



# **Greenhouse Gas Emissions Inventory Report FY14**

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## **Lakeland Community College Greenhouse Gas Emissions Inventory Report FY14**

### **Introduction:**

This report is a follow-up to the Greenhouse Gas Emissions Inventory Report for FY 2004 – 2013, using the Campus Carbon Calculator, which is now available through the University of New Hampshire's Sustainability Institute (University, 2014).

### **Letter from the Compiler**

An addition to this report, that has not been included in previous reports, is the inclusion of an off-set for carbon dioxide (CO<sub>2</sub>) sequestered by the trees of our forested lands. This acreage and off-set will be used in future reports. This will not only give proper accounting of Lakeland's total emissions, but will also recognize the continued preservation of these woodlands as assets to our students, staff, faculty and larger community. The forested areas not only offer CO<sub>2</sub> sequestration, but offer native habitat to animal communities, maintain biodiversity, and offer an opportunity for faculty to explore a woodlands habitat with students, teaching about the importance of nature and giving those students a respite from the stressors abundant in daily life.

The College has acquired a history of positive outcomes and performance relating to reduction in total Greenhouse Gas emissions as outlined in this report. This success is a direct result of the decisions made at the executive level initiating comprehensive changes at this institution by the President, Dr. Morris Beverage and Treasurer and Senior VP of Administrative Services, Michael Mayher. Further, the implementation of these initiatives and guidance by the Director for Facilities Management, Robert Diehl, as well as ideas for further energy conservation by Assistant Director Joseph Kilijanczyk and Maintenance Coordinator Daniel Duraney have made the core Energy Efficiencies projects a reality. Creative solutions have also been offered by our Assistant for Purchasing, Mark Iacofano who developed a Surplus Auction program, as well as working with our Custodians, who are the 'boots on the ground' making the daily efforts that have resulted in the recycling and diversion of waste as successful as it has become.

These efforts, as well as others, shows that with the encouragement and efforts of multiple stakeholders working together, energy efficiency and other applied sustainability initiatives will decrease the overall greenhouse gas emission improving the pieces of the larger picture of clean air, water and land for clean and healthy communities. This is Lakeland Community College being

fiscally, environmentally and socially responsible to itself, its students and to the larger community which it serves.

*Susan Walker-Meere*

Project & Sustainability Liaison

Department for Facilities Management

## **Background**

The Tufts University report 'Method for Conducting a Greenhouse Gas Emissions Inventory for Colleges and Universities' offers a good overview of the science behind the greenhouse effect.

Molecules found in the Earth's atmosphere act as "greenhouse gases." When sunlight strikes the Earth's surface, some of the sunlight is reflected as infrared radiation (heat). Greenhouse gases tend to absorb part of this infrared radiation as it is reflected back towards space, trapping the heat in the atmosphere. Many gases exhibit such "greenhouse" properties, including those that occur naturally in the atmosphere, such as water vapor (H<sub>2</sub>O), carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O), and those that are man-made, such as chlorofluorocarbons (CFCs), hydro fluorocarbons (HFCs), and perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>). Since the beginning of the industrial revolution, the combustion of fossil fuels and other human activities have increased the atmospheric concentrations of greenhouse gases and have enhanced the heat-trapping capability of the earth's atmosphere. As a result, the planet is heating at a faster rate than at any time in the last 10,000 years. Eleven of the hottest years in recorded history have occurred since 1983. The decade of the 1990s was the hottest in the 20th century. Rising global temperatures are expected to raise sea level, and change precipitation and other local climate conditions. Changing regional climate is projected to alter forests, crop yields, water supplies, and affect human health, animals, and many types of ecosystems (Tufts).

Affinity Consultants created and compiled the first Greenhouse Gas Emissions Inventories, developing a framework in which future inventories could be built by LCC. This FY14 survey conducted by LCC, is an updated and revised analysis which reflects the present inventory information. Lakeland hopes to continue to find further avenues to improve its reduction of GHG emissions and carbon 'footprint' by exploring additional efficiencies, innovative technologies and effort by the college's community in conservation of resources. These might include: printing on two sides of the paper, turning off lights, encouraging carpooling and using mass transit, reducing the use of individual space heaters,

composting post-consumer organic waste, increasing recycling, adding renewable energy systems where feasible and other such measures.

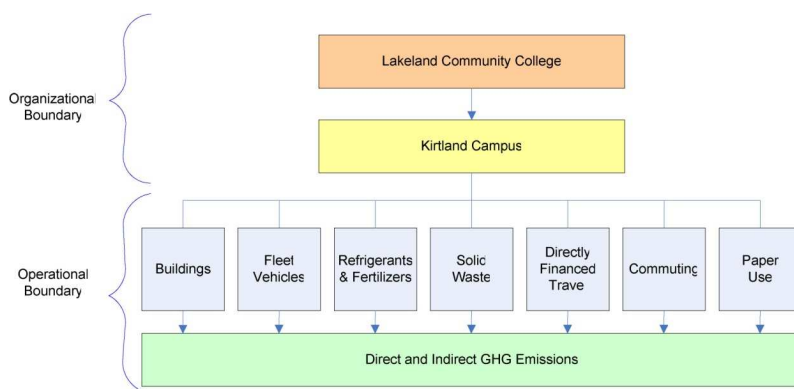
In addition to improving efficiencies, Lakeland continues to explore ways to communicate to the students, staff, faculty and community about the successes and challenges that are met along the path to sustainable practices implementation. Direct one-on-one outreach with these individuals and groups, as well as formal in-class and event size presentations, are offered by knowledgeable staff as ways to share information and encourage incorporation of the initiatives into curriculum and into local businesses' efficiencies models. At its core, this knowledge is an example of the Triple Bottom Line: People, Planet, Prosperity, a framework that guides ultimate success for all.

## Methodology and Framework

The foundation of this report was established by Affinity Consultants for the period of FY-04 to FY11. The FY12 – FY14 reports were generated by this complier, building on the previous work and incorporating relevant updates, analysis, remarks, and procedural changes throughout.

Past inventories have used the Clean Air Cool Planet Calculator. Since mid-2014 the calculator has become part of the University Of New Hampshire Department Of Sustainability and the independent group Sightlines (UNH, 2014). It is now called the Campus Carbon Calculator V7.0.

