

### *Assessment*

Faculties Planning and Construction, Physical Plant

## **G. Recycled Content Materials**

### *Vision*

The use of recycled content materials will be increased by diverting them from the waste stream on major construction and renovation projects.

### *Accomplishments*

Recycling of demolition and construction materials is in place. Recycled content in construction materials are being used increasingly.

### *Opportunities*

Concrete made with fly ash makes use of a waste product while reducing carbon dioxide emission. Crushed concrete can be used for sub-base in roads, sidewalks, and parking lots. Metals are readily recycled, durable, and low maintenance. Plastics are often recycled into building materials. Recently, biomasses polymers have become available and are very desirable

for their recyclability by natural processes. Interior partition systems made of recycled materials such as paper pulp and plastics with integral finishes can replace drywall and steel studs as well as paint or wallpaper. These systems are made to be dismantled and can substantially reduce material waste and labor at the time of demolition for remodeling. Buildings can be constructed so as to be easily disassembled such that its components are reusable in new buildings.

#### *Barriers*

Those at USF in charge of ordering building materials and reviewing proposals must be aware of the properties of available alternatives and their ability to be recycled.

#### *Recommendations*

Revise the Facilities Planning and Construction “Design and Construction Guidelines” to include a requirement for evaluation of recycled and readily recyclable building materials for use in new buildings and building renovations.

#### *Assessment*

Facilities Planning and Construction, Purchasing and Property Services

## **H. Renewable Building Materials**

#### *Vision*

The use of materials made from rapidly renewable resources and materials will be maximized.

#### *Accomplishments*

The use of rapidly renewable materials is increasing on campus.

#### *Opportunities*

Rapidly renewable materials are becoming increasingly available due to demand generated by awareness of sustainability.

#### *Barriers*

First cost of some of these materials is still somewhat high, because supply is not keeping up with demand.

#### *Recommendations*

Revise the Facilities Planning and Construction “Design and Construction Guidelines” to include sustainable construction practices in terms of rapidly renewable materials use.

#### *Assessment*

Facilities Planning and Construction, College of Engineering

## **I. Biodegradable Materials**

### *Vision*

The use of materials that are naturally biodegradable will be maximized.

### *Accomplishments*

None known

### *Opportunities*

Use materials that naturally decompose. This applies to wood, wool, cotton, paper, jute, and other organic materials. Recently, biodegradable plastics have been developed. Several examples of biodegradable insulation made of natural (e.g., soy, biomass) and recycled (e.g., clothing, newspaper) materials exist.

### *Barriers*

Biodegradable building material research is still in a relatively early stage, although significant advances have been made in the area of biopolymers and insulation materials. Availability of biodegradable building materials is still relatively small.

### *Recommendations*

Revise the Facilities Planning and Construction “Design and Construction Guidelines” to include requirement for evaluation of biodegradable building materials for use in new buildings and building renovations.

### *Assessment*

Facilities Planning and Construction, College of Engineering

## **J. Building Orientation**

### *Vision*

Daylighting strategies will be maximized to reduce dependence on electrical lighting while minimizing heat gain. Building design, including orientation, overhangs, screens, and other measures will be used to minimize the use of energy for HVAC systems, while minimizing need to increase lighting.

### *Accomplishments*

Most new building constructions maintain an east-to-west orientation. Sunscreen solar controls have been established for south facing windows. There is an increased use of high efficiency glass in new building projects.

### *Opportunities*

Reducing energy use for lighting in buildings and choosing appropriate lighting fixtures will reduce our carbon footprint. Use windows with a high solar heat gain coefficient (SHGC),

especially on the east and west sides of buildings where shading devices are not effective. Use window assemblies with below “U” value to maximize the insulation value of glazed surfaces. Place glazing strategically to maximize daylighting, thus reducing the artificial lighting load while reducing heat gain. Exterior walls should be shaded from the sun or have a high “R” value to reduce heat gain. Use more fenestration and light shelves. Orientate new building projects to take advantage of prevailing winds.

#### *Barriers*

Sometimes underground utility relocation costs impact building location/orientation. Sunscreens add to first cost but pay for themselves over its life cycle. High efficiency glazing systems can have a higher upfront cost and must be evaluated in terms of the Life Cycle Assessment (LCA).

#### *Recommendations*

Revise the Facilities Planning and Construction “Design and Construction Guidelines” to include requirement for evaluation of building orientation and related strategies in new buildings and building renovations.

#### *Assessment*

Facilities Planning and Construction, School of Architecture and Community Design

### **K. Green Roofs**

#### *Vision*

Buildings will have high reflectance roofs to reduce heat gain, and “Green Roofs” will be considered when appropriate.

#### *Accomplishments*

Roof replacements with very high insulation values and high reflectivity SRI (Solar Reflective Index) of 94 are being used. Fifteen roofs have been replaced over the past three years, covering a total square footage of 410,865.

#### *Opportunities*

Buildings roofs should use materials with a high coefficient of reflectance and should be insulated at a minimum of R-38 to reduce heat gain through the roof. Flat roofs are more prone to leakage. Consider pitched metal roofs to shed water quickly rather than flat roofs that need more internal drain systems. Alternative durable, recyclable, roofing systems with high solar reflectance that dramatically increase energy efficiency include, single ply membrane, sloped metal roofs, and liquid applied coatings and vegetated green roofs. In addition, research should be done on the use of “solar trees” on the top floors of USF garages that provide shade for parked cars and collect solar energy used to power the garages.

### *Barriers*

Building conventions change slowly and it is often difficult to implement innovative materials. Pitched metal roofs may have higher first cost due to more material and labor cost.

### *Recommendations*

Revise the Facilities Planning and Construction “Design and Construction Guidelines” to include requirement for evaluation of roofing materials and insulation based on Life Cycle Assessment.

### *Assessment*

Facilities Planning and Construction, School of Architecture and Community Design

## **L. Building Technology**

### *Vision*

Innovations in building technology, materials, and methods will be explored.

### *Accomplishments*

None known

### *Opportunities*

Build stronger relationships with academic and research programs to provide educational and research opportunities in building projects. Facilitate and integrate university research input into new buildings as test bed and demonstration projects.

### *Barriers*

Untested materials and systems may increase maintenance and operational costs.

### *Recommendations*

Focus on new technologies and materials research that promote sustainable solutions.

### *Assessment*

Facilities Planning and Construction, College of Engineering

## **M. Rainwater Harvesting**

### *Vision*

All buildings will make use of rainwater harvesting practices to fully supply or augment their water needs.

### *Accomplishments*

The new Patel Center for Global Solutions Building will be the first building on campus to incorporate rainwater harvesting by collecting rainwater into a cistern and then plumbing it

separately for toilet and urinal flushing. Three additional cisterns are in the planning process. The 'Running of the Bulls' fountain at the Marshall Center reuses waste water from the HVAC system.

#### *Opportunities*

Installing moderate sized cisterns around each individual building, garages or group of buildings (individual colleges) in order to capture rainwater and stormwater could create a decentralized water reuse strategy, thus decreasing infrastructure costs and allowing localized management of water consumption.

#### *Barriers*

Several local municipalities recognize the benefits associated with rainwater capture and reuse from small-scale cisterns. Large upfront costs will continue to inhibit proliferation of cistern-based systems although a sustainability analysis could indicate the outweighing benefits. Storm water capture presents another set of barriers, primarily those associated with permitting and land-use.

#### *Recommendations*

Establish an automated network of water storage facilities throughout campus, so that each common area may be individually monitored and regulated.

#### *Assessment*

Facilities Planning and Construction, Physical Plant

## **N. Low-flow Water Fixtures**

#### *Vision*

Water fixture maintenance and replacement with new, low-flow technologies will be enhanced.

#### *Accomplishments*

A significant portion of past faucets and flushing devices have been replaced with low-flow motion-sensing automatic sensors (e.g., 1.6 gal/flush, minimum). There is an upcoming plan (to be implemented in 2010) to take inventory of all fixtures throughout campus.

#### *Opportunities*

Install low-flow or no-flow (waterless) urinals and other fixtures.

#### *Barriers*

Certain barriers preventing the total adoption of motion activated faucets and low-flow fixtures exist and are often the result of a cost/benefit ratio. For instance, certain fixtures around campus are not widely used and thus may not benefit from the time and money necessary to install an automatic fixture. Many automatic fixtures require battery power which subjects them to periodic but temporary failure and also increases operation and maintenance costs.

Automatic faucets may require calibration in order to function at peak efficiency. Waterless urinals have cleaning challenges with regard to chemical buildup in pipes.

#### *Recommendations*

In order to meet SWFWMD requirements, it will be necessary for USF to indicate that efforts to reduce water consumption are being made. A campus-wide survey of existing plumbing fixtures and possible replacement with low-flow fixtures is currently being considered. Utilize direct-wired automatic faucets and flushers instead of battery-based models, and create a battery recycling and phase-out plan for existing battery-based models. It is recommended to develop an awareness campaign and mechanism that makes it easy for people to report leaking faucets and encourages them to do so.

#### *Assessment*

Physical Plant, Facilities Planning and Construction

### **O. Dual-plumbing**

#### *Vision*

The use of dual-plumbing in campus facilities will be increased.

