



## **2<sup>nd</sup> Greenhouse Gas Inventory Report**

**September 15, 2010**

**Office of University Sustainability**

**GoGreen.FIU.edu**

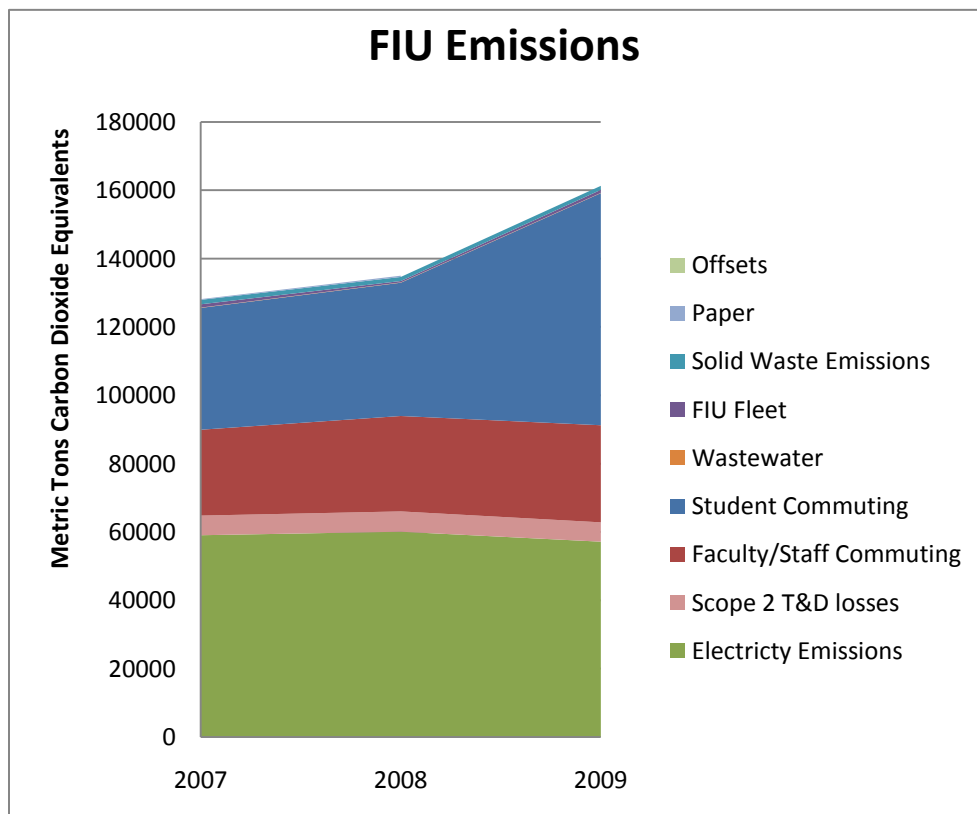
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## Executive Summary

Since the signing of the ACUPCC in May 2007, Florida International University has made great strides in formalizing sustainability on campus. In 2009, a full time staff member was hired to oversee sustainability initiatives. A Sustainability Committee consisting of 6 students, 6 faculty, and 6 staff members was formed in early 2010 that serves as a sustainability advisory committee to the President of the university. More recently, an Office of University Sustainability was established. The office will have 2 full-time staff and many student interns. The main focus of the office will be on integrating sustainability into the culture at FIU as well as implementing projects to reduce emissions. FIU has a very ambitious growth plan. From 2007 to 2009 student population increased by 2,000 students and over 100,000 square feet have been added to the campus building footprint. In the next 5 years, FIU plans to increase the population even more and continue adding more buildings to the campus. Even with this growth spurt, FIU has successfully implemented mitigation projects and reduced emissions in four main areas.

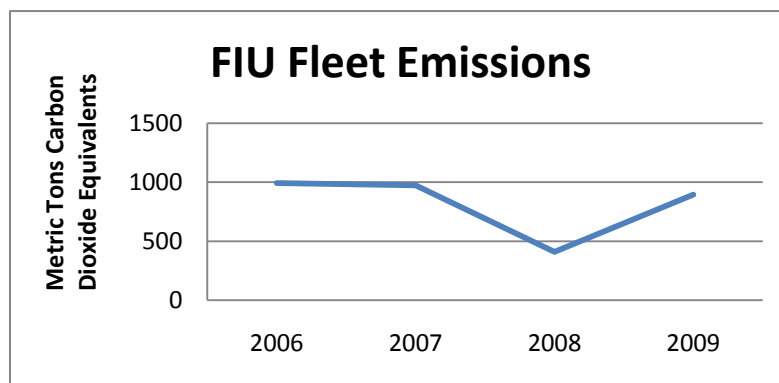
For this inventory, the Clean Air – Cool Planet Campus Carbon Calculator was used. This is the same program used in the initial greenhouse gas inventory in 2008. The Campus Carbon Calculator is specifically designed for colleges and universities to track emissions. It is an excel based program that produces charts, graphs, and projects into the future. Emissions in this report and in the Clean Air – Cool Planet Campus Carbon Calculator are measured in Metric Tons of Carbon Dioxide Equivalents, or MTeCO<sub>2</sub>. This unit converts other greenhouse gas emissions into equivalents of carbon dioxide so one number can be focused on. In 2007 FIU emitted 127,136.1 MTeCO<sub>2</sub>. Emissions increased in 2008 to 134,977.6 MTeCO<sub>2</sub>, and then to 161,393.0 MTeCO<sub>2</sub> in 2009. FIU has been very successful in reducing emissions in the areas of electricity, wastewater, fleet, and solid waste. Student commuting is the largest emitter at FIU. This will be an area of focus in the upcoming years. Demand management strategies are needed to reduce commuter emissions with a growing population.