With this change, new metrics have been put in place to further refine the previous calculator with the goal of making the calculations more relevant and accurate as new techniques are developed to calculate, to limit and to off-set emissions.



## Findings of this inventory

The data for which the report is based is reflective of Lakeland's fiscal year (FY) which starts on July 1st and ends June 30th of the following year. Data was collected for the main GHG emission contributors including:

### Scope 1

- Natural Gas
- College vehicle fleet
- Fertilizer
- Refrigerants

### Scope 2

- Electricity

### Scope 3

- Commuting of Students, Faculty and Staff
- Directly financed outsourced travel,
- Solid Waste
- Wastewater discharge
- Paper purchases

### Offsets

- Sequestration by existing woodland areas on Campus

**Additional information** including population data (student, faculty, and staff) and building space (gross square feet), was gathered and utilized within the Campus Carbon Calculator primarily for metric purposes and are as follows with a summary of percent of change compared to the previous fiscal year:

## Population

Table 1 – Full-Time Equivalent (FTE) Population Summary

Fiscal Year	Student Population FTE (#/Year)	Faculty Population (#/Year)	Staff Population (#/Year)
FY04	8,682	331	265
FY05	8,626	330	277
FY06	8,802	349	346
FY07	8,938	332	338
FY08	9,325	335	338
FY09	9,335	334	345
FY10	9,896	340	327
FY11	9,910	353	325
FY12	9,336	348	327
FY13	8,852	304	276
FY14	8,229	282	258

% Change			
FY13-FY14	-7%	-7%	-6.5%

*Student, faculty, and staff population information provided by Research Department and obtained from Banner software and Higher Education Information System. The student population data, represented as full-time equivalents, was calculated by*

*adding the number of full-time students to one-half the number of part-time students. The faculty and staff population data, represented as full-time equivalents, were calculated by adding the number of full-time faculty/staff to one-third the numbers of part-time faculty/staff.*

Lakeland has seen a decrease by 7% in full-time equivalent student populations (FTE), a decrease by 7% in faculty population and a decrease by 6.5% in staff population.

## Area

The physical building square footage area at the LCC campus has increased over time since the beginning of the college, though it saw little growth between FY04 and FY12. There has been an increase with the addition of 5,400 square feet during the C Building Renovation project completed in FY14.

## Scope 1 Emissions

### On Campus Stationary Sources (Natural Gas Consumption)

Many on-campus stationary sources are powered by natural gas. Natural gas information for FY2004 through FY2014 was supplied by the Facilities Management Department and is based on billing information.

Table 2 – Natural Gas Consumption

Fiscal Year	Natural Gas Consumption (MMBtu/Year)
FY04	46,572
FY05	42,620
FY06	45,846
FY07	45,363
FY08	46,053
FY09	44,830
FY10	32,326
FY11	29,505
FY12	20,453
FY13	23,988
FY14	27,426

% Change	
FY04 - FY14	Decrease 41%
FY13 - FY14	Increased 14%

### Direct Transportation Sources (College Vehicle Fleet)

Lakeland maintains a college fleet which consists primarily of Police and maintenance-related vehicles, with a few additional vehicles for food service and athletics. From FY04 through FY2009, Lakeland did not track actual gasoline and diesel fuel consumption for the college fleet. However, Ron Lee, Director of Budgeting (Administrative Services) was able to provide annual budgetary information for college fleet gasoline and diesel fuel consumption (combined). The Facilities Management Department estimated that diesel consumption equated to 8% of the total annual college fleet fuel budget, with gasoline making up the remaining 92%. Starting in FY2010, the college began tracking the individual costs associated with diesel and gasoline consumption.

Fuel cost estimates (FY2004 through FY2009) or actual annual fuel costs (FY2010 and FY2014) were divided by the average annual fuel cost values (\$/gallon of diesel or gasoline) listed for the Midwest of the U.S., as documented by the U.S. Department of Energy - Energy Information Administration, to estimate college fleet fuel consumption by fuel type as shown in Table 3.

Table 3 – Gasoline & Diesel Consumption for College Fleet		
Fiscal Year	Estimated Gasoline Consumption (Gal/Yr)	Estimated Diesel Consumption (Gal/Yr)
FY04	11,583	1,011
FY05	12,362	1,080
FY06	11,261	983
FY07	10,930	945
FY08	10,982	955
FY09	10,950	950
FY10	8,859	2,351
FY11	8,884	2,338
FY12	8,884	2,338
FY13	8,884	2,338
FY14	8,884	2,338

% Change		
FY04 - FY14	-23%	57%
FY13 - FY14	0%	0%

The FY14 costs were based on the FY11 costs because the metric used in the past reports was changed due to not having a separate value for either gas or diesel. LCC has created a new protocol for purchasing gas and diesel separately for future reporting accuracy.

### Agricultural Sources (Fertilizer Application)

LCC contracts TruGreen to routinely apply a synthetic granular urea fertilizer blend, as well as control products when necessary, to the grounds of Lakeland's main campus. TruGreen and Lakeland's Facilities Management Department indicate that the typical fertilizer blend contains 28% nitrogen. Through analysis of TruGreen's invoices (supplied by the Facilities Management Department), Lakeland was able to provide annual fertilizer application information as presented in Table 4.

Thanks to the efforts of Assistant Director for Facilities Management Joe Kilijanczyk, there is continued success in reducing the amount of fertilizer that we apply annually to our turf areas across campus. There has been a reduction of 75% since FY04. The FY14 was a unique year and no fertilizer was applied.