#### *Accomplishments*

The Patel Center for Global Solutions Building will be the first building on campus to utilize dual-plumbing. Use of harvested rainwater to be used for the flushing of toilets and urinals reduces the need to withdraw water from the aquifer for that purpose.

#### *Opportunities*

Dual-plumbing within each new building and future retrofit is necessary in order to implement reclaimed/greywater/rainwater reuse for such applications as toilet flushing.

#### *Barriers*

Although dual-plumbing is an established practice, permitting to bring greywater or rainwater back into a building envelope for reuse remains difficult.

#### *Recommendations*

Upfront/installation costs as well as operations and maintenance costs may be significantly reduced by plumbing with established alternative materials (e.g., PEX, CPVC). Such a decrease in costs could make dual-plumbing economically feasible.

#### *Assessment*

Physical Plant, Facilities Planning and Construction

## **P. Greywater Reuse**

### *Vision*

Strategies to reuse greywater on campus will be implemented.

### *Accomplishments*

Greywater reuse is not currently implemented anywhere throughout campus, although several opportunities exist.

### *Opportunities*

Collection of greywater from within buildings for eventual treatment and reuse within the very same buildings, or for irrigation purposes, can reduce the amount of water drawn from campus wells, thereby reducing the costs associated with sewerage and well water permitting.

### *Barriers*

Although greywater reuse is an established practice, permitting to bring greywater back into a building envelope for reuse remains difficult. Most permitting for greywater reuse will likely require treatment and storage, which implies a high starting cost and level of difficulty.

### *Recommendations*

Petition the local permitting authority for greywater reuse studies and future implementation on-campus.

### *Assessment*

Physical Plant, Facilities Planning and Construction

## **Q. Water Metering**

### *Vision*

Water metering will be increased throughout campus.

### *Accomplishments*

There are now sub-metering retrofits on existing buildings.

### *Opportunities*

Metering and publishing (through monitors in common areas, or on “dashboard” websites) the flow of water in real-time through all existing and future buildings would provide a unique educational tool and express the importance of water conservation. It is important to connect a building’s occupants to their personal water consumption in order to realize drastic decreases in campus water use.

### *Barriers*

Retroactive installation of water meters as well as the necessary publishing tools (data loggers, servers, software) may prove to be costly if only upfront costs are considered.

### *Recommendations*

Conduct a sustainability analysis to evaluate the benefits of water and energy conservation, including occupant interaction linked to a water metering system; water meters may prove beneficial overall.

### *Assessment*

Physical Plant, Facilities Planning and Construction



## Action Steps for Transportation

### A. Pedestrian and Bicycle Commuting

#### *Vision*

Students, staff and faculty living within ½ mile from campus will walk and bicycle to and from campus. Upon arrival to campus, students, staff and faculty will walk and bicycle between and among various areas on campus. They will feel empowered to walk and bicycle and will desire to do so, through the provision of functional and aesthetically pleasing facilities, programs and services that enable safe and convenient walking and bicycling and through the availability of carsharing vehicles for hourly rental for trips not easily accommodated by walking or bicycling.

#### *Accomplishments*

USF's Tampa Campus Master Plan has laid the groundwork by containing an adopted Long Range Bicycle Lane Plan and associated policies for the construction of on-road bicycle lanes as part of roadway improvement projects. The Master Plan also contains an adopted Long Range Pedestrian Network and associated policies for the improvement of major pedestrian corridors. (University of South Florida 2005 Campus Master Plan Update, Element 11, Transportation, Figures 11-4 and 11-11 and Goals, Objectives, and Policies, C. Pedestrian and Non-Vehicular Circulation Sub-Element, October 2006, pp. 13-15). These Plans call for enhancing pedestrian corridors with the application of design standards and landscaping from Master Plan Elements 3 and 16, adding pedestrian features at all new improved signalized intersections, and providing convenient bike racks at all new and renovated facilities (University of South Florida Tampa 2005 Campus Master Plan Update, Campus Master Plan Goals, Objectives, and Policies, Chapter 11 Transportation Element, Policies 11A.4.1, 11A.4.2 and 11A.4.3., adopted December 7, 2006). The University has already constructed four miles of bike lanes on campus. Several pedestrian/bike projects have recently been completed and provide connectivity to off-campus neighborhoods: sidewalks and bike lanes on Elm Drive from Bull Run to 50th St., sidewalks and bike lanes on Holly Drive from Maple Drive to 50th St., the shaded western extension of Sessums Pedestrian Mall from Engineering to the new 1,000-bed residence Hall at Magnolia. Additionally, bike racks are being provided with every new building constructed on campus.

There is an increase in on-campus housing and dining and other services to encourage and enable students, staff and faculty to remain on campus during the day rather than take off-campus mid-day trips. Trees, trellises, and arcades have been established to increase shade on sidewalks. The USF Division of Public Safety provides a Bicycle Anti-Theft Registration Program. Both the Hillsborough Area Regional Transit (HART) and the USF Bull Runner Transit provide

bike racks on buses. The USF Bicycle Club has been established by students in the past year. The Campus Recreation Center has planned a bicycle rental program to begin in the Fall 2009.

In partnership with the New North Transportation Alliance (NNTA), USF has received 37 bicycle U-racks in 2010, which are in the process of being placed by USF Parking and Transportation Services, throughout the campus. Some will be located inside parking garages to provide additional security and cover from weather. To supplement those provided by FPC and placed as part of new building construction, these additional racks fill in the gaps around existing buildings where additional bicycle parking is needed.

USF representatives have been actively engaged in the planning process with Hillsborough County, for the development and establishment of the University Area Multimodal Transportation District. This is a designation by the State of Florida that would channel land developer contributions toward transportation improvements that give priority to pedestrians, bicyclists and public transit. Other coordination with host local governments has included participating in and hosting the kick-off meeting for the Hillsborough County Pedestrian Safety Action Plan Committee, an effort funded by the Florida Department of Transportation, which is targeting the University area for a marketing campaign to promote safe walking. USF representatives have also been actively involved in public meetings regarding a County study to assess facility improvements to increase pedestrian safety along Fletcher Avenue near the University.

#### *Opportunities*

USF Facilities Planning and Construction (FPC) has the opportunity to continue implementing the adopted 2005 Campus Master Plan by completing pedestrian and bicycle linkages to reduce car for use on-campus and off-campus trips. FPC has also kicked off the process for the 5-year update of the Campus Master Plan, in which policies to support pedestrian and bicycle travel can be maintained and refined. To support this, the USF Bicycle Club has completed a map and inventory of bicycle parking on the Tampa campus.

The USF Sustainable Transportation Subcommittee also has responded to the Provost's interest in the possibility of starting a bike sharing program on campus (this is a separate concept from the bike rental program underway at the Campus Recreation Center). The Transportation Subcommittee has provided a brief summary of the various issues and decision points that would need to be considered in the development of a bike sharing program. They identified several service models, as well as case studies that provide examples of both program successes and failures.

CUTR staff has provided pedometers for campus special events that encourage people to walk more. If people developed the habit of walking and enjoying it as exercise, more may choose to walk for both exercise and transportation. This has significant potential to reduce greenhouse gas emissions. For intra-campus trips from one building to another, many people currently drive their cars from one parking lot to another, based upon the results from the 2007 Parking and Transportation Services Survey. Thirty percent of students and 27 percent of faculty and staff

move their vehicle to another parking space during the day, on a daily basis. Out of these, 37 percent of students and 8 percent of faculty and staff move their vehicles to a location closer to their on-campus destination (2007 Parking and Transportation Survey, University of South Florida). These very short trips represent engine “cold starts”, which is that portion during warm-up of an automobile engine in which gasoline is not burned efficiently and higher emissions result. Reduction of very short trips such as these can make a big difference in reducing greenhouse gas emissions.

FPC has the opportunity to continue actively advocating for pedestrian safety in Hillsborough County’s plans to widen Fletcher Avenue, a County road that runs along the north border of the campus. FPC, PATS, CUTR and other USF departments as appropriate, have the opportunity to continue active partnerships in transportation planning projects supported by host local governments, including the University Area Multimodal Transportation District, the New North Transportation Alliance, and campaigns like Tampa BayCycle. USF CUTR researchers are pursuing the development of a pedestrian trip planning website, in cooperation with the University of Maryland that has volunteered to contribute the open-source software currently used for their trip planner.

### *Barriers*

A major concern is for the safety and comfort of pedestrians and bicyclists who use Fletcher Avenue, a County road that runs along the north border of campus. Pedestrians and bicyclists must cross Fletcher Avenue to get to and from campus. Plans are underway by Hillsborough County to widen Fletcher Avenue from a 4-lane divided facility to a 6-lane divided facility, which will reach the University’s riverfront park northeast of the campus and make crossing Fletcher Avenue even more difficult.

A student paper providing the results of a survey of bicyclists on campus, reported that 35 percent of bicyclist survey respondents perceive that overall quality of bicycle lanes on campus is inadequate and 20 percent of bicyclist survey respondents indicated they have experienced bicycle theft on campus (Rana, Tejsingh [2008] “A Survey Design of Studying Bicycle Trends at University of South Florida,” Department of Civil and Environmental Engineering, University of South Florida, Tampa, pp. 21, 23).