## Scope One: Fleet

FIU has made changes to “green” the campus fleet. Since 2007, the number of vehicles in the campus fleet has been reduced. Biodiesel was added to the fleet fuel mix; two 100% Bio-diesel buses were added to make trips between campuses, and a third one is scheduled to join the fleet in the upcoming year. Within the last year, all fleet vehicles running on diesel switched to using 20% bio-diesel. The campus fleet consists of many vehicles including trucks, cars, boats, buses, and golf carts. These vehicles use a variety of fuel types from 100% Bio-diesel to electricity to gasoline. These changes have shown a decrease in emissions over the last 4 years.

There is a dip in emissions in 2008 due to a long period of time when the majority of the campus fleet vehicles were inactive. Emissions are expected to decrease from 2006 levels because of increased use of Bio-diesel, a decrease in diesel fuel, and a smaller fleet.



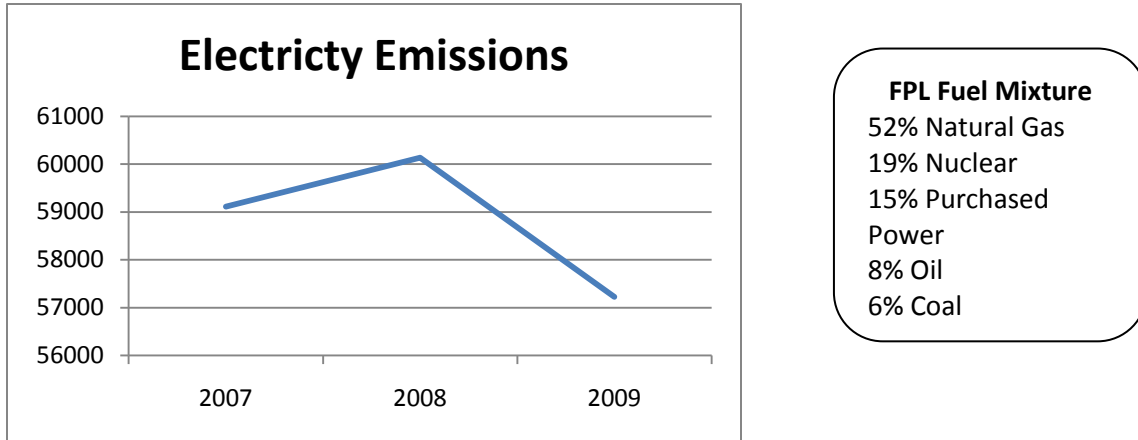
## Scope One: Refrigerants and Chemicals

Data was collected from the FIU Environmental Health and Safety Office who collect and file annual reports from all campus departments. FIU phased out the use of the refrigerant chemical HCFC-22, in 2009 per the Montreal Protocol. HCFC-22 and other chemicals like it are commonly used in air conditioning applications. This chemical and other similar chemicals are being phased out because of the high global warming potential. It is 1810 times more potent than carbon dioxide.<sup>1</sup>

<sup>1</sup> IPCC (2007), Changes in Atmospheric Constituents and in Radiative Forcing, <http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-chapter2.pdf>

## Scope Two: Energy Usage

FIU has been successful at reducing energy emissions over the last couple years. Many projects have been implemented such as a 5-Year Energy Conservation Plan and LEED Silver Certified buildings to reduce the amount of energy consumed and save money. FIU's energy is supplied by the Florida Power & Light Company; they use a variety of different fuel sources. In 2007 emissions from electricity was 58,109.4 MTeCO<sub>2</sub>. It decreased in 2009 to 57,223.8 MTeCO<sub>2</sub>.



### Electricity Consumption and Cost per Gross Square Foot

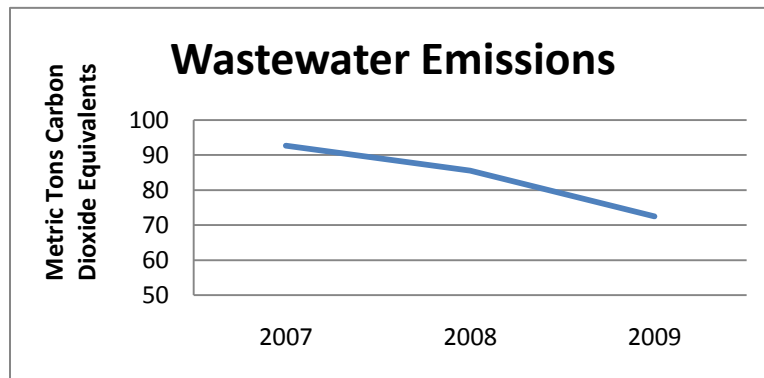
| Fiscal Year | GSF       | kWh               | Electricity Cost | kWh/Ft. <sup>2</sup> | Cost/FT. <sup>2</sup> |
|-------------|-----------|-------------------|------------------|----------------------|-----------------------|
| 2007        | 6,465,756 | 96,736,716        | \$8,321,806.27   | 14.9                 | \$1.29                |
| 2008        | 6,465,756 | 100,104,021       | \$8,387,289.21   | 15.5                 | \$1.30                |
| 2009        | 6,580,685 | <b>95,262,420</b> | \$8,531,589.09   | <b>14.5</b>          | \$1.30                |

FIU is committed to building LEED Silver Certified buildings. LEED certified buildings reduce energy consumption and greenhouse gas emissions, save money, and are healthier for the environment and people. They are specifically designed with energy conservation in mind. In 2010, FIU's first LEED Silver certified building was opened. FIU has made a commitment to certify all new construction buildings LEED Silver.