Table 4 – Annual Fertilizer Application

Fiscal Year	Nitrogen Percentage (%)	Fertilizer Applied (Lbs/Yr)
FY04	28	36,520
FY05	28	36,220
FY06	28	35,750
FY07	28	20,500
FY08	28	20,500
FY09	28	12,150
FY10	28	7,940
FY11	28	11,230
FY12	28	11,220
FY13	28	8,983
FY14	28	0

% Change		
FY04 - FY13		-75%
FY13- FY14		-



### **Refrigerants and Chemicals**

Lakeland has utilized two refrigerants (HFC-134A and HCFC-22) over FY04-FY11 with the addition of HCFC-410A in FY14, within the heating, ventilation, and air conditioning (HVAC) equipment. HCFC's are being phase out by the international agreement (The Montreal Protocol) which acts to eliminate ozone depleting gases. But, HFC's still have a large GHG impact. HFC-134A (1,1,1,2-Tetrafluoroethane) has a Global Warming Potential (GWP) of 1,300 and HCFC-22 has a GWP of 1,700 and HFC-410A has a GWP similar to HCFC-22. GWP is defined as the cumulative relative radiative forcing of gases over a specified time horizon (usually 100 years) resulting from the emission of gas relative to a reference gas (usually carbon dioxide). Losses of these refrigerants may occur at Lakeland due to equipment failure or maintenance activities. The Facilities Management Department has not tracked refrigerant loss in the past; however, the department estimated annual loss to be well below 10 pounds per year. Siemens (Siemens, Inc.) manages the HVAC Service Maintenance Contract and allocated refrigerant loss between HFC-134A, HCFC-22 and HCFC-410A based upon total onsite quantities of each refrigerant (e.g., percentage breakdown)

## **Scope 2 Emissions**

### **Purchased Electricity**

Electricity consumption for FY2004 through FY2014 was supplied by the Facilities Management Department and is based on billing information. There is continued progress in reducing total annual kilowatts used and thus overall emissions. We have reduced use by 34% since FY2004. We showed an increase of .6% since FY13. The general trend has been for electricity reductions. These are a direct result of the energy management plan and retrofits as well as continued efforts by the Facilities Management team to identify additional area for savings.

Table 6 – Electricity Consumption

Fiscal Year	Electricity Consumption (kWh/Year)
FY04	11,168,197
FY05	11,611,450
FY06	11,759,598
FY07	11,341,306
FY08	11,674,047
FY09	10,478,891
FY10	8,337,483
FY11	7,867,070
FY12	7,654,528
FY13	7,282,800
FY14	7,332,720

% Change	
FY04 - FY14	-34%
FY12 - FY14	.6%

Transportation and distribution losses associated with electricity purchases are accounted for within Scope 3 calculations within the Campus Carbon Calculator.

## Scope 3 Emissions

### Student Commuting

Vehicles are a major source of pollution and are therefore accounted for under Scope 3 in this inventory (Union, 2013). Lakeland is a community college; therefore student commuting to and from campus can have a significant impact to GHG emissions and accounts for 63% of all emissions in this inventory year. Greater than 99% of the students that attend Lakeland commute from one of four counties – Lake, Cuyahoga, Geauga, and Ashtabula. In order to calculate student commuting distances, Lakeland estimated the average traveling distance from each of these counties and combined this with

registration information for these same counties as presented in Table 7. Upon final review of the FY13 report, this figure was found to be too high and has been re-evaluated for future inventories. The distance from Geauga County was changed from 20 miles to 18 miles and the distance from Ashtabula County was changed from 40 miles to 36 miles.

Table 7 – Student Commuting Distances

County	Avg. One-Way Commuting Distance 2	Percentage of Students Registered During Period										
		FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14
Lake	10	63%	64%	64%	62%	63%	63%	62%	62%	61%	61%	63%
Cuyahoga	20	20%	20%	21%	22%	22%	22%	22%	22%	23%	23%	23%
Geauga	18	10%	10%	9%	10%	10%	10%	11%	10%	10%	10%	9%
Ashtabula	36	6%	6%	6%	6%	5%	6%	5%	5%	5%	5%	5%

2Average one-way commuting distance is based on traveling from the center of each respective county to Lakeland's Kirtland Campus.

Based on the data presented in Table 7, Lakeland calculated a weighted-average student commuting distance for each of the fiscal years. The weighted-average student commuting distance was calculated to be approximately 15 miles per trip (one-way) for fiscal years FY2004 through FY2013. Because of the changes made to the values of Geauga and Ashtabula Counties the weighted average is now 14 miles per trip (one-way). This new value is used in this the FY14 report, and will be used in future reports.

Lakeland estimated the number of trips to campus per day, days per week, and weeks per year to estimate the total number of trips associated with students, faculty, and staff commuting. To further refine these estimates, Lakeland evaluated Laketran ridership, carpooling, and distance learning (opportunities which have progressively increased over the years). Since September of 1999, students enrolled in credit classes at Lakeland are entitled to free Laketran bus service, Lake County's regional transit authority. Laketran was able to provide Lakeland with a ridership summary (trips per year) for each fiscal year. Each trip via Laketran is assumed to be 10 miles as Laketran travels primarily within Lake County. Lakeland does not track the number of students that may carpool - nor does Lakeland believe that carpooling is very prevalent. Therefore, Lakeland has assumed the percentage of student carpoolers to be 1 percent. Lakeland calculated the total number of student commuting trips (to and from the college) based on the following equation:

$$\text{Student Commuting Trips/Year} = (\text{Annual Student FTE}) \times (\text{Trips/Day}) \times (\text{Days/Week}) \times (\text{Weeks/Year})$$

Table 8 provides details on student commuting trips based on population information contained in Table 1 and Lakeland commuting frequency estimates.

Table 8 – Total Student Commuting Trips

Fiscal Year	Student Population (#/Year)	Trips Per Day	Days Per Week	Weeks Per Year <sup>3</sup>	Student Trips Per Year	Laketrans Trips Per Year
FY04	8,682	2	3	45	2,344,140	36,825
FY05	8,626	2	3	45	2,329,020	37,898
FY06	8,802	2	3	45	2,376,540	50,577
FY07	8,938	2	3	45	2,413,260	56,189
FY08	9,325	2	3	45	2,517,750	53,199
FY09	9,335	2	3	45	2,520,450	62,237
FY10	9,896	2	3	45	2,671,920	66,884
FY11	9,910	2	3	45	2,675,565	61,580
FY12	9,336	2	3	45	2,520,720	68,154
FY13	8,852	2	3	45	2,390,040	65,030
FY14	8,229	2	3	45	2,221,830	60,483

<sup>3</sup>“Weeks Per Year” determined from a 16-week fall term, a 16-week spring term, and a 13-week summer term.

% Change	
FY04 - FY14	-.5%
FY13 - FY14	-.7%

Based on the total student commuting trips calculated in Table 7 and Laketrans ridership information, Lakeland was able to estimate student commuting percentages for personal vehicles (single occupant), carpooling, and bus ridership.

Trip mileage estimates, annual trips per year, and carpooling/Laketrans ridership percentages are entered into the Campus Carbon Calculator (which takes into account fuel efficiency for all applicable transportation) to properly estimate GHG emissions from student commuting.