Funding for campus bike lanes and pedestrian improvements are often low administrative priorities, especially in the current budgetary climate of fiscal constraints. Other barriers to walking include the Florida summer climate of high temperatures and daily afternoon rain showers, lack of showers and lockers and a lack of information and awareness about walking and bicycling. Motorists on campus often drive over the posted speed limit and do not yield right of way to pedestrians. Visitors to the USF Tampa Campus last October 2009 for the 4<sup>th</sup> Annual Campus and Community Sustainability Conference, expressed surprise that the posted speed limits on campus were as high as 30 mph. Bicyclists, pedestrians and motorists alike lack knowledge about state bicycle and pedestrian laws. Many bicyclists lack basic riding skills, such as signaling, scanning, emergency stopping, proper placement of the bicycle when riding in the street and merging into traffic to make left turns.

### *Recommendations*

1. It is recommended to continue completing the on-campus Long Range Pedestrian Network of pedestrian facilities and Long Range Bicycle Lane Plan of bicycle lanes and increasing the number of bicycle racks on campus.
2. It is recommended to require new and renovated building projects to meet or exceed LEED minimum standards regarding the number of bike racks based on building occupancy.
3. It is recommended that periodically the campus be visually surveyed during peak periods during the week, to identify locations where there are more bicycles than available parking and where bicycles are being secured to sign poles or otherwise parked in inappropriate places. These locations can be placed on a list as needing consideration for more bike racks as they become available.
4. It is recommended that future parking garages be designed to accommodate covered bicycle parking and safe access to them by bike, as the new Beard garage does.
5. It is recommended to reduce bicycle theft by encouraging bicyclists to invest in a better lock, such as a titanium U-lock. Bicycling promotional campaigns, such as Tampa BayCycle, can distribute a limited number of free bicycle locks.
6. Members of the USF Bicycle Club can be recommended by a faculty advisor or formally designated by the USF Office of Sustainability to serve as educators to provide peer-to-peer sustainability outreach on the USF Tampa Campus about the merits of bicycle commuting, the bicycle facilities and services available, and bicycle safety.
7. For the last several years, the NNTA has been promoting alternative transportation, including bicycling and walking at the Bull Market, and should continue to do so. Educators can also provide outreach at a booth at the Marshall Student Center and other outlets, to promote safe walking and bicycling, and provide information about upcoming special events, such as Tampa BayCycle and opportunities, such as joining the USF Bicycle Club or taking a bike safety class offered by the League of American Bicyclists Certified Instructors. Promotions would also include the availability of services, such as the Campus Police Bicycle Anti-Theft Program.
8. It is recommended that a USF Tech Fee be granted to staff at the USF Center for Urban Transportation Research to develop a walking map (sidewalk map) and pedestrian trip planning website, called Walk-A-BULL for the USF Tampa Campus using OpenStreet Map. This map would be available in electronic format, in addition to limited hard copies. This map could provide information on the best walking route to take, based upon criteria selected by the user, such as shortest route, route with greatest ADA accessibility, route with the most shade, and so on. This map is envisioned to eventually extend beyond campus borders to include destinations within walking distance, such as apartment complexes and shopping venues.
9. It is recommended to support the USF Bicycle Club in its desire to develop a campus bicycle facilities map that provides more detailed information of interest to USF Tampa Campus commuters than does the current Hillsborough MPO Bicycle Facilities Map. This new bicycle facilities map would be developed as either a stand-alone document, or as part of the walking map or PATS campus map. A schedule could be established for a periodic bicycle and pedestrian facility inventory and updating of the electronic map by

the Bicycle Club, as FPC and PATS informs the Bicycle Club of completed new improvements.

10. It is recommended to support the Bicycle club in its desire to provide information and outreach programs to incoming students at orientation meetings, to show how to get around town by bicycle.
11. It is recommended that USF representatives continue to participate in planning processes of host local governments, as those identified above.
12. It is recommended that posted speed limits on campus be changed to one uniform speed of 20 mph and that this limit be strictly enforced. This will significantly reduce chances of motor vehicle collisions with pedestrians and bicyclists (National Highway Traffic Safety Administration, United States Department of Transportation. "Literature Review on Vehicle Travel Speeds and Pedestrian Injuries," Final Report, DOT HS 809 021, October 1999). The lower uniform speed limit may also frustrate motorists. This could be addressed with traffic calming roadway design alterations. At the time that motorists purchase parking permits, the uniform speed limit should be emphasized, with a notice for motorists to sign, signifying that they understand and will abide by the posted campus speed limit.
13. It is recommended that a "Share the Road" safety campaign be created and marketed to all drivers (including Bull Runner), pedestrians and bicyclists. Education campaigns should promote alternative transportation including information about safe driving/travel behavior and responsibilities of everyone to abide by the law and treat others with courtesy and respect.

#### *Assessment*

Center for Urban Transportation Research, Bicycle Club

## **B. Bus System**

#### *Vision*

Students, staff and faculty will begin deciding to live and eat on campus or near campus. Local municipalities will begin offering incentives for pedestrian-centric development near campus. Residential location decisions and resulting transit oriented development will enable the Bull Runner Transit to serve high volumes of passengers throughout the week and expand its service coverage and frequency. More staff, students and faculty living farther away take advantage of the heavily discounted park-n-ride lot permits.

#### *Accomplishments*

The USF Tampa Campus runs a biodiesel-fueled (at one time, 100 percent biodiesel, but not presently) fare-free campus bus service, the Bull Runner Transit. The Bull Runner Transit provides service for trips within the campus, as well as connecting to neighborhoods to the east, north and west of the campus, connecting to the HART University Area Transit Center, and providing service to the University Mall, located west of the campus. The system serves almost one million riders per year and that number is expected to increase now that a new Automatic

Vehicle Locator (AVL) system has been implemented. The AVL offers several services including the ability to see arrival predictions for all buses at all stops, the ability to track buses along the routes so riders can plan their day accordingly, and the ability to set up alerts for recurring use via text message and bus viewing in real-time. In April 2010, USF will also implement automatic passenger counting on buses so riders will be able to know how full a bus is before it arrives. Plans are to eventually link this information to the Walk-A-BULL walk trip planner so that riders can spend less time waiting at bus stops.

### *Opportunities*

It is an opportunity to continue to evaluate expansion of the Bull Runner Transit off campus and reduce transit headways (i.e., intervals between bus runs), expand route coverage, and upgrade transit equipment and facilities. It is an opportunity to utilize our relationship with HART to improve regional bus service to the campus. The USF Tampa Campus Master Plan 2005 contains a policy in which the University will encourage the use of periphery lots in conjunction with use of the Bull Runner Transit for the purpose of decreasing the volume of traffic on the loop road of the campus (University of South Florida Campus Master Plan Goals, Objectives, and Policies, USF Tampa 2005 Campus Master Plan Update, adopted December 7, 2006, Chapter 11 Transportation Element, Policy 11A.1.6). HART also seeks to coordinate more closely with USF to enhance connection between HART services and the Bull Runner Shuttle (Hillsborough Area Regional Transit, 2010-2019 Transit Development Plan Update, Tampa, FL, September 30, 2009, p. 5-3).

### *Barriers*

Insufficient funding is a barrier to expanding Bull Runner Transit service. Another barrier is readily available campus parking that is still too inexpensive to provide sufficient motivation to switch travel modes and use the Bull Runner. There is also a lack of transit oriented development. While new apartment complexes continue to be built along 42<sup>nd</sup> Street to the north and McKinley Drive to the south, these new and existing residential complexes are too far from existing supermarkets to walk for groceries.

### *Recommendations*

1. It is recommended that USF seek retail and private developer partnerships to expand off campus bus service.
2. It is also recommended that campus parking rates be further evaluated to provide deeper discounts and incentives to park-and-ride users, while making up the difference in parking fees by increasing the price of the regular permits.
3. It is recommended that NNTA continue promoting Bull Runner Transit and its new AVL service. It is also recommended to reduce headways at peak times when Bull Runner buses are standing room only.
4. It is recommended to provide more input to HART route designs for routes that serve the USF Tampa campus (Recommendations taken from "Unlimited Access Partnership—UPass: The University of South Florida and HARTline." PowerPoint presentation, USF Parking and Transportation Services, Slide 9).

5. It is recommended that USF continue discussions with HART regarding linkages between the proposed rapid transit service and the Bull Runner Transit, as well as USF campus pedestrian and bicycle access to proposed rapid transit service stations.

#### *Assessment*

Parking and Transportation Services, Center for Urban Transportation Research

### **C. Commuter Options**

#### *Vision*

Students, staff and faculty are sophisticated users of the many travel options available to them for their commute to and from the USF Tampa Campus. These travel options are fully funded and supported by campus and host government policies that tip the balance much of the time for commuters toward choosing a mode other than single occupant vehicle (SOV) travel. Commuters enjoy having multiple travel mode choices and are adept at efficient travel planning, such as linking trips, and matching the best mode to suit each particular trip.

#### *Accomplishments*

Students ride fare-free on both the Bull Runner Transit and the HART regional transit system. Those who commute by transit at least two times per week have access to the free Emergency (taxi) Ride Home program. Free carpool and vanpool matching services, such as the Bay Area Commuter Services' (BACS) Tampa Bay Ride Share, offers interested commuters a way to identify and meet others who live and work or go to school near each other and who also want to ride share. Bay Area Vanpool is another service available to USF staff, students and faculty, for groups of 7-15 commuters who live and work or go to school near one another and who can save money by co-leasing a van and sharing the ride.