In electricity generation that is not produced on site, there will be transmission and distribution losses. This occurs when the electricity is transported through transmission lines to the site of usage. On average 9% to 10% of electricity is lost during T&D. Losses from T&D mirror electricity consumption.

### Scope Three: Wastewater

Wastewater is any water that has been adversely affected in quality by human activity. The most common wastewater is from sewage and drainage. The Facilities Management Department at FIU has been upgrading the sanitary system. This resulted in a decrease in emissions by 22% since 2007 from wastewater. The department expects efficiency to increase more as the system is re-evaluated and upgraded further to be in compliance with the Department of Environmental Resource Management.



### Scope Three: Paper

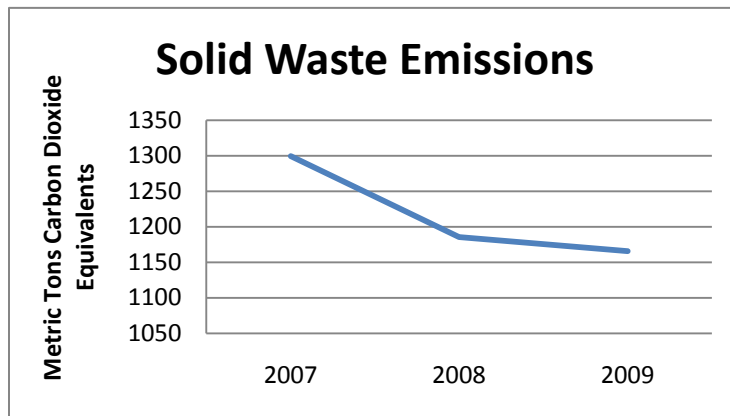
Paper consumption was not included in the initial greenhouse gas inventory due to lack of data. OfficeMax has a vending contract with FIU for office supplies. They were able to provide the quantity of paper purchases over the last couple years. FIU made a commitment to purchase a minimum of 30% recycled content white office paper. Departments and offices can choose to purchase a higher recycled content paper if they would like. FIU's emissions from paper consumption is very small, however it has increased in the last couple of years. To reduce paper consumption, the FIU Sustainability Committee is looking to partner with OfficeMax to have a print reduction campaign across the university. Also, a cost-benefit analysis is being conducted to see if raising the minimum recycled content will be economical.

### Scope Three: Solid Waste

With a population of around 40,000 students and 8,000 employees, FIU creates a large amount of waste. FIU has been successful at reducing the waste stream by increasing the recycling program on campus. Currently FIU uses a single stream recycling program where all recyclables can be placed in the same bin and do not have to be sorted. The single stream program increased participation in recycling which decreased the amount of waste produced. FIU also offers many recycling programs to the community outside of the main stream recycling program. There is a very strong cardboard recycling program on campus. There are drop off locations around campus for empty ink cartridges and batteries, all of FIU's tree trimmings are chipped and used for mulch. The Facilities Management Department recycles light bulbs, ballasts, and wood pallets. FIU Vehicle Services recycles used oil, oil rags, and old tires. In Spring 2010 FIU had its first electronics recycling drive where people could drop off unwanted electronics to be recycled properly and for free. Having a strong recycling program reduces the amount of waste FIU creates, saves money, and preserves the environment.

Every year, FIU participates in RecycleMania. It is a national competition between schools to see who can recycle and reduce their waste stream the most. This past year, FIU placed second in the state in the Gorilla Prize division, which is based on cumulative pounds recycled. FIU is working towards a goal of recycling 75% of the waste stream by 2020 per the Florida Energy Bill signed in 2008 by the Florida Governor. Currently FIU recycles an average of 30% of the waste stream each month.

Emissions from solid waste have dropped by around 10% since 2007. FIU will continue to promote and expand the campus recycling program. A waste audit will be conducted by students to help determine the best way to reduce the waste stream and where to place trash and recycling bins to have better compliance.



In 2007 emissions from solid waste was 1,299.2 MTeCO<sub>2</sub> and in 2009 it dropped to 1,165.7 MTeCO<sub>2</sub>. FIU has not established any formal offsets.

### Scope Three: Offsets

In the future FIU will look into establishing large offsets, but currently the focus is on mitigation of emissions. There is currently one small offset; it is from composting. The Panther Dining Office, run by Aramark, in conjunction with the Agroecology Program and the FIU Garden Club compost all organic food waste from the Fresh Foods Cafeteria. Each week between 150 to 225 pounds of food waste is composted. That averages out to reducing about 1.4 metric tons of CO<sub>2</sub> equivalents in one year.

In the initial greenhouse gas inventory, a nature preserve on campus was counted as an offset. It was clarified that already existing preserves could not be used as an offset, so it was not counted in this inventory or in the updated 2007 baseline.

### Scope Three: Commuting

FIU has a very large commuter population. Around 3,000 students reside on campus and 38,000 students take some form of transportation to campus. Commuting continues to be FIU's largest emitter, and has increased since 2007. It is the only area that has not decreased since the initial inventory.

Estimations of commuter habits had to be made for the initial greenhouse gas inventory. In this inventory, commuter data is more accurate. Commuter data is estimated using a sample population. The sample population is from students and employees who filled out a commuter survey during a time they interacted with the Parking and Transportation Office, either online or in person. There are two different surveys, one for online, and one for in the office (paper). No one is required to fill out a survey and the survey is not linked to a specific student or employee. Surveys that are incomplete or incorrect are not used in the sample population.

#### FIU Commuter Survey

1. What type of decal do you have? (paper version only) [This defines the person's role]
2. What zip code do you most often commute from to FIU?
3. Which campus do you most often commute to?
4. How many total miles do you drive to and from FIU on an average day when you go to campus?
5. How many days, on average, do you commute to FIU a week?
6. What is the make, model, and year of the car you most often use to commute to FIU.