### Faculty and Staff Commuting

Lakeland has a multitude of faculty and staff that serve various functions for the college. In order to determine commuting distances, Lakeland evaluated the driving distance from each faculty/staff

member's city of residence based on an evaluation of FY2009 records from the Human Resources Department. Based on this data, Lakeland calculated a weighted-average commuting distance for faculty and for staff (separately). The weighted-average commuting distance was calculated to be approximately 15 miles per trip (one-way) for faculty and approximately 11 miles per trip for staff. Lakeland has assumed that faculty and staff commuting trip estimates have remained relatively the same over the years; therefore, were applied to total annual faculty and staff commuting travel calculations for fiscal years FY2004 through FY2014.

Lakeland calculated the total number of faculty and staff commuting trips (to and from the college) based on the following equations:

$$\begin{aligned}\text{Faculty Commuting Trips/Year} &= (\text{Annual Faculty FTE}) \times (\text{Trips/Day}) \times (\text{Days/Week}) \times (\text{Weeks/Year}) \\ \text{Staff Commuting Trips/Year} &= (\text{Annual Staff FTE}) \times (\text{Trips/Day}) \times (\text{Days/Week}) \times (\text{Weeks/Year})\end{aligned}$$

Lakeland does not track the number of faculty and staff that may carpool - nor does Lakeland believe that carpooling is very prevalent. Therefore, Lakeland has assumed that 1 percent of the faculty and staff carpool. Lakeland believes that Laketran ridership for faculty and staff is at or near 0 percent; therefore, no Laketran ridership is assumed for these groups.

Trip mileage estimates, annual trips per year, and carpooling/Laketran ridership percentages are entered into the Campus Carbon Calculator (which takes into account fuel efficiency for all applicable transportation) to properly estimate GHG emissions from faculty and staff commuting.

### Directly Financed Outsourced Travel

Directly financed travel is the result of faculty and staff-related business travel and travel associated with college athletics has a significant impact on Lakeland's overall GHG inventory (e.g., air travel, bus travel, rental vehicles, etc.). Airline travel is of particular concern as it consumes large amounts of fossil fuels and the impacts of radiative forcing is estimated to be 1 to 5 times greater in the stratosphere than in the troposphere according to the IPCC. The Campus Carbon Calculator incorporates a radiative forcing factor of 2.8, which is derived from IPCC's best estimates of the ratio of total radiative forcing from air travel to that from carbon dioxide emissions alone.

Travel distances associated with these activities have not been accurately tracked over the years and obtaining the data at this point would be a significant undertaking, if not impossible. In order to quantify

directly financed travel mileage, Lakeland reviewed expense documents for a representative time period (i.e., July 2009 through October 2009) to quantify air travel mileage (based on departure and destination airport), bus travel mileage associated with athletics (based on roundtrip distance from the Kirtland Campus to destination city), and personal mileage reimbursements (as reported on personal expense reports). The data for these four months was extrapolated to estimate annual mileage for these three categories. An additional 10% was added to bus travel to account for other variables such as route taken, miscellaneous travel within destination city, etc.

The overall travel budget has increased modestly since fiscal year FY2004. As a result, Lakeland has assumed that mileage associated with directly financed travel has remained relatively constant. Therefore, the mileage estimates are reflective of each fiscal year represented in this report (FY2004 through FY2014).

*<sup>6</sup>Based on roundtrip flight miles from departure and arrival airports as calculated by <http://www.webflyer.com>.*

*<sup>7</sup>Based on roundtrip distance from Kirtland Campus to destination city as reported by <http://maps.google.com/> plus 10%*

## Solid Waste

As solid waste decomposes within the landfill, methane gas is generated as a by-product. The Campus Carbon Calculator correlates greenhouse gas emissions with solid waste disposal associated with the College. Lakeland College's solid waste was transported during this reporting period via Waste Management to the Lake County Solid Waste District (Lake County Landfill) in Painesville, Ohio. The Lake County Landfill is, and has been since FY2004, equipped with a methane capture system which collects the methane a portion which is sold for use as a fuel in other industries (approximately 75%), and the rest (25%) is flared on site.

Waste vendors collect solid waste on a routine basis from all waste receptacles except for the compactor unit which is emptied on an as-needed basis. Only the waste collected in the compactor unit is weighed (by the vendor) and documented through invoices. As a result, the Facilities Management Department conducted an evaluation in 2010 and a Waste Audit in 2014 which gave a picture from which to extrapolate total tons per year that the college generates. Previous to this report the estimated total was 310 tons which has since been reviewed and revised.

After compiling a comprehensive recycle and diversion report, the total waste estimate was changed/reduced to 234 tons annually based on lesser amounts in each dumpster at pick-up and more notably because the volume of recycling and diversion has increased since 2010. The previous conversion factor of 300 lbs. /cubic yard was also revised to the EPA's 150 lbs. /cubic yard for residential

uncompacted waste (EPA). This change was made because the recycling and diversion rates are so high that the common trash could now be given the EPA's designation of 'residential' instead of 'commercial/industrial'. This re-evaluation increases the percentage of recycled and diverted to the amount of total waste, therefore increases the rate of recycling and diversion. As of this inventory Lakeland has a Recycling/ Diversion rate of 47%. This is gained through the plastics/metal/glass/paper & cardboard recycling program, the surplus auction programs, metal recycling and other areas.

### Wastewater

Wastewater effluent from the College is discharged to the sanitary sewer and treated by the Gary L. Kron Water Reclamation Facility located in Mentor, Ohio. Wastewater effluent generates methane gas which contributes to Lakeland's Scope 3 emissions. Utility bills provided by the Facilities Management Department indicate the annual discharge volumes listed in Table 14. There has been a 43% decrease in discharge from FY2004 -2013 due to low flow faucets and low flush toilets being added throughout campus.

Table 14 – Annual Sanitary Sewer Discharge

Fiscal Year	Sanitary Sewer Discharge (Gal/Year)
FY04	13,466,992
FY05	12,301,608
FY06	14,226,212
FY07	10,219,176
FY08	10,210,948
FY09	7,779,948
FY10	8,100,840
FY11	10,518,376
FY12	7,593,696
FY13	7,664,008
FY14	7,332,720

% Change	
FY04 - FY14	-46%

### Paper Purchases

The production of paper stock creates significant upstream GHG emissions. Given the amount of paper consumed by Lakeland, this is an important Scope 3 emission. The Purchasing Department was able to

provide estimates on the total amount of paper purchased by the college broken down by type and recycled content. We continue to assess the options to move to higher overall recycled paper content and reducing paper use by moving to digital content. The cost to change to a higher percent recycled paper has been prohibitory at this point.