Because of USF's leadership in providing commuter options, USF is a designated member of "Best Workplaces for Commuters<sup>SM</sup>," a national recognition program. USF is home to the nationally recognized Center for Urban Transportation Research (CUTR) and also works closely as a founding member of the New North Transportation Alliance (NNTA), a transportation management organization and public private partnership that seeks to reduce single occupant vehicle travel and improve air quality (University of South Florida Campus Master Plan Goals, Objectives, and Policies, USF Tampa 2005 Campus Master Plan Update, adopted December 7, 2006, Chapter 11 Transportation Element, Policy 11A.2.5). The USF Tampa Campus has been an active member in NNTA since 1994 and initially provided seed grant funding. NNTA's first Board Chairman was the Director of USF Parking and Transportation Services. NNTA partners jointly identify and address transportation issues in the major destination center known as New North. Central to the New North service area is the USF Tampa Campus. Partners in NNTA include the James A. Haley Veterans Hospital, Busch Gardens Theme Park, the University Mall, the City of Tampa, Hillsborough County, HART, Florida Department of Transportation, and numerous neighborhood and civic associations.

NNTA, which is staffed by CUTR, has provided bicycle safety workshops for students, staff and faculty, and distributed free titanium U-locks to reduce bicycle theft. CUTR staff has also launched, through NNTA, the annual Tampa BayCycle campaign, which encourages bicycle commuting by the USF community. CUTR staff, through NNTA, has also sponsored the printing and distribution of the Hillsborough County Bicycle Facility Map, developed by the Hillsborough Metropolitan Planning Organization (MPO). CUTR staff, through NNTA, has also provided detailed input as part of the Hillsborough MPO Long Range Transportation Planning Process, regarding needed bicycle and pedestrian facilities off-campus in adjacent communities where many USF students, staff and faculty live.

This past year, the NNTA Board voted to urge Hillsborough County to make good on its promise to use City Investment Tax funds to complete roadway improvements for the 22<sup>nd</sup> Street Main Street Improvement Program, a length of roadway located in one of the poorest communities in the County just west of the USF Tampa Campus. The new improvements included better sidewalks, bicycle lanes, public transit bus bays and shelters and safety improvements for pedestrians, such as cross walks, speed humps and reduced speed limits.

An hourly car rental service, WeCar (hybrid cars leased by Enterprise Rent-a-Car), launched in July 2009 is available to students, faculty, and staff at very low rates. This car rental service enables commuters, who would otherwise have to drive to campus due to the need to run errands during the day, to leave their cars at home and take transit or some other alternative mode to campus. The policy framework for supporting commuter options at USF is in place, as shown in the USF Tampa Campus Master Plan 2005, which includes objectives to reduce the impact of future traffic growth (University of South Florida 2005 Campus Master Plan Update, Element 11, Transportation, A. Traffic Sub-Element, December 7, 2006, pp. 4-10).

In addition, USF Facilities Planning and Construction is actively engaged with Hillsborough County and its host local government, the City of Tampa in the state campus master planning process and the local government comprehensive planning process. This planning process lays out the long-term planning for land use mix, and densities/intensities that enable the further development and redevelopment of off-campus housing within the service area of the Bull Runner Transit and within walking and bicycling distance to the campus.

### *Opportunities*

USF has the opportunity to promote conditions that will increase the use of commuter options (i.e., vanpool, carpool, telework, staggered class scheduling and compressed work, bicycling, walking, and transit). In addition, the USF Pilot Carpool Pass and Parking Program has been recently developed by USF Parking and Transportation Services, with technical support from the USF Center for Urban Transportation Research. This new program will be launched in the Fall Semester, 2010. Employee/student incentives for program participation include reserved priority carpool parking spaces and reduced parking permit costs. The preferential carpool parking program is supported by free participant membership eligibility in the Emergency Ride Home (ERH) Program and the free Tampa Bay Rideshare service offered through BACS. In conjunction with the pilot WeCar service, USF CUTR is presently doing research on dynamic

parking pricing based on time of day and day of week, with a rate based upon usage rather than a flat fee. Funding is provided through one-time grants. After the 2-year demonstration, USF will need to determine how to continue to support the carsharing program.

### *Barriers*

Barriers include inadequate funding of transportation demand management strategies, abundant supply of car parking at inexpensive rates, faculty reluctance to stagger class scheduling, lack of transit oriented development surrounding the USF Tampa campus and a widely dispersed regional development pattern that is difficult to serve by public transit. Barriers also include underdeveloped pedestrian and bicycle infrastructure, an underfunded public transit system, and the perceived risks of active engagement with local governments to overcome these barriers.

### *Recommendations*

1. It is recommended to increase awareness of the USF Tampa Campus community regarding existing transportation options and the role of transportation in greenhouse gas emissions. Education can include a variety of media, such as the student newspaper, The Oracle and the Bicycle Club web site, and the identification of simple actions that individuals can take to reduce their personal transportation carbon footprints. It is recommended that student government be active in promoting personal responsibility and in developing a campaign on Emissions Reduction Awareness.
2. It is recommended to develop and provide a personal tracking tool or greenhouse gas calculator, the data of which can be downloaded anonymously to a website, aggregated and reported periodically to the campus community as progress to lower the campus footprint. Such data might also be used to promote competitions and special events.
3. It is recommended that multiple campus stakeholders continue to participate in the Campus Master Plan update and to integrate Climate Action Plan recommendations into the Master Plan update.
4. It is recommended to increase Bull Runner Transit off campus and consider increasing parking permit rates, with revenues expended on alternative transportation services, such as the Bull Runner Transit.
5. It is recommended that USF allow employees to use pre-tax payment for all qualified transportation fringe benefits (as detailed in Section 132(f) of the Internal Revenue Code for transit and vanpools). Vanpools should be subsidized the same as transit.
6. It is also recommended to expand the use of Distance Learning for students.
7. It is also recommended that a policy and guidelines for the conduct of special events on campus be developed to lower the carbon footprint caused by special events. This would include current, easy-to-access, easy-to-understand information about how to get to the campus without driving a car. This could be required as part of all event announcements, prominently displayed.
8. It is recommended that USF maintain active membership in the New North Transportation Alliance, as a means to strengthen partnerships with public and private sector entities in the planning and implementation of programs and services, as well as

the planning, construction and maintenance of facilities that enable students, staff and faculty to commute to and from the campus by alternative transportation modes.

9. It is recommended that USF reinstate funding to the New North Transportation Alliance to match those provided by the Florida Department of Transportation and Hillsborough County, to enable NNTA to continue its work promoting commute options to single occupant vehicle travel. Staff of NNTA can provide a student-directed campaign and/or competition on the campus to encourage students for one day, to try changing their mode of travel from single-occupant vehicle to some alternative mode of their choice. The promotional campaign may promote Tampa BayCycle, the WeCar, UPass, the Bull Runner and other alternative transportation programs on campus. Staff can measure pre-campaign mode share and commute distance of participating students to post-campaign mode share. Staff can also participate in new student orientations prior to students moving to campus, to educate them about alternative transportation and that a car is not needed to get around campus or off campus.
10. It is also recommended that USF consider developing faculty and staff on-campus housing opportunities. Providing on-campus housing for faculty and staff could substantially decrease traffic and generate rental revenue for the University.

#### *Assessment*

Center for Urban Transportation Research, Parking and Transportation Services

### **D. Motor Vehicle Idling**

#### *Vision*

At peak hours of the weekday, motor vehicle traffic moves at a reasonable pace with no unacceptably long wait times at traffic signals. Drivers of trucks delivering goods to campus turn off their ignition, and students, staff and faculty refrain from studying, eating, sleeping, etc. in their cars with engines idling and air conditioners running.

#### *Accomplishments*

Multiple edge campus intersection improvements have been completed in collaboration with Hillsborough County to reduce greenhouse gas/air pollution due to excessive idle time.

#### *Opportunities*

USF presently does not have a regulation or policy regarding motor vehicle idling; however, in December 2008 a Florida Administrative Rule was passed prohibiting operators of heavy duty diesel engine powered motor vehicles from idling more than five consecutive minutes (with several exceptions detailed). The intent of the Rule is to reduce greenhouse gas emissions (62-285.420, F.A.C. by specific authority of 403.061, F.S.). For the last five years, researchers at the USF Center for Urban Transportation Research have been working to develop software for GPS-enabled cell phones with an aim to analyze and mitigate transportation problems. One such application is a tracking tool called TRAC-IT which records GPS traces from a user's cell phone (after the user opts in). A GPS trace, using Google Earth, can track and illustrate the idling times

and locations of a participating commuter. Methods are currently being developed to automatically identify these “idle” locations so GPS data can be processed on a larger scale, for example, to identify these locations within a university campus. Such data could be used to optimize traffic signals as well as identify locations that require additional trip reduction strategies.

### *Barriers*

Barriers to pursuing strategies to reducing on-campus motor vehicle idling include lack of funding for investigating and rectifying locations of excessive delay, lack of a campus policy prohibiting idling of passenger cars in parking lots, as well as enforcement of such policy.