The survey asks the participant to estimate the number of miles they commute on an average day to and from FIU. The responses to this question have a high error due to people guessing. These numbers were not used in the greenhouse gas inventory. Mileage was calculated from zip codes. An excel file was made with each zip code listed on surveys and the distance from the center of that zip code to each campus. All the mileage was then averaged together to get the average mileage of a one-way commute trip. FIU serves a large geographic area, many students from surrounding counties commute to FIU every day. A few zip codes were recorded that are over 65 miles from one of the FIU campuses; they were excluded in calculating the average commute trip mileage. We found that the average one-way commute trip for an FIU community member is 24 miles.

Many other averages and assumptions had to be made about the commuter population. Students typically don't commute to campus every day. The average days a week students commute to campus came out to 3.6 days. This works out to 7.2 one-way commute trips per student per week. The number of weeks a year students commute to campus can vary greatly depending on if they are present Fall and Spring Semester and also if they take summer courses. The number of weeks was estimated looking at the academic calendar for the past few years and taking an average. The Spring and Fall semester average out to about 15 weeks each and the summer semester is one 15 week term or two 6 week terms. Since a large majority of the FIU population is present during the summer terms, it was estimated that the average student commutes to school 36 weeks a year.

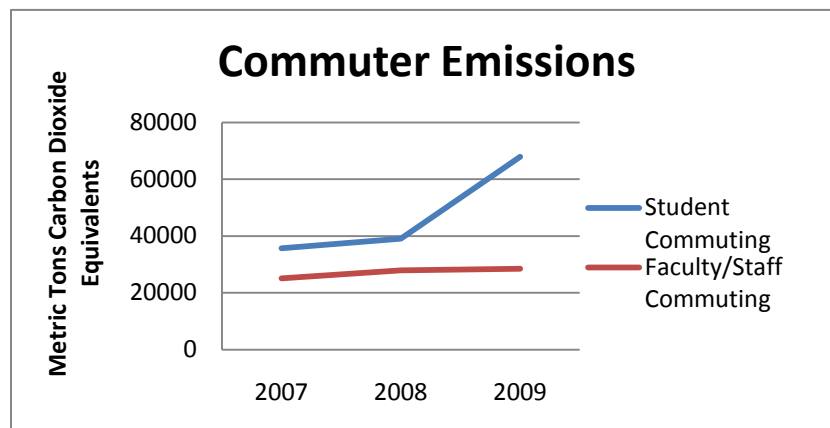
Only the average one-way commute mileage was used in calculating faculty and staff commuting emissions. Like students, many faculty at the University do not come to campus every weekday. They were estimated in coming to campus 4 days a week. Staff however, have a set schedule and come to campus 5 days a week. The number of weeks a year faculty and staff commute to campus also differs. Faculty were estimated to commute 45 weeks a year, however some faculty do not work during the summer semester, so their commuting weeks would be lower. Since staff are on more of a set schedule they are estimated to commute to campus 50 weeks a year.

There were many possible errors and limitations in the data the commuter survey collected:

1. The survey does not link to a specific person; someone can fill out multiple surveys skewing results.
2. The web survey does not ask what type of decal they have, therefore we do not know if they are student or employee. (The paper survey asks)
3. Since the survey is fill-in-the-blank, there is higher error as opposed to a “multiple-choice” or option survey.
4. The survey is only for people who have to come in the Parking and Transportation office or go to the website, therefore excluding parts of the population that do not need a decal because of biking, walking, public transportation (that is not purchased at the office), or getting dropped-off.
5. The survey is not mandatory for the university community to fill out.
6. Multiple surveys come back with missing fields or incorrect data that cannot be used.
7. The survey is not automatically uploaded into an excel file or database, human entry error can occur.
8. Mileage will never be 100% correct because only mileage from the center from each zip code to the campuses is known.
9. People can make multiple trips to campuses or different campuses a day.
10. People may drive from somewhere other than the zip code they gave.
11. The commuter survey only sampled a small percentage of the population, around 2.7%.
12. Since the survey did not distinguish between student and employee, a proportion was used based on the population of FIU.

These limitations will be addressed and changed for the 2010-2011 academic year commuter survey. The new survey will be sent to the entire FIU population and will record information on not only driving, but transportation in general like walking, biking, or taking the bus.

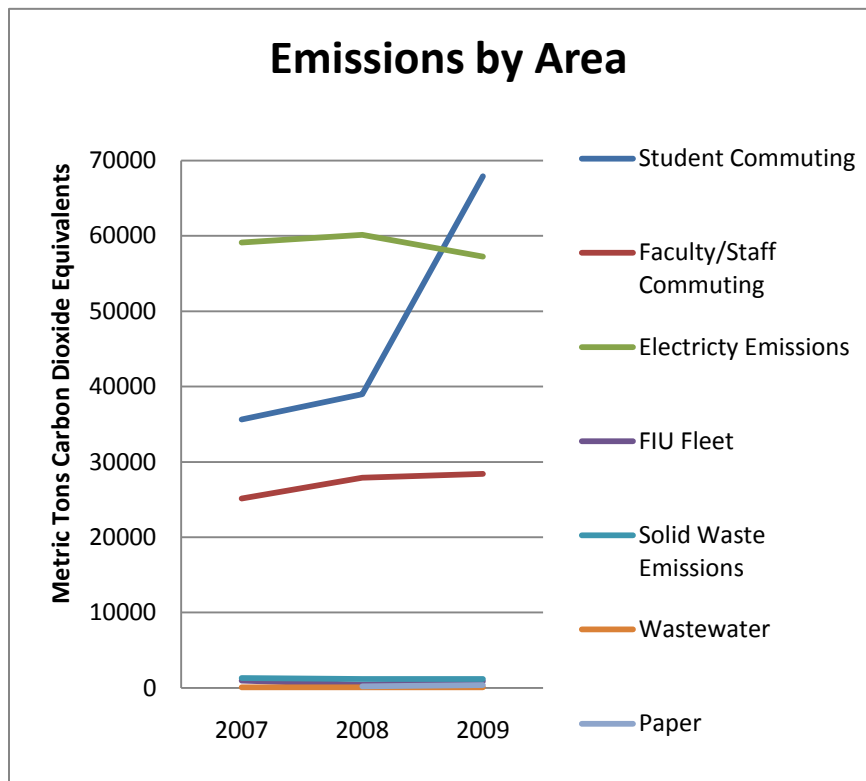
Emissions from commuting, particularly students, have increased dramatically since 2007. In 2007 17,543 student parking decals were purchased, in 2009 31,966 student decals were purchased. That is a 46% increase in students driving to campus. Student commuting accounted for 35,639 MTeCO<sub>2</sub> in 2007 and in 2009 it jumped to 67,914 metric tons of carbon dioxide equivalents. Faculty and Staff commuting emissions have held steady since 2007 only rising an average of 1,000 MTeCO<sub>2</sub> tons a year.