### **Renewable Energy and Renewable Energy Credits and Off-sets**

Trees remove carbon dioxide from the air in a process called carbon sequestration, transforming the carbon dioxide into carbon and making use of it to build living matter - leaves, stems, trunk, roots. Understanding the true sequestration benefit that the existing trees provide is important in calculating the overall global climate change impact that an institution has.

It should be noted that the Kirtland campus includes a significant amount of undeveloped property – much of which is forested woodlands. Lakeland has estimated that this land is about 248 acres. Lakeland hasn't in the past accounted for the carbon dioxide that is sequestered in these woodlands. Having conferred with representatives from the University of New Hampshire on how they use this source as an off-set, Lakeland will now include our woodlands as carbon sequestration areas.

The calculation is as follow:

$$248 \text{ (Acres ) } \times .4047 \text{ (conversion to hectare) } \times 7.67 \text{ (emissions conversion factor) } = 769.80 \text{ (MT CO}_2\text{/year)}$$

Lakeland does not currently use any renewable energy sources or purchase renewable energy credits for offsets; therefore, the net emissions have been reduced by the forest sequestration off-sets which are reflected in the total emissions.

### **Results and Discussion**

All of the data gathered was entered into the Campus Carbon Calculator (UNH) to determine the total metric tons of carbon dioxide equivalent (eCO<sub>2</sub>). As previously noted, Lakeland has utilized the most recent version of the Campus Carbon Calculator TM (V7.0) and entered all the updated data inputs for FY14, as well as all data originally entered into Version 6.4 of the original GHG inventory for FY2004 through FY2012. The updated version contains minor changes in emission factors which have been applied and resulted in updated emissions estimates, albeit minor in nature. The following pages contain graphs that highlight the inventory results.



### Scope 1

- Natural Gas
- College vehicle fleet
- Fertilizer
- Refrigerants

### Scope 2

- Electricity

### Scope 3

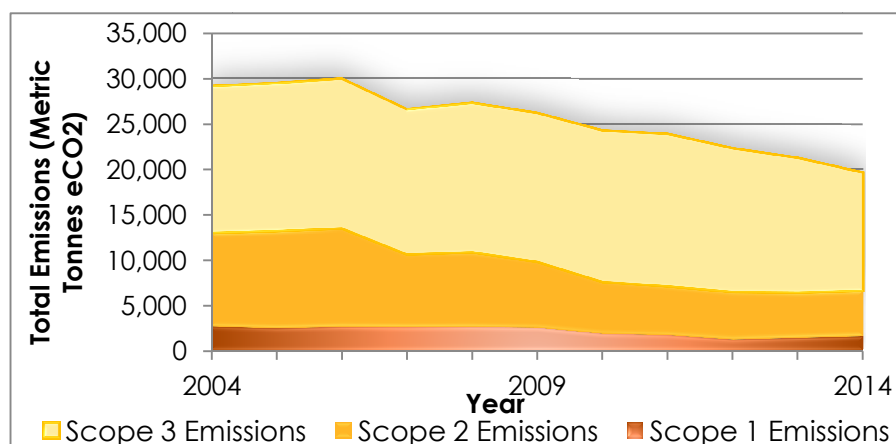
- Commuting of Students, Faculty and Staff
- Solid Waste
- Wastewater discharge
- Paper purchases

### Offsets

- Sequestration by woodland areas

Lakeland Greenhouse Gas Emissions e-CO <sub>2</sub> for FY04-FY13					
Fiscal Year	Scope 1	Scope 2	Scope 3	Off-set Forest Lands	Net Emissions Metric Tons
FY04	2,642.4	10,286.0	16,158.0	-	29,086.4
FY05	2,439.6	10,694.2	16,289.5	-	29,423.3
FY06	2,600.1	10,830.7	16,486.0	-	29,916.8
FY07	2,553.6	8,010.5	15,982.6	-	26,546.7
FY08	2,580.6	8,228.6	16,444.9	-	27,254.0
FY09	2,510.2	7,239.2	16,389.5	-	26,138.9
FY10	1,844.1	5,695.1	16,675.3	-	24,214.4
FY11	1,694.6	5,373.7	16,762.6	-	23,830.9
FY12	1,212.9	5,228.6	15,812.2	-	22,253.6
FY13	1,400.9	4,974.6	14,820.7	-	21,196.2
FY14	1,570.5	5,008.7	13,008.6	769.8	18,818.0
Percent change from FY04 - FY14					-35%
Percent Change from FY12 - FY14					-11%

## 1. Total Emissions by SCOPE



## Major GHG Contributors

Review of the emissions data from FY04 through FY14 has indicated that major contributors to GHG emissions at Lakeland include, in order of greatest contribution:

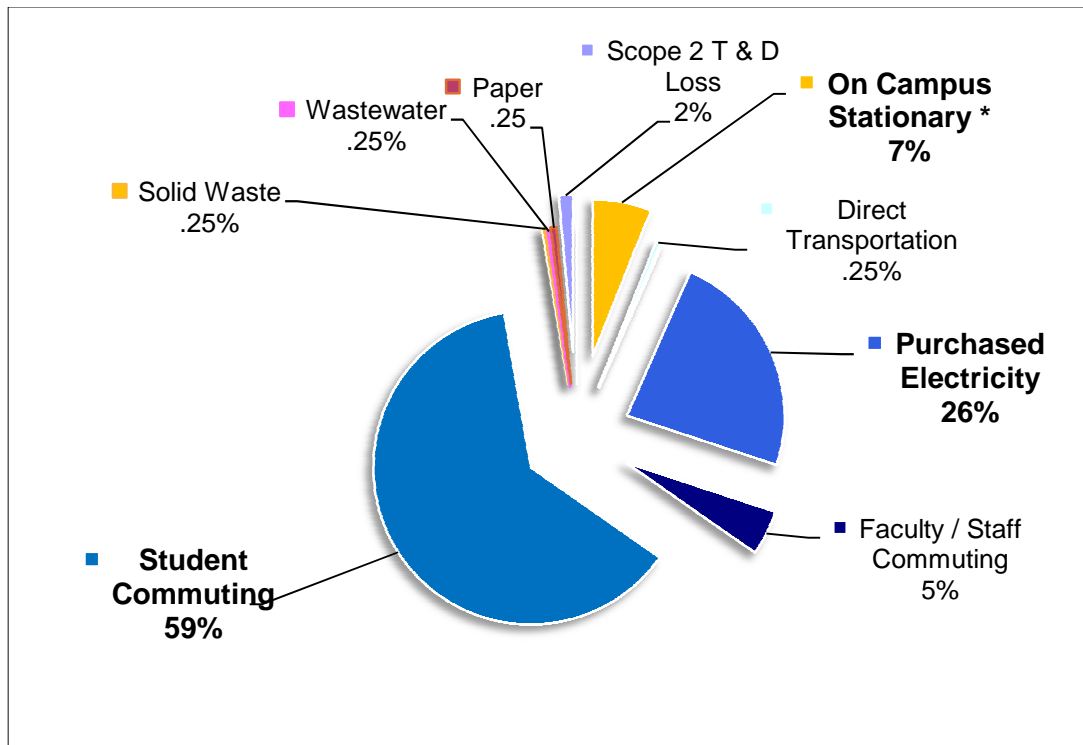
-  - Student Commuting (Scope 3) 59%
-  - Electric Consumption (Scope 2) 26%
-  - Natural Gas Consumption (Scope 1) 7%

Further analysis of this data indicated that student commuting has stayed about the same as last year, electric consumption (see chart pg. 10) increased by .6% from last year, and natural gas consumption (see chart pg. 6) has increased by 14 % from last year – primarily due to an abnormally cold winter.

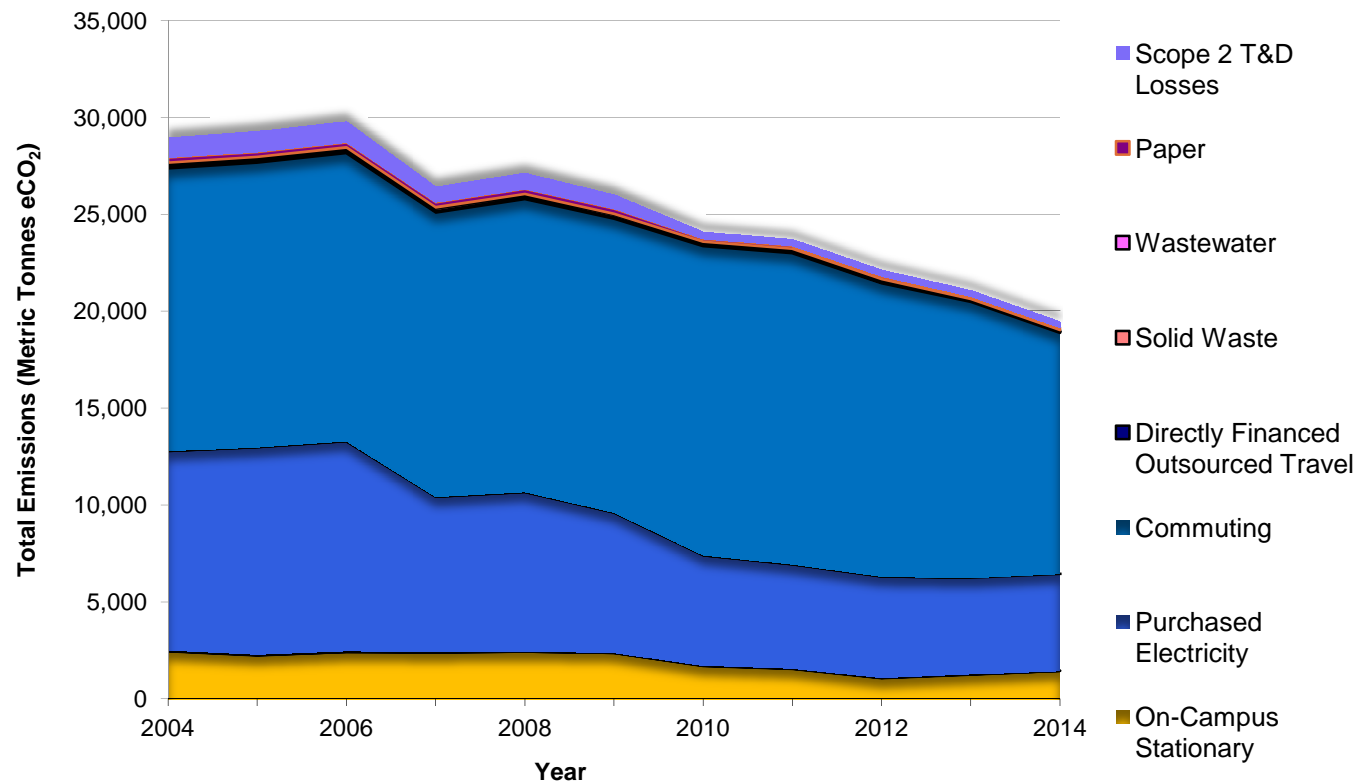
Table 17 – Contribution of Major Sources of GHG Emissions (% of Total Emissions)

Fiscal Year	Natural Gas Consumption	Electric Consumption	Student Commuting
FY04	9%	35%	47%
FY05	8%	36%	46%
FY06	8%	36%	46%
FY07	9%	30%	51%
FY08	9%	30%	51%
FY09	9%	28%	55%
FY10	7%	24%	60%
FY11	7%	23%	62%
FY12	5%	23%	62%
FY13	6%	23%	63%
FY14	7%	26%	59%