### *Recommendations*

1. It is recommended that USF establish a policy to reduce motor vehicle idling. It is recommended that operators of heavy duty diesel engine powered motor vehicles that access the campus, such as those providing regular deliveries of goods, should be informed of the Florida Rule prohibiting excessive idling times.
2. It is recommended to continue intersection improvements, including traffic signal optimization, to reduce idle times.
3. It is recommended to conduct studies on strategies to reduce idling time, maintain uniform traffic speed, and quantify emissions with and without such changes.
4. It is recommended that CUTR pursue the development of a tracking tool to identify locations and times of the day of excessive motor vehicle idling.

### *Assessment*

Facilities Planning and Construction, Parking and Transportation Services, Center for Urban Transportation Research

## **E. Mass Transit**

### *Vision*

HART bus service provides safe, fast and convenient transportation between USF and destinations throughout the County. Connections between HART and the Bull Runner Transit provide greater access between the USF Tampa Campus and regional destinations.

### *Accomplishments*

USF’s U-Pass program averages 31,500 HART rides per month. Students ride fare-free and faculty and staff pay just \$0.25 per trip. USF’s involvement in the dialogue with public partners has positioned the USF Tampa Campus to be served by major transit improvements. These include HART’s application to the Federal Transit Administration for New Starts funds for a rapid transit system connecting downtown Tampa to USF and beyond, and the development of a “Multi-Modal Transportation District” (MMTD) adjacent to the USF Tampa Campus in unincorporated portions of Hillsborough County. The MMTD is a Florida state designation that will give greater priority to transportation investments for pedestrian, bicycle and transit access

over capacity improvements serving the automobile. Through this community engagement, USF is laying the groundwork for improvements in public transit, bicycle and pedestrian facilities that will enable USF students, staff and faculty to safely commute to and from the campus without the need for a car.

### *Opportunities*

There is an opportunity to educate USF students, staff, and faculty about mass transit options. The existing Bull Runner Transit and its connection to the existing regional public transit agency, HART, provide a foundation on which to build a fast and efficient public transit system that serves USF and competes successfully with the automobile. For example, the USF Tampa Campus is presently served by HART Routes 5, 6 and 18, which enter the campus and provide access to the University Area Transit Center, where passengers can transfer to other routes. Route 57 runs adjacent to the campus and provides access to Temple Terrace and neighborhoods east and north of the campus. Through student fees, USF provides fare-free access for students to HART service, called the UPass program. Staff and faculty can also ride HART at the reduced rate of \$0.25 per ride. In addition, USF students, staff and faculty who use HART or some other form of alternative transportation are eligible to sign up for the free Emergency Ride Home program (up to eight free taxi rides per year), offered through BACS, the regional commuter assistance program.. A total of \$1.25 billion in federal stimulus money will help pay for a high-speed rail line from Tampa to Orlando. Additionally, HART has almost completed an Alternatives Analysis for the development of a rapid transit service, potentially connecting Tampa's downtown to the USF Tampa Campus as the first line to be completed. USF has the opportunity to work with HART and other agencies to link the proposed rapid transit service to USF.

### *Barriers*

HART regional transit service has been underfunded for years. As a result, public transit service is presently not good enough to compete with automobile travel. Public bus service also suffers from an undeserved stigma that it is dirty and used only by society's "undesirables". While many people want light rail service, there is a lack of awareness that the success of any rapid transit service will depend on high ridership on a feeder bus system. In 2002, the Hillsborough Board of County Commissioners (BOCC) voted down a proposal to provide a local match to Federal funds that would have begun the development of a light rail system. Presently, the establishment of rapid transit service depends upon a BOCC decision, County voter support, and funding from the Federal Transit Administration. These barriers are beyond the control of USF. USF's capacity to enable students to use HART public transit is limited to providing fare subsidies and providing Bull Runner connections. Another barrier is that the UPass is funded by USF in a way that creates a conflict of interest between minimizing costs to the University and supporting the University's sustainability goal by maximizing HART ridership. USF reimburses HART for every UPass ride taken. While the 2007 Parking and Transportation Survey was able to provide information regarding the percentage mode share of students, staff and faculty who ride HART service, it is not known where riders board and alight, requiring the use of general estimates regarding trip length and subsequent greenhouse gas emissions reductions resulting from transit travel.

## *Recommendations*

1. It is recommended that USF remain an actively engaged partner in host local government transportation planning processes to support public transportation to tie in with the USF Tampa Campus.
2. It is recommended to continue UPass and set a target in terms of increasing the number of rides and/or students using HART. The UPass program would be critical to making the proposed rapid transit service (such as light rail) successful.
3. It is recommended to establish a comprehensive public education campaign to educate students, faculty, and staff about the benefits of mass transit for health, safety, and the environment.
4. It is recommended to work with HART to put a system in place for the collection of data to enhance accuracy of future greenhouse gas emissions inventories.
5. It is recommended to evaluate alternative methods to finance the UPass program that aligns the University's goal to deliver services cost efficiently and at the same time support its sustainability goal by maximizing public transit ridership on HART.

## *Assessment*

Center for Urban Transportation Research, Parking and Transportation Services

## **F. Parking**

### *Vision*

"The transit, circulation, and parking goals of the Tampa Campus Master Plan are to encourage options for flexible transit and vehicular access to the campus and to array parking in accessible concentrations around the perimeter of the academic core and the medical area" (Campus Master Plan Goals, Objectives, and Policies, USF Tampa 2005 Campus Master Plan Update, adopted December 7, 2006, Chapter 11 Transportation Element, Goal, p. 4). The vision for the future is that there is no more convenient "car-first" development and that priority is given to pedestrians.

### *Accomplishments*

Parking cost and availability stand out to be the most important reason in motivating bicycling, according to a student researcher who conducted a 2008 survey of campus bicyclists (Rana, Tejsingh [2008] "A Survey Design of Studying Bicycle Trends at University of South Florida," Department of Civil and Environmental Engineering, University of South Florida, Tampa, p. 18). Indeed, this is an accomplishment, as principles of parking management can encourage use of alternative modes of transportation by managing location, availability and cost of parking. There are additional benefits to bicyclists. About 67% of survey respondents of the above cited study indicated they feel that biking has improved their health "somewhat" or "greatly" (Rana 2008, p. 25).

The university has constructed four multilevel parking structures that have reduced surface parking sprawl and pedestrian/car conflicts. These efforts have eliminated 120 acres of heat islands thereby increasing the permeable areas and landscape and waterscape on campus. The university has also modified class scheduling to effect a more even distribution of parking demand thereby increasing existing classroom and facilities use. USF allows departments to offer compressed work week (CWW) to employees whose duties can be appropriately applied to a CWW schedule while maintaining job performance and satisfactory customer service. USF Human Resources Department provides guidance to managers for offering flextime. In addition, USF allows departments to offer telecommuting to employees whose duties can be appropriately applied to a telecommuting work arrangement while maintaining job performance and satisfactory customer service. USF Human Resources Department provides a telecommuting policy.

### *Opportunities*

USF has the opportunity to implement additional parking fees, and limit on-campus car use. USF has the opportunity to locate any new parking supply at the campus periphery (not in prime locations) to strengthen campus life and the surrounding community.

### *Barriers*

The primary barrier consists of existing cultural expectations and demands for cheap, convenient, door-to-door parking accessibility. Another barrier is that the manner in which the bonds on the parking garages are amortized creates a conflict between meeting the University's obligation to eliminate debt and the University's sustainability goal to reduce single occupant vehicle travel by encouraging use of alternative modes. Parking permit revenues are the primary source of funding to pay University loans for parking garage construction.

### *Recommendations*

1. It is recommended to provide sheltered, secure bicycle parking in convenient locations near building entrances.
2. It is recommended to provide a bicycle/transportation hub near the centrally located Marshall Student Center, possibly run by the USF Bicycle Club, to encourage students to bike and inform them of transportation alternatives.
3. It is recommended to provide locker and shower facilities in buildings to encourage bicycling and walking from off-campus by students, staff and faculty.
4. It is recommended to reduce or hold constant the net number of motor vehicle parking spaces on campus. If it is determined that more parking capacity is needed, it is recommended to consider shared use parking lots, such as that with the University Mall.
5. It is recommended to incorporate sheltered outdoor electric fueling stations outside buildings for recharging Plug-in hybrid electric and 100 percent electric vehicles.
6. It is recommended that USF charge premiums for parking spaces located in the central part of campus.
7. It is recommended that an evaluation of alternatives for paying the University's loans for parking garage construction be undertaken to identify alternative funding sources or

parking permit pricing that may reduce/eliminate dependence upon parking permit revenues.

#### *Assessment*

Center for Urban Transportation Research, Parking and Transportation Services, Green Building Subcommittee

### **G. Campus Fleet**

#### *Vision*

Campus fleet vehicles are used for a variety of purposes, and the fleet consists of different types of vehicles uniquely suited to different purposes, such as carrying heavy landscaping materials, addressing maintenance needs of campus facilities, postal deliveries, public safety, patrolling, and transporting visitors within the campus. Such vehicles provide efficient and cost effective transportation service. Policies are in place for the appropriate uses of campus fleet vehicles, which are easily understood, reasonable and periodically reviewed with staff.

#### *Accomplishments*

A motor vehicle procurement policy (including golf carts) exists for all campus administrative, operations and academic departments, and includes alternative fuels as an important criterion in purchase of vehicles. University extensively uses electric and gasoline golf carts to minimize operating costs and carbon footprint. Additionally, a conscious attempt is made to reduce the number of street licensed vehicles and need to make out of campus trips using street licensed vehicles. This is accomplished through increased use of on-campus stores for maintenance and office supplies.