There are programs in place that promote alternative transportation at FIU. The FIU GreenRide Carpool Program is in its second year and currently has over 1,400 users. While that is only about 1% of the commuting population, the program is continuously growing. FIU will continue to promote and expand the program. The Golden Panther Express Shuttle bus and the Cats shuttle bus travels between the three main FIU campuses giving students an option to driving. The Cats shuttle buses run on 100% Bio-diesel. FIU also offers a half price discount to students on the county’s metro pass that allows access to the country bus system. In the future FIU hopes to partner with the county on transportation projects such as a light rail project extending to FIU.

**Conclusion**

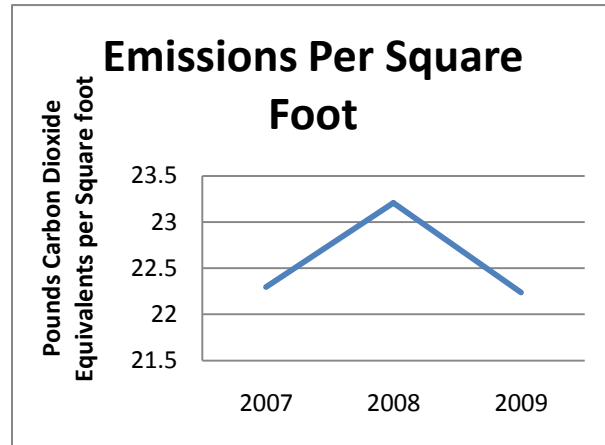
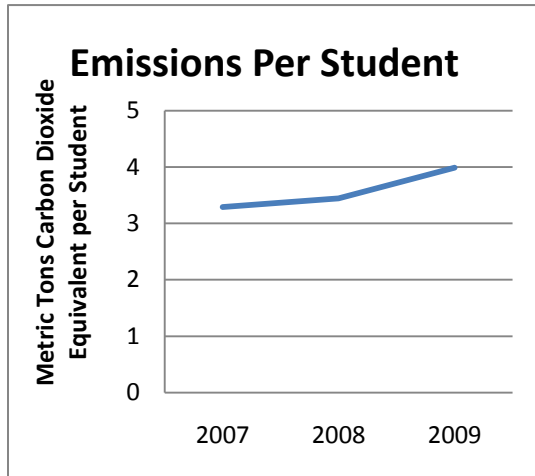
FIU has been successful in reducing emissions in many areas. FIU’s goals for the future will focus on reducing emissions from commuters. Emissions from commuting increased so much since 2007, that reductions in other areas are not visible. For the future, the focus will be on developing transportation demand management strategies to reduce commuter emissions, while maintaining emission reductions in other areas. This will be very important with the continual growth of FIU. There are plans to increase total enrollment to 50,000 students by 2015. Reducing emissions of a growing university will be difficult, but the newly formed Office of University Sustainability will be able to focus on and implement mitigation projects.



The graph above shows the decrease and increase of emissions in each area. Student commuting accounted for 42% of total emissions in 2009. The next largest area of emissions is from electricity which

accounted for 35% of total emissions. Solid Waste, Wastewater, FIU Fleet, and Paper consumption produce very little emissions compared to the other areas; all areas together account for less than 4% of total emissions. Due to changes in calculation methods and more accurate data, the baseline established by 2007 numbers changed since the initial inventory was conducted.

With FIU’s aggressive growth plan, it is important to reduce emissions per student and per gross square foot to show progress. The charts below outline emissions per student served and emissions per gross square foot.



Does not include commuter emissions

FIU will follow the Climate Action Plan to reduce emissions. The action plan outlines three reduction scenarios. The first is the most aggressive goal of 25% below 2007 levels by 2025. The other goals are 10% and 15% below 2007 levels by 2025. Even though FIU will be increasing campus population and adding infrastructure, the primary reduction goal is 25% reduction below the 2007 levels. A 25% reduction below 2007 levels is 95,352 MTeCO<sub>2</sub>. From current levels, FIU would need to mitigate 66,362 MTeCO<sub>2</sub>. The main focus will be on reducing emissions from commuters since they produce the most emissions. The action plan will be updated this year with the new data and numbers from this inventory. It will outline how previous projects have helped reduce FIU’s emissions, and introduce new projects to reduce emissions in the future.