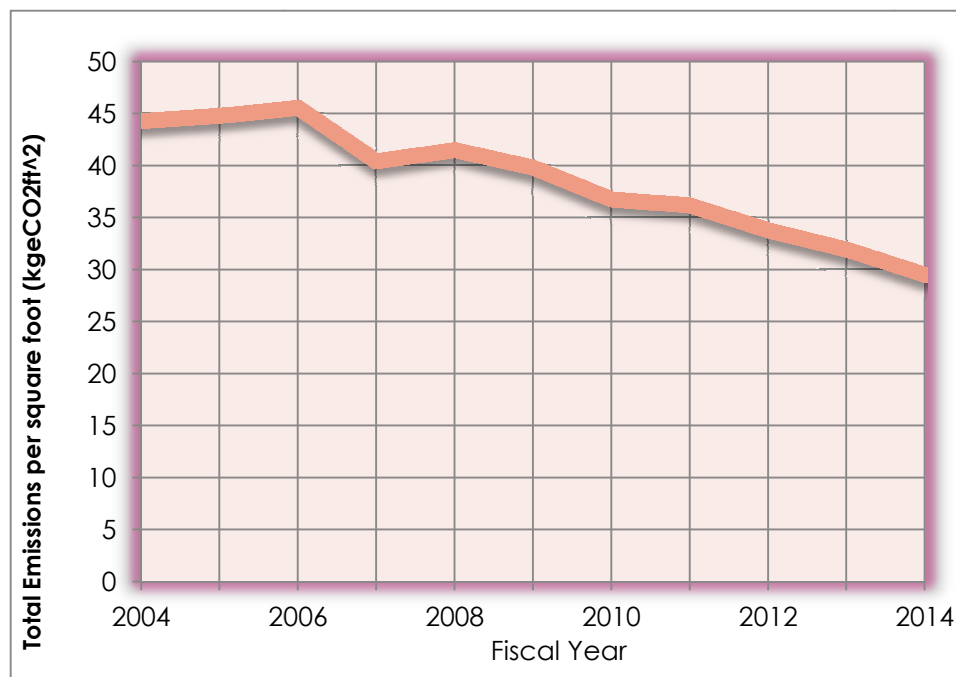
## 2. Total Emissions by SECTOR



\* Note: 'On Campus Stationary' is Natural Gas consumption



## 2. Total Emissions by Building Square Footage



### Mitigation

Lakeland has taken significant steps over the past several years to increase energy efficiency and reduce greenhouse gas emissions. The following is a short list of activities and accomplishments; however, there are many opportunities that still exist.

1. In June of 2008, Lakeland hired Siemens, Inc. to implement a comprehensive energy and resource efficiency improvement project. As of FY14, **Lakeland's energy efficiency efforts have seen improvements since 2007; Natural Gas at 45%, Electric at 37% and Water at 46%. This translates to reductions of annual energy costs by more than \$500,000.**

2. Lakeland, under the guidance of Senior VP Michael Mayher, has spelled out their energy conservation goals in Resolution No. 28-08, which has translated into GHG reductions in both Scope 1 and 2 emissions. Those conservation goals are as follows:

Fiscal Year	Reduction in electricity (per gross square foot)
FY10	36%(cumulative)
FY13/14	50%(cumulative)
FY14/15	To be determined

Source: Resolution No. 28-08

Fiscal Year	Reduction in natural gas (per gross square foot)
FY10	46%(cumulative)
FY13/14	60%(cumulative)
FY14/15	To be determined

Source: Resolution No. 28-08

3. Lakeland has installed a green roof on the A-Building, the first in Lake County, which minimizes storm water runoff, reduces solar gain, and provides additional insulation.

4. The college upgraded the roof of the T-Building and S-Building with above ASHRAE recommended (superior insulation) levels and applied a white coating that reduces solar gain, reducing air conditioning needs and costs.

5. In August of 2002, Lakeland transitioned from a 5-day per week class schedule to a 4-day per week class schedule. This change most likely has reduced GHG emissions associated with commuting to and from the college and reduced costs associated with heat, cooling and water use.

6. Annual college waste has been identified in the Recycling/ Diversion Report 2014. This reports details that the college recycles and diverts 47% of its total waste. This score is reflective of the positive improvements in waste management which has been gained from 12 areas the college uses to collect and measure waste:



REPORTING Streams:

1. Paper & Cardboard
2. Trash Compactor
3. Dumpster
4. Single Stream
5. Surplus Auction
6. Metal
7. Tires
8. Kitchen Oil
9. Light Bulbs
10. Composting
11. Pallets
12. Plant Material

This translates into less GHG emissions from landfill gases as well as other pollution that is related to making new items from virgin materials instead of recycling or reusing discarded items.

## Reference Cited

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Union of Concerned Scientists, "Cars, Trucks, and Air Pollution", Cambridge, MA: Union of Concerned Scientists, URL accessed Sept. 3, 2014, URL: [http://www.ucsusa.org/clean\\_vehicles/why-clean-cars/air-pollution-and-health/cars-trucks-air-pollution.html](http://www.ucsusa.org/clean_vehicles/why-clean-cars/air-pollution-and-health/cars-trucks-air-pollution.html) , last revised: 09/03/13

ACUPCC Emissions Reporting Tool,  
URL: <http://rs.acupcc.org/> and <http://rs.acupcc.org/stats/complete-ghg/>

iTree Reporting Tool, n.d. URL: <http://www.itreetools.org/>

University of New Hampshire Carbon Calculator, 2104.  
URL: <http://www.sustainableunh.unh.edu/calculator>

**The following pages contain concise overview Annual Summaries for each inventory year starting with FY04 that show total emissions by Scope. It is a useful tool to use as a comparison from year to year and for evaluation of areas that have changed for better or worse.**

# Annual Summary Fiscal Year - 2004

MODULE	Summary					
WORKSHEET	Overview of Annual Emissions					
UNIVERSITY	Lakeland Community College					
Select Year -->	2004	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
Scope 1	Co-gen Electricity	-	-	-	-	-
	Co-gen Steam	-	-	-	-	-
	Other On-Campus Stationary	46,572.5	2,469,272.9	245.7	4.9	2,476.9
	Direct Transportation	1,578.4	112,565.6	22.2	7.5	115.4
	Refrigerants & Chemicals	-	-	-	-	7.0
	Agriculture	-	-	-	143.9	42.9
Scope 2	Purchased Electricity	111,719.9	10,273,670.4	122.0	31.2	10,286.0
	Purchased Steam / Chilled Water	-	-	-	-	-
Scope 3	Faculty / Staff Commuting	14,235.5	1,011,572.6	214.2	71.6	1,038.3
	Student Commuting	185,781.8	13,206,482.2	2,777.2	928.8	13,552.7
	Directly Financed Air Travel	174.0	35,197.2	0.3	0.4	35.3
	Other Directly Financed Travel	442.0	31,568.0	6.0	2.0	32.3
	Study Abroad Air Travel	-	-	-	-	-
	Solid Waste	-	-	5,914.8	-	147.9
	Wastewater	-	-	2,828.1	19.9	76.6
	Paper	-	-	-	-	244.4
	Scope 2 T&D Losses	11,049.2	1,016,077.3	12.1	3.1	1,017.3
	Offsets	Additional				
	Non-Additional					-
Totals	Scope 1	48,150.9	2,581,838.5	267.9	156.3	2,642.2
	Scope 2	111,719.9	10,273,670.4	122.0	31.2	10,286.0
	Scope 3	211,682.5	15,300,897.3	11,752.7	1,025.9	16,144.9
	All Scopes	371,553.3	28,156,406.2	12,142.7	1,213.4	29,073.0
	All Offsets					-
	Net Emissions:					