The Physical Plant is experimenting with a solar powered golf cart retrofit kit for future wider application. Additionally, Physical Plant is in the process of purchasing larger electric powered vehicles for the purpose of delivering campus mail, paper rolls, cleaning supplies, and furniture. The new electric vehicles are slated for retrofit to facilitate solar powering of the vehicles. The fossil fuel based vehicles will be retired upon arrival of the new electric vehicles.

#### *Opportunities*

Physical Plant staff in charge of motor vehicles could identify opportunities, challenges, and costs relating to alternative fuel vehicle adequacy for the job (e.g., transporting heavy loads), in-house vehicle maintenance and inventory of spare parts, and staff training. This might be conducted as a business feasibility study in conjunction with students in the College of Business Administration as a class project.

#### *Barriers*

For the 2009 Greenhouse Gas Emissions Inventory, there was a gap in data representing departmental vehicles that were refueled off campus. Current departmental record keeping does not capture the amount of fuel purchased off campus. The Inventory represented fuel

usage only for those motor vehicles under the direct control of Physical Plant and Parking and Transportation Services.

#### *Recommendations*

1. It is recommended that a record keeping system be devised for academic departmental vehicles and administrative units that refuel off site to log fuel usage. An inventory should be conducted to identify, by department, the number of vehicles by type and fuel type used.
2. Based on Physical Plant's experience with solar charging and electric vehicles, it is recommended that the University incorporate best practices in the vehicle purchasing policy.

#### *Assessment*

Physical Plant, Clean Energy Research Center, Center for Urban Transportation Research

## **H. Air Travel**

#### *Vision*

The USF Tampa Campus community recognizes the importance of using air travel judiciously. Air travel is used only when it is not feasible to accomplish objectives by other means.

#### *Accomplishments*

The USF Travel and Compliance Department in Accounts Payable transitioned its processing of travel requests and reimbursements to an electronic system last year. This will enable the ability to do queries on the data to provide more detail regarding passenger miles traveled.

#### *Opportunities*

USF can review its air travel policies in light of its goal to reduce greenhouse gas emissions.

#### *Barriers*

USF is located on the far southeastern side of the continental United States, making the campus geographically isolated from other major cities and destinations. For example, USF is a member of the Big East Athletic Conference, requiring student athletes to travel to competitions at destinations across the Eastern Seaboard.

#### *Recommendations*

1. It is recommended that USF review its air travel policies in light of its goal to reduce greenhouse gas emissions. This would include contacting the academic, athletic and administrative departments to discuss their departmental missions and generate ideas on how to use air travel only when necessary and more efficiently.
2. It is also recommended that USF develop data about how USF employees and students get to and from the airport, and determine whether cost/emission-effective means can be developed to reduce this part of the campus carbon footprint, for example, working

with PATS, HART or others to provide shuttle service, backed up with policies on reimbursements for parking at the airport.

3. It is also recommended that USF consider establishing a policy of purchasing offsets for greenhouse gases generated from necessary air travel. It is also recommended that the Travel and Compliance Department assist in identifying how air travel data required for future greenhouse gas emissions inventories should be collected and organized.

### *Assessment*

Center for Urban Transportation Research

## **I. Education Mission**

### *Vision*

USF fully utilizes and mentors the talents and aspirations of future transportation professionals to incorporate principles of sustainability in the development and maintenance of urban transportation systems. USF provides opportunities for its students to use the USF Tampa Campus as a laboratory for studying transportation issues and testing ideas for enhancing transportation sustainability.

### *Accomplishments*

The USF Center for Urban Transportation Research (CUTR) offers several courses on transportation that incorporate principles of sustainability, including “Access Management,” “Public Transportation,” “Transportation and Land Use,” and “Transportation and Society.” CUTR also provides the technical support for NNTA and numerous education programs for transportation professionals, including public transit management and bus maintenance programs, and the Florida Commuter Choice Certificate Program (FCCCP). The FCCCP provides transportation professionals in the field of transportation demand management locally, statewide, and nationally to hone their skills and knowledge in the latest developments in the field. Most recently, the training modules have been adapted to an online “webinar” format to reach out to more students and enable professionals to engage in professional development activities without having to drive or book airline flights. This has resulted in lowered emissions of criteria air pollutants (federal Clean Air Act) as well as greenhouse gas emissions. The National Center for Transit Research at USF CUTR, provides opportunities for graduate students to engage in research in public transportation. The Bull Runner consistently employs students as bus drivers. Presently, approximately 60 percent of drivers are students. The Bull Runner Transit provides real life operations experience for the students while using a readily available human resource asset.

### *Opportunities*

USF has a great resource in its students to engage them in problem solving activities, using the USF Tampa Campus as an example and a living laboratory to implement new ideas. This could be an opportunity to meet the USF education and research mission, as part of the School for Global Sustainability.

*Barriers*

None identified

*Recommendations*

It is recommended that undergraduates and graduate students from CUTR, the Civil and Environmental Engineering Department, and other academic departments be given opportunities to develop traffic and parking solutions for the campus as part of course curricula, and integrate these lessons into the Master of Arts program in Global Sustainability.

*Assessment*

Center for Urban Transportation Research



## Action Steps for Energy

### A. Monitoring

#### *Vision*

The University will require a computerized Life Cycle Cost Analysis (LCCA) of the HVAC system to be submitted for all new and renovated facilities to determine the amount of chilled water required from the central system (Master Plan Policy 10.B.1.1). The LCCA may also include material selections such as wall/roof insulation values and window U-value and S.C. Further, Master Plan Policies 10A.3.10 and 10B.2.16 require the use of meters for energy consumption of the University's chilled, heated, and potable water as well as electric utilities.

#### *Accomplishments*

Through the use of the Florida Energy Code, USF has implemented standards in building insulation values for walls, roofs, windows, motor and equipment efficiencies, mechanical systems insulation and controls for both HVAC and lighting. Life cycle cost analysis and FLACOM (Florida Commercial Building Energy Computational Program) are required as part of the Building Construction Document process.

#### *Opportunities*

With careful attention to the design process, evaluation of different material types and choice of efficient mechanical/electrical/plumbing systems, this can be systematically accomplished. Strategies should include Interdisciplinary Design Practices, Redi-Check, and LEED Certification. Further, emphasis could be placed on training, operations, and maintenance to keep buildings operating as designed and efficiently.

#### *Barriers*

Energy efficient systems may cost more and therefore are subject to "value engineering." Additional Design fees may apply. Time dedicated for training may also be a barrier unless creatively scheduled.

#### *Recommendations*

Evaluate current design standard, clarify, update and exceed current building codes where sensibly applicable. This may include utilizing new standards such as ASHRAE Standard 189 – High Performance Green Buildings. This is a standard that is being developed to be accepted as a "code" document. It is being written in conjunction with USGBC and IESNA. Employing a commissioning agent during design and construction would also improve building performance

and IAQ. Also, buildings should have an educational display, training, or other means of informing occupants of energy being saved and consumed.

#### *Assessment*

Physical Plant, Facilities Planning and Construction

### **B. Commissioning**

#### *Vision*

Continuous commissioning and retro-commissioning options will be explored for energy conservation.

#### *Accomplishments*

Facilities Planning and Construction has hired commissioning services on Magnolia Hall and the new Patel Center for Global Solutions, and is currently procuring one for the SE Plant. Commissioning is now a requirement for all new and renovated projects; this includes the new Interdisciplinary Sciences building, Music, the Wellness Center, and the Athletics Basketball Center.

#### *Opportunities*

It has been documented that commissioning saves operational costs, for instance energy savings has been documented to be 10-25 percent over non-commissioned buildings. "Over first five years after commissioning a building saves \$4 on utility costs for every \$1 invested in commissioning." LEED projects require commissioning. In retro-commissioning projects, buildings are evaluated for their current operation compared to the original design. There are opportunities to correct deficiencies due to wear and tear on equipment and to identify revised space loading. In commissioning and retro-commissioning, there is documentation of equipment operations and maintenance, training, and functionality of systems that will ensure life safety, enhance IAQ, and improve energy performance.

#### *Barriers*

The primary barrier is cost. For a new building = \$1.50-\$2.00/sf. For an existing building = \$0.50-\$1.50/sf.

#### *Recommendations*

Require commissioning on all new Major Projects Construction (depending on level of scope). For retro-commissioning, identify buildings where it can be of most benefit, i.e., those that require large amounts of energy (such as the research buildings), have IAQ problems, non-performance issues, and where occupants complain.

#### *Assessment*

Physical Plant, Facilities Planning and Construction

## **C. Conservation**

### *Vision*

Various conservation measures will be explored and all buildings will be Energy Star rated.