Over the past year, FIU has been developing a custom Greenhouse Gas Database and Inventory. This database is being developed by the FIU Sustainability Program Assistant and a group students led by a professor in the Construction Management Department. Instead of purchasing a Greenhouse Gas Inventory software, the Climate Commitment Task Force saw this as an opportunity to create a database that would be custom tailored to FIU and allow students to gain experience. The database will store all data needed for the inventory as well as perform calculations and create graphs and reports from the data. The inventory will be a live website that is available for all to view and track FIU’s emissions. Having this information become interactive with the campus population will help them become more involved in the effort of reducing emissions on campus.

## References

**Clean Air Cool Planet Campus Carbon Calculator:** <http://www.cleanair-coolplanet.org/toolkit/inv-calculator.php>

**FIU Climate Action Plan:** <http://wordpress.fiu.edu/gogreen/2009/09/21/president-rosenberg-approves-fius-climate-action-plan/>

**FIU Initial Greenhouse Gas Inventory:** <http://wordpress.fiu.edu/gogreen/2009/09/21/president-rosenberg-approves-fius-climate-action-plan/>

**FIU 5 Year Energy Conservation Plan:** <http://facilities.fiu.edu/>

**FIU Recycling** (within The Facilities Management Department): <http://facilities.fiu.edu/Recycling>

**The Facilities Management Department:** <http://facilities.fiu.edu/>

**FIU Department of Parking and Transportation:** <http://parking.fiu.edu>

**The Florida Power and Light Company:** <http://fpl.com>

### **Special Thanks to the following Offices for providing data for the inventory**

Office of Planning and Institutional Research

The Facilities Management Department

Department of Parking and Transportation

OfficeMax

The Panther Dining Office (Aramark)

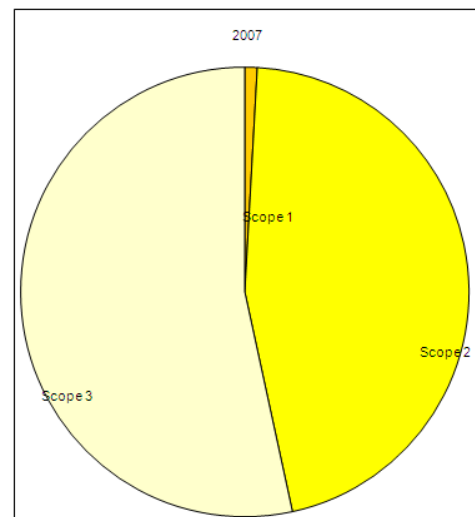
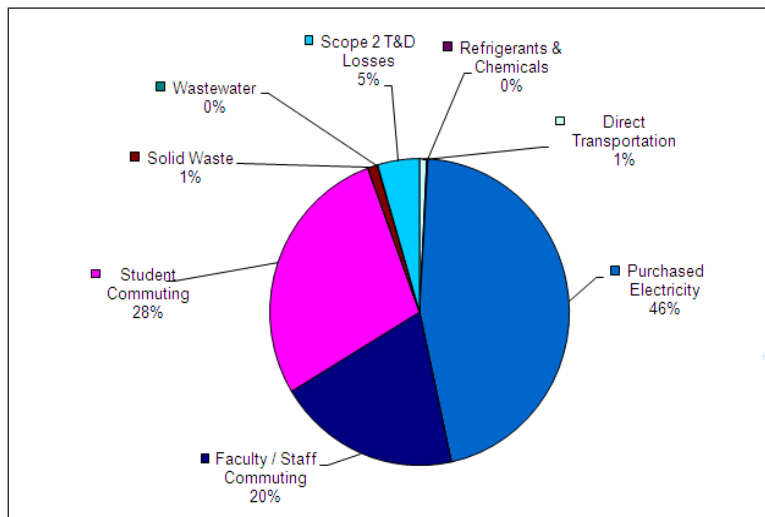
The Department of Risk Management and Environmental Health & Safety