## Annual Summary

### Fiscal Year - 2005

MODULE	Summary					
WORKSHEET	Overview of Annual Emissions					
UNIVERSITY	Lakeland Community College					
Select Year -->	2005	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
Scope 1	Co-gen Electricity	-	-	-	-	-
	Co-gen Steam	-	-	-	-	-
	Other On-Campus Stationary	42,620.5	2,259,737.5	224.8	4.5	2,266.7
	Direct Transportation	1,685.6	120,101.2	23.7	8.0	123.1
	Refrigerants & Chemicals	-	-	-	-	7.0
	Agriculture	-	-	-	142.7	42.5
Scope 2	Purchased Electricity	116,154.0	10,681,420.7	126.9	32.4	10,694.2
	Purchased Steam / Chilled Water	-	-	-	-	-
Scope 3	Faculty / Staff Commuting	14,724.1	1,045,215.7	221.4	74.0	1,072.8
	Student Commuting	186,859.1	13,269,437.1	2,791.5	933.7	13,617.5
	Directly Financed Air Travel	165.0	33,380.7	0.3	0.4	33.5
	Other Directly Financed Travel	445.2	31,759.4	6.1	2.1	32.5
	Study Abroad Air Travel	-	-	-	-	-
	Solid Waste	-	-	5,914.8	-	147.9
	Wastewater	-	-	2,583.3	18.2	70.0
	Paper	-	-	-	-	244.4
	Scope 2 T&D Losses	11,487.8	1,056,404.2	12.5	3.2	1,057.7
	Offsets	Additional				
	Non-Additional					-
Totals	Scope 1	44,306.1	2,379,838.7	248.5	155.2	2,439.3
	Scope 2	116,154.0	10,681,420.7	126.9	32.4	10,694.2
	Scope 3	213,681.2	15,436,197.1	11,530.0	1,031.5	16,276.3
	All Scopes	374,141.2	28,497,456.5	11,905.5	1,219.1	29,409.9
	All Offsets					-
	Net Emissions:					

## Annual Summary Fiscal Year - 2006

MODULE	Summary					
WORKSHEET	Overview of Annual Emissions					
UNIVERSITY	Lakeland Community College					
Select Year -->	2006	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
Scope 1	Co-gen Electricity	-	-	-	-	-
	Co-gen Steam	-	-	-	-	-
	Other On-Campus Stationary	45,846.2	2,430,767.0	241.8	4.8	2,438.3
	Direct Transportation	1,535.4	109,860.2	21.6	7.3	112.6
	Refrigerants & Chemicals	-	-	-	-	7.0
	Agriculture	-	-	-	140.9	42.0
Scope 2	Purchased Electricity	117,635.9	10,817,702.6	128.5	32.8	10,830.7
	Purchased Steam / Chilled Water	-	-	-	-	-
Scope 3	Faculty / Staff Commuting	16,659.1	1,188,068.4	250.5	83.7	1,219.3
	Student Commuting	186,379.6	13,297,974.5	2,777.1	929.2	13,644.3
	Directly Financed Air Travel	160.4	32,447.3	0.3	0.4	32.6
	Other Directly Financed Travel	438.4	31,410.4	6.0	2.0	32.2
	Study Abroad Air Travel	-	-	-	-	-
	Solid Waste	-	-	5,914.8	-	147.9
	Wastewater	-	-	2,987.5	21.1	81.0
	Paper	-	-	-	-	244.4
	Scope 2 T&D Losses	11,634.3	1,069,882.7	12.7	3.2	1,071.2
Offsets	Additional					-
	Non-Additional					-
Totals	Scope 1	47,381.6	2,540,627.1	263.4	153.0	2,599.8
	Scope 2	117,635.9	10,817,702.6	128.5	32.8	10,830.7
	Scope 3	215,271.9	15,619,783.3	11,948.9	1,039.6	16,472.8
	All Scopes	380,289.4	28,978,113.0	12,340.8	1,225.4	29,903.3
	All Offsets					-
	Net Emissions:					29,903.3

## Annual Summary

### Fiscal Year - 2007

MODULE	Summary					
WORKSHEET	Overview of Annual Emissions					
UNIVERSITY	Lakeland Community College					
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
Scope 1	Co-gen Electricity	-	-	-	-	-
	Co-gen Steam	-	-	-	-	-
	Other On-Campus Stationary	45,362.6	2,405,127.3	239.3	4.8	2,412.5
	Direct Transportation	1,489.2	107,101.8	20.9	7.1	109.7
	Refrigerants & Chemicals	-	-	-	-	7.0
	Agriculture	-	-	-	80.8	24.1
Scope 2	Purchased Electricity	87,658.4	7,997,980.0	124.2	31.7	8,010.5
	Purchased Steam / Chilled Water	-	-	-	-	-
Scope 3	Faculty / Staff Commuting	15,617.1	1,120,056.9	234.4	78.4	1,149.3
	Student Commuting	183,607.7	13,173,839.0	2,729.1	913.8	13,514.4
	Directly Financed Air Travel	155.2	31,398.5	0.3	0.3	31.5
	Other Directly Financed Travel	425.8	30,656.8	5.8	2.0	31.4
	Study Abroad Air Travel	-	-	-	-	-
	Solid Waste	-	-	5,914.8	-	147.9
	Wastewater	-	-	2,146.0	15.1	58.2
	Paper	-	-	-	-	244.4
	Scope 2 T&D Losses