### *Accomplishments*

First replaced T12 fluorescent lamps and magnetic ballasts with F32 T8 fluorescent lamps and electronic ballasts under the Green Lights program. The second replacement (currently underway) includes replacing F32 fluorescent lamps with F28 T8 fluorescent lamps for all campus buildings in excess of 4 million square feet. Installed vend-mizer, a motion sensing lighting and energy control technology for vending machines on all vending machines. Replacing incandescent traffic lights with LED traffic lights (a current project). Modified University standards to Induction lighting for street and walkway lighting for current and future projects. Installed motion sensing light switches in classrooms and conference rooms in some existing and new buildings. Converting chilled water distribution system from Primary/Secondary pumping to variable primary type to reduce energy use in pumping and to improve chiller efficiency. Installed economizers on boiler stacks to recover heat from boiler stacks to pre-heat make up water for boilers. Replaced inefficient single stage steam absorption chillers with highly efficient centrifugal electric chillers with up to 0.55kW/ton efficiency. Replaced 3-way bypass valves on chilled water coils with 2-way valves on 90 percent of campus buildings to improve temperature differential between chilled water supply and return, thereby improving energy efficiency of the central chiller plant. Installed building control automation for centralized monitoring and efficiency improvement using newly created specialized team of building control technicians. All new buildings have night setback and/or occupied/unoccupied control. Installed energy metering on most buildings with remote reading and data gathering, also standardized for new buildings. Cost efficient purchasing of natural gas through gas transportation contracts has saved \$7.7 million in gas costs. Close buildings for usage outside of normal operating hours of offices and classes to reduce energy consumption; also reduces after-hours cleaning.

### *Opportunities*

USF has many buildings that could potentially qualify or apply for Energy Star rating. Achieving this rating shows EPA compliance, acknowledgement of building performance, and goals of sustainability. Credits can be applied in LEED-EBOM. The university is also exploring using online dashboards for all buildings. This would allow Physical Plant to turn off computers, lights, and HVAC systems at will.

### *Barriers*

The greatest barriers are time, cost, and building types do not typically fall into EPA's Energy Star rating categories. Another barrier is the lack of incentives for users of energy to conserve. For example, when presented with ideas for saving energy, one person replied, "Why? It doesn't affect our budget/E&G funding."

### *Recommendations*

Begin documentation (requires one year of energy/utility data) to determine applicability. It is also recommended to develop a system to track behavior change to generate feedback to the users of energy so they can work toward improvement.

### *Assessment*

Physical Plant, Power Center for Utility Explorations

## **D. Recovery**

### *Vision*

The University will continue building and equipment improvement as part of Capital Renewal and Infrastructure Improvements to improve energy loss recovery. This effort directly impacts Master Plan Policies 10A.3.3 and 10B.1.2 in which facility improvements will be implemented on identifying priorities of existing deficiencies, maintenance, and expansion.

### *Accomplishments*

Energy recovery is now implemented into design where appropriate. The Greenlights Program has replaced inefficient light fixtures across campus. High efficiency chillers have been installed. Heat pipes on high OA systems have received additional insulation. Roof replacements, with new highly reflective surfaces, have been ongoing. The conversion of the chilled water distribution system from primary/secondary to variable primary has recovered lost energy. Heat pipe heat recovery systems in air handling units with 100% outdoor air have been installed. Return ducts are insulated even though not required by Florida Building Code.

### *Opportunities*

Continual evaluation of building uses and systems can be accomplished. It is possible to evaluate the ventilation and cooling/heating requirements. Anytime a building or system is altered, a broad scope analysis should be done to determine if occupants, equipment, and systems will be affected. At times, building occupant surveys should be completed to identify IAQ problems. A comprehensive program will not only improve energy performance, but identify equipment deficiencies (exterior sealants, leaking ducts, controls, occupancy changes, scheduling). Major renovations could be included with "Performance Based Returns on Energy Projects." LEED-EBOM may be an example to implement.

### *Barriers*

Maintenance budgets often do not match the needs of aging of facilities. As buildings and equipment get older, they will require additional maintenance. Further, infrastructure funding assigned by the State is limited and often projects are moved out for future years. Time for staff training and maintenance funds have decreased significantly by recent budget cuts. Unfortunately, these barriers limit the amount of buildings that are selected for major renovations.

### *Recommendations*

Energy recovery should be a collaborative effort by Facilities Planning and Construction and Physical Plant, among other on-campus units and organizations. Such an effort should be interdisciplinary and should bring together architects, engineers and other technical staff to identify opportunities in saving energy in buildings and improving existing energy-use systems. Interdisciplinary Research and Grants provide opportunities for energy recover projects. Explore performance based returns (explore large scale energy saving projects with proven payback periods). Ideas could range from Chilled Water storage, co-generation, optimizing utility plant efficiency, induction lights on streets and garages, and so on.

### *Assessment*

Physical Plant, Facilities Planning and Construction

## **E. Renewables**

### *Vision*

The production and use of renewable energy on campus will be increased.

### *Accomplishments*

The Solar Energy Charging Station (at the College of Engineering) was established in 1995 and represents the first 20,000 watt solar charging station in the U.S. A solar golf cart retrofit for existing gas-powered carts is currently under evaluation. The Clean Energy Research Center at USF has received over \$15 million of funding in the last 10 years for renewable energy project research, design, and development, including: electric vehicles, photovoltaics, microturbine landfill gas, battery development and management, and hydrogen production/storage and conversion to fuel cells. The Power Center for Utility Explorations at USF has secured a prestigious Smart Grid project worth more than \$15 Million to work with local utilities to create, test, and develop smart grids.

### *Opportunities*

Develop partnership with university organizations, community partners (including the Museum of Science and Industry), and local utilities such as TECO. USF is currently researching solar PV roofing applications for a test facility. Another opportunity is to enter into an agreement to purchase Green Energy (from biomass), as USF does periodically for special events and programs. USF is currently exploring opportunities in generating power through a small scale vertical wind turbine.

### *Barriers*

The effective use of PV has still not provided paybacks. It is anticipated that the efficiency of PVs will increase exponentially over the next few years. Locations will also need to be found for PV or Solar cell "farms."

### *Recommendations*

Seek grants for renewable energy projects. Use of solar cells for water heating could be implemented on a case by case basis (e.g., Patel Center). Track successes at other large institutions. Identify funding sources. Develop partnership with university organizations, community partners, and local utilities. Develop a resource guide for renewable energy purchasing for on-campus events.

### *Assessment*

Physical Plant, Clean Energy Research Center



## Action Steps for Consumption

### A. Procurement

#### *Vision*

Green purchasing will be adopted throughout the University in all areas of purchasing. In addition there will be a simultaneous effort to reduce material use in general. In addition, the university, by amending present policies and directives, will require green technology purchasing by all university affiliates. At present many University approved cleaning product vendors offer green products, and thus those products are available for widespread usage. The vision for the University is to use nothing but environmentally friendly cleaning products and eliminate any opportunities to purchase products that do not meet established green certification standards. All Vendor Codes of Conduct will have a sustainability component and emphasis. Green vendors will be given priority.

#### *Accomplishments*

The USF purchasing department is presently reviewing a new Green Purchasing Directive that was developed by the Waste/Recycling/Purchasing Subcommittee. It has been requested that Sustainability be an agenda item at the Interinstitutional Committee on Purchasing meeting. Several general efforts are underway such as Energy Star purchases of computer equipment, flex fuel purchases for the university fleet, and an emphasis on the importance of sustainability to USF vendors in the competitive bidding process. Physical plant currently purchases Green Seal Certified products for cleaning throughout the university: Respect TM foam soap (made by GOJO specifically for Unisource), Spartan chemicals (including all purpose cleaner, glass cleaner, carpet cleaner, floor seal and finish, floor finish remover, clean by peroxy 15, and Green Solutions Industrial Cleaner), and paper products (toilet tissue jumbo 80 percent recycled content, multifold towels, roll paper towels). Recycled office paper and office papers with various levels of recycled content are available for various colleges and departments to purchase. Most colleges and departments recycle their office paper.

#### *Opportunities*

Adopt the Green Purchasing Directive and begin the process to engage stakeholders in expanding this into a Green Purchasing Policy. Develop language privileging the purchase of recycled and green products. Include more recycled materials on state contracts. Establish a formal definition of "local" for contract language (consider the LEED definition). Expanding green purchasing with a local focus will support the local economy and community, as well as

earn LEED points. Additional benefits include reduction in operating costs and opportunities for student research.

#### *Barriers*

Barriers include potentially higher costs per product, difficulty in quantifying lifecycle benefits, and preconceived perceptions about product performance.

#### *Recommendations*

Adopt current Green Purchasing Directive and create a University wide Green Purchasing Policy. Office budgets should be examined to encourage the purchasing of energy efficient equipment. All vendor codes of conduct should be amended to have a sustainability component and emphasis.

#### *Assessment*

Purchasing and Property Services, Physical Plant

## **B. Dining Services**

#### *Vision*

All food service will be as sustainable as possible, with a focus on local foods and vendors, avoiding waste, and recycling (or composting) all unavoidable waste.

#### *Accomplishments*

Currently, USF Aramark receives local products from Flowers Baking Company, Dressler Foods, TG Lee Dairy, R.G.E. Distributing, and Beege Distributing. They are also researching receiving fresh produce from a company called Fresh Point that supports local growers. Most of their brands on campus carry Fair Trade products. They are also speaking with a company to begin utilizing organic produce in the dining halls. All dining halls offer USDA Organic Certified, Vegan & Vegetarian options at every location, every day. They have implemented trayless dining to save water and energy (32,992 gallons of water saved per academic year), and provide reusable recyclable cups for discounted fountain beverage purchases and reusable recyclable bags to transport food purchases. Dining in with reusable tableware is encouraged, but Aramark also provides reusable recyclable to-go containers. USF Dining Services recycles cardboard and tin materials through Frito-Lay and Republic Waste Services. Low-watt light bulbs are now used and are recycled through Frontier lighting (saves 1,689 kilowatt hours per academic year). Grease from the restaurants is taken by Darling Restaurant Services or Filtafry, which recycles it for biodiesel to power automobiles. Some restaurants now use paper napkins made from 100 percent unbleached, recycled content and are making a switch to green-ware that uses a renewable corn-based resin. There are three recycling containers outside each dining halls where patrons are able to recycle their materials and Aramark partners with the university in recycling at other retail locations.