Office of the Controller, Finance & Administration

Appendix

Fiscal Year 2007

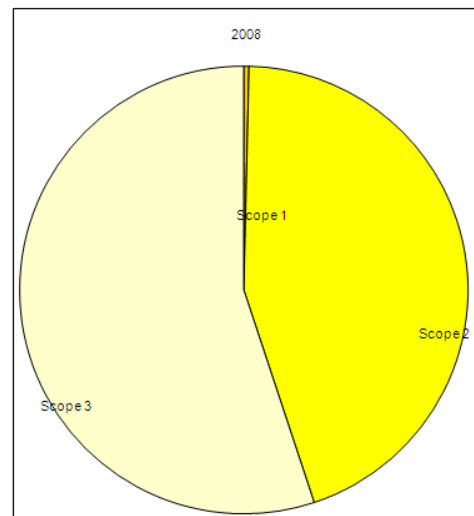
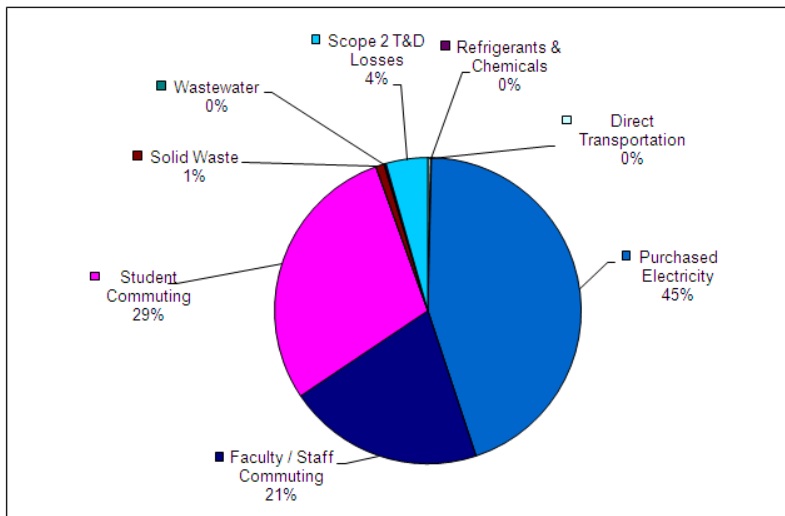
| MODULE          | Summary                         |                    |                 |                 |                  |                  |
|-----------------|---------------------------------|--------------------|-----------------|-----------------|------------------|------------------|
| WORKSHEET       | Overview of Annual Emissions    |                    |                 |                 |                  |                  |
| UNIVERSITY      | FIU                             |                    |                 |                 |                  |                  |
| Select Year --> | 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      | -                  | -               | -               | -                | -                |
|                 | Direct Transportation           | 13,508.0           | 950,291.6       | 175.8           | 61.1             | 972.9            |
|                 | Refrigerants & Chemicals        | -                  | -               | -               | -                | 154.2            |
|                 | Agriculture                     | -                  | -               | -               | -                | -                |
| <b>Scope 2</b>  | Purchased Electricity           | 778,747.9          | 57,857,580.9    | 658.2           | 789.8            | 58,109.4         |
|                 | Purchased Steam / Chilled Water | -                  | -               | -               | -                | -                |
| <b>Scope 3</b>  | Faculty / Staff Commuting       | 349,168.7          | 24,508,306.1    | 4,789.8         | 1,653.5          | 25,120.8         |
|                 | Student Commuting               | 494,851.0          | 34,810,016.0    | 6,452.2         | 2,242.9          | 35,639.7         |
|                 | Directly Financed Air Travel    | -                  | -               | -               | -                | -                |
|                 | Other Directly Financed Travel  | -                  | -               | -               | -                | -                |
|                 | Study Abroad Air Travel         | -                  | -               | -               | -                | -                |
|                 | Solid Waste                     | -                  | -               | 51,968.9        | -                | 1,299.2          |
|                 | Wastewater                      | -                  | -               | 218.9           | 292.8            | 92.7             |
|                 | Paper                           | -                  | -               | -               | -                | -                |
|                 | Scope 2 T&D Losses              | 77,019.0           | 5,722,178.3     | 65.1            | 78.1             | 5,747.1          |
| <b>Offsets</b>  | Additional                      |                    |                 |                 |                  | -                |
|                 | Non-Additional                  |                    |                 |                 |                  | -                |
| <b>Totals</b>   | <b>Scope 1</b>                  | 13,508.0           | 950,291.6       | 175.8           | 61.1             | 1,127.1          |
|                 | <b>Scope 2</b>                  | 778,747.9          | 57,857,580.9    | 658.2           | 789.8            | 58,109.4         |
|                 | <b>Scope 3</b>                  | 921,038.8          | 65,040,500.5    | 63,494.9        | 4,267.3          | 67,899.5         |
|                 | <b>All Scopes</b>               | 1,713,294.7        | 123,848,373.0   | 64,328.9        | 5,118.3          | 127,136.1        |
|                 | <b>All Offsets</b>              |                    |                 |                 |                  | -                |
|                 | <b>Net Emissions:</b>           |                    |                 |                 |                  | <b>127,136.1</b> |