### *Opportunities*

Extensive opportunities for improvement exist. USF's main food service provider, Aramark, has expertise in sustainable food service. At other universities, Aramark offers dining facilities that serve local foods only, maintain "no waste" restaurants, and support composting programs. Greenware products should be used during the interim time period until zero waste is achieved. Procuring materials locally can stimulate local business and earn LEED points.

### *Barriers*

Aramark programs and staff at USF generally do not receive sustainability training.

### *Recommendations*

USF should require all food service vendors to phase in a plan that would result in zero waste. A university wide CUPS program should be implemented (programs that encourage the use of reusable mugs are usually accompanied by financial incentives such as discounts; vendors save money by reducing the amount of disposables they purchase and the university saves money due to waste reduction). Local food sources should be given first priority. USF Aramark should be required to provide all green services and programs to USF that they currently provide to other universities in Florida. A composting program should be established in partnership with the USF Botanical Garden and interested members of the USF community.

### *Assessment*

Aramark, Housing and Residential Education

## **C. Waste**

### *Vision*

All USF stakeholders will make every effort to reduce consumption and waste.

### *Accomplishments*

There is an extensive recycling program, since 1990, operated by Physical Plant. Yard waste is collected by Republic, and the vendor separates materials. Garbage "solids" are burned at the Falkenburg facility to generate electricity. Scrap metal is recycled. Some food waste is being composted with USF Grounds department. USF regularly participates in the Waste Minimization category in Recyclemania.

### *Opportunities*

Use vendors and food service providers that reduce packaging and use biodegradable or recyclable packaging when it is required. Reduction of material use across campus will result in cost savings and reduced operating costs. USF will earn LEED points and provide opportunities for student research.

### *Barriers*

Baseline data are scattered among various operating units, and so waste levels are difficult to establish or estimate. Scale of impact, tracking, monitoring, and priorities are difficult to assess without baseline statistics.

### *Recommendations*

A campus-wide assessment study is needed. In addition, USF should establish and adopt a campus-wide Material Use Reduction Policy. A “waste audit” working group can be convened to develop the policy, targeting high volume flows.

### *Assessment*

Purchasing and Property Services, Physical Plant

## **D. Paper**

### *Vision*

USF will become a paperless campus.

### *Accomplishments*

On-line review of plans, policies, and other documents saves large amounts of paper every year. Many faculty make use of the digital drop-box feature on Blackboard and review and return term papers and tests electronically. Studies are underway at computing facilities on campus to assess paper use, reuse, and recycling efforts. Over 2,000 recycling containers for paper have been distributed on campus (over 500 tons of paper were recycled in 2009; 9,700 tons have been recycled since the program began).

### *Opportunities*

Encourage paperless information sharing and, when possible, use of double-sided printing. Conduct research on how to make reviewing large documents online as easy as doing it with paper copies.

### *Barriers*

The greatest barrier is behavioral on the part of the consumer.

### *Recommendations*

A thorough analysis of paper usage by all stakeholders should be undertaken as soon as possible. Student paper recycling can be greatly increased if adequate paper recycling receptacles are ensured in every classroom. We must continue to pursue electronic textbook opportunities and work with publishers for multiple use arrangements. Inform students and encourage textbook rentals and exchange. USF has a real opportunity to impact its supply chain in this area. By prioritizing and emphasizing environmental stewardship and local preference the university can use its purchasing power for positive change. University policies should be developed to encourage paperless information sharing and the use of double-sided printing.

## *Assessment*

Purchasing and Property Services, Physical Plant

### **E. Recycling**

#### *Vision*

The University will continue to take steps to reduce the quantity of solid waste generated by expanding its recycling program to include additional interior and exterior, easily accessible drop-off locations (Master Plan Policy 9D.1.1). These drop-off facilities will be installed in the individual buildings, residential areas, or in other convenient locations. The University will strive to provide, at a minimum, for the recycling of paper, corrugated cardboard, glass, plastics, and metals. Awareness programs directed toward students, faculty, and staff will be included in this recycling program. Solid waste management is organized through the University of South Florida Physical Plant department. It provides an infrastructure to dispose of waste through trash receptacles and recycling bins to collect and manage all wastes produced by the University, except for auxiliary buildings and residence halls. (To date the physical plant department is not responsible for auxiliary buildings and residence halls.) The types of recyclables collected by containers and bins include the categories of paper, glass, plastic and cardboard. Mixed paper includes office paper, colored paper, newspapers, junk mail, phonebooks, file folders and cardboard. Glass bottles, plastic bottles, and aluminum cans are collected from these buildings as well. A special, more comprehensive, recycling area is located on Sycamore Drive at the University, which will be able to support use by members of the USF community who live off campus in apartments or condominiums that lack recycling facilities. USF also works to increase the availability of recycling in such complexes, by providing information to new faculty and students about which complexes provide recycling.

#### *Accomplishments*

USF has completed its first waste audit. Data including volumes and revenue for paper and aluminum recycling have been compiled. Student assistants went through actual receipts from 1996 through 2007. It was determined that physical plant has recycled over 48 tons of aluminum and over 9,700 tons of mixed paper. This is an important step in developing a plan to expand recycling efforts. Physical plant expanded its recycling of plastics and glass in addition to the Sycamore Drive Community Recycling Center. An additional 350 blue recycling containers were distributed to academic and administrative Tampa campus buildings. Additional containers are planned. The USF Student Environmental Association has been working on establishing aluminum can recycling in the residence halls. They have secured a private sector partner – Tampa Bay Recycling – to donate the bins. The Housing and Residential Education Recycling Committee is beginning a pilot project in Juniper-Poplar (a 1,000 bed residence) with bins donated from Coca-Cola Recycles.

#### *Opportunities*

Increase supply of recycling bins for multiple types of objects. Pursue new private sector recycling management partnerships once the recycling market rebounds (such as Tampa Bay

Recycling). Pursue underwritten private sector promotional partnerships to increase recycling with programs such as those provided by Coca-Cola and Anheuser-Busch distributors. Develop waste minimization plans to lessen the volume of necessary recycling. Develop opportunities for student research and service learning. Support the student-driven Recyclemania program throughout the university.

#### *Barriers*

Bin location, space requirements, staff and transportation costs, are all effective barriers to recycling on campus. Recycling market conditions are poor at present following the national financial crisis, but are expected to reverse with the renewed focus on environmental stewardship and federal efforts.

#### *Recommendations*

Develop a University wide recycling policy that would include branch campuses, auxiliary buildings, and residence halls to truly maximize recycling capability and efficiency. Restructure building budgets to require that individual buildings pay for trash collection thereby encouraging maximum recycling and promote paperless efforts. It is recommended to track behavior change to provide feedback to the generators of waste (e.g., departments, etc.) so they can work toward improvement.

#### *Assessment*

Physical Plant, Purchasing and Property Services

## **F. Electronic Equipment Recycling**

#### *Vision*

USF will recycle all electronic equipment.

#### *Accomplishments*

To date, various colleges, departments, and divisions oversee their own electronic waste recycling. Many colleges and departments actively recycle their equipment with various companies and programs.

#### *Opportunities*

USF has an opportunity to streamline and simplify electronic waste collection by developing a unified process for the recycling of electronic waste. Care must be taken to vet companies in this field to prevent the use of so-called recyclers who ship the waste abroad to be dumped and thereby contribute to a larger problem. Many legitimate programs are free. A few manufacturers accept old equipment from customers who purchase new equipment. USF could give preference to these or at least let purchasers know about which do and do not.

#### *Barriers*

Lack of centralized policy and resource identification.

### *Recommendations*

USF has the opportunity to participate in many free electronic recycling programs. The University should adopt a policy that mandates electronic recycling to responsible parties (recyclers who do not ship materials for dumping abroad). The University could establish a centralized collection point, or allow decentralized decision making as long as electronic equipment is recycled. Participation in these programs should not be optional. At a minimum, acceptable programs should be identified and their contact information distributed throughout the University system.

### *Assessment*

Computer Store, Purchasing and Property Services

## **G. Recycling Construction Debris**

### *Vision*

The University will recycle and/or salvage construction, demolition and land clearing waste as practical and possible (Master Plan Policy 9D.2.2).

### *Accomplishments*

Construction waste is increasingly being recycled. All LEED projects require records to be submitted as evidence.

### *Opportunities*

Require recycled materials records to be kept for all construction and demolition projects, large and small.

### *Barriers*

Monitoring and enforcement is difficult.

### *Recommendations*

Revise the Facilities Planning and Construction "Design and Construction Guidelines" to require recycled materials records to be kept for all demolition projects.

### *Assessment*

Facilities Planning and Construction, Physical Plant