Clean Air – Cool Planet Campus Carbon Calculator

Fiscal Year 2008

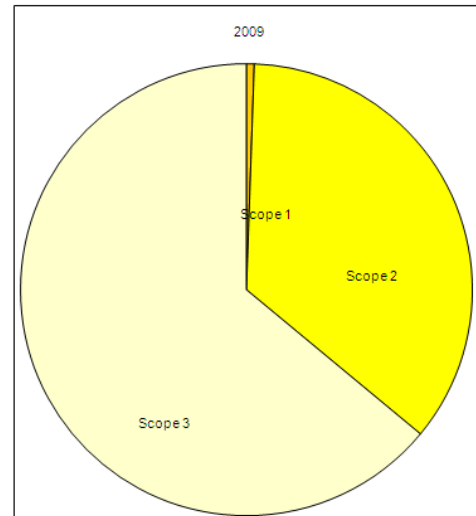
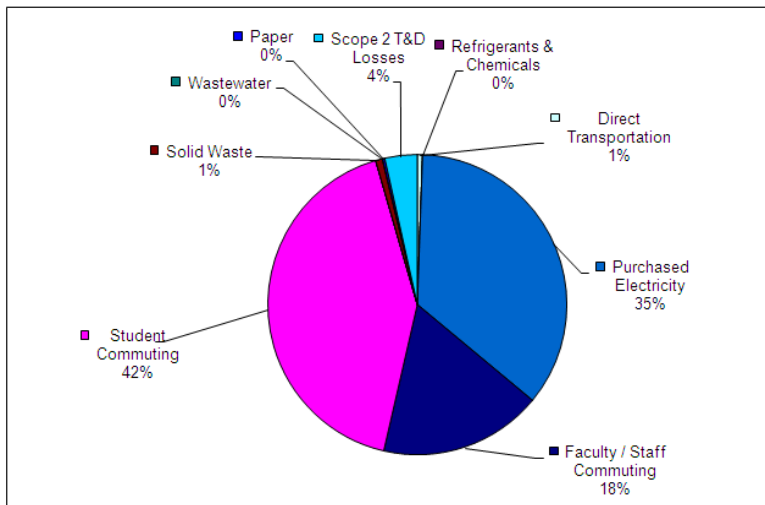
| MODULE          | Summary                         |                    |                 |                 |                  |                                 |
|-----------------|---------------------------------|--------------------|-----------------|-----------------|------------------|---------------------------------|
| WORKSHEET       | Overview of Annual Emissions    |                    |                 |                 |                  |                                 |
| UNIVERSITY      | FIU                             |                    |                 |                 |                  |                                 |
| Select Year --> | 2008                            | 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      | -                  | -               | -               | -                | -                               |
|                 | Direct Transportation           | 5,781.2            | 399,516.8       | 71.8            | 25.1             | 408.8                           |
|                 | Refrigerants & Chemicals        | -                  | -               | -               | -                | 86.4                            |
|                 | Agriculture                     | -                  | -               | -               | -                | -                               |
| <b>Scope 2</b>  | Purchased Electricity           | 805,855.3          | 59,871,543.4    | 681.1           | 817.3            | 60,132.1                        |
|                 | Purchased Steam / Chilled Water | -                  | -               | -               | -                | -                               |
| <b>Scope 3</b>  | Faculty / Staff Commuting       | 387,999.1          | 27,233,830.2    | 5,322.5         | 1,837.4          | 27,914.4                        |
|                 | Student Commuting               | 541,591.7          | 38,090,634.3    | 7,094.0         | 2,464.4          | 39,002.4                        |
|                 | Directly Financed Air Travel    | -                  | -               | -               | -                | -                               |
|                 | Other Directly Financed Travel  | -                  | -               | -               | -                | -                               |
|                 | Study Abroad Air Travel         | -                  | -               | -               | -                | -                               |
|                 | Solid Waste                     | -                  | -               | 47,410.0        | -                | 1,185.3                         |
|                 | Wastewater                      | -                  | -               | 201.8           | 269.9            | 85.5                            |
|                 | Paper                           | -                  | -               | -               | -                | 217.0                           |
|                 | Scope 2 T&D Losses              | 79,700.0           | 5,921,361.4     | 67.4            | 80.8             | 5,947.1                         |
| <b>Offsets</b>  | Additional                      |                    |                 |                 |                  | (1.4)                           |
|                 | Non-Additional                  |                    |                 |                 |                  | -                               |
| <b>Totals</b>   | Scope 1                         | 5,781.2            | 399,516.8       | 71.8            | 25.1             | 495.2                           |
|                 | Scope 2                         | 805,855.3          | 59,871,543.4    | 681.1           | 817.3            | 60,132.1                        |
|                 | Scope 3                         | 1,009,290.8        | 71,245,825.9    | 60,095.6        | 4,652.6          | 74,351.6                        |
|                 | All Scopes                      | 1,820,927.2        | 131,516,886.1   | 60,848.5        | 5,495.0          | 134,978.9                       |
|                 | All Offsets                     |                    |                 |                 |                  | (1.4)                           |
|                 |                                 |                    |                 |                 |                  | <b>Net Emissions: 134,977.6</b> |



Clean Air – Cool Planet Campus Carbon Calculator

Fiscal Year 2009

| MODULE          | Summary                         |                    |                 |                 |                  |                  |
|-----------------|---------------------------------|--------------------|-----------------|-----------------|------------------|------------------|
| WORKSHEET       | Overview of Annual Emissions    |                    |                 |                 |                  |                  |
| UNIVERSITY      | FIU                             |                    |                 |                 |                  |                  |
| Select Year --> | 2009                            | 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      | -                  | -               | -               | -                | -                |
|                 | Direct Transportation           | 12,956.2           | 872,336.3       | 170.1           | 59.1             | 894.2            |
|                 | Refrigerants & Chemicals        | -                  | -               | -               | -                | -                |
|                 | Agriculture                     | -                  | -               | -               | -                | -                |
| <b>Scope 2</b>  | Purchased Electricity           | 766,879.5          | 56,975,814.3    | 648.2           | 777.8            | 57,223.8         |
|                 | Purchased Steam / Chilled Water | -                  | -               | -               | -                | -                |
| <b>Scope 3</b>  | Faculty / Staff Commuting       | 394,873.2          | 27,716,200.8    | 5,417.3         | 1,870.1          | 28,408.9         |
|                 | Student Commuting               | 939,120.0          | 65,979,172.4    | 12,609.6        | 4,365.6          | 67,595.4         |
|                 | Directly Financed Air Travel    | -                  | -               | -               | -                | -                |
|                 | Other Directly Financed Travel  | -                  | -               | -               | -                | -                |
|                 | Study Abroad Air Travel         | -                  | -               | -               | -                | -                |
|                 | Solid Waste                     | -                  | -               | 46,627.8        | -                | 1,165.7          |
|                 | Wastewater                      | -                  | -               | 171.1           | 228.9            | 72.5             |
|                 | Paper                           | -                  | -               | -               | -                | 374.4            |
|                 | Scope 2 T&D Losses              | 75,845.2           | 5,634,970.6     | 64.1            | 76.9             | 5,659.5          |
| <b>Offsets</b>  | Additional                      |                    |                 |                 |                  | (1.4)            |
|                 | Non-Additional                  |                    |                 |                 |                  | -                |
| <b>Totals</b>   | <b>Scope 1</b>                  | 12,956.2           | 872,336.3       | 170.1           | 59.1             | 894.2            |
|                 | <b>Scope 2</b>                  | 766,879.5          | 56,975,814.3    | 648.2           | 777.8            | 57,223.8         |
|                 | <b>Scope 3</b>                  | 1,409,838.4        | 99,330,343.9    | 64,889.9        | 6,541.5          | 103,276.4        |
|                 | <b>All Scopes</b>               | 2,189,674.0        | 157,178,494.6   | 65,708.1        | 7,378.4          | 161,394.4        |
|                 | <b>All Offsets</b>              |                    |                 |                 |                  | (1.4)            |
|                 | <b>Net Emissions:</b>           |                    |                 |                 |                  | <b>161,393.0</b> |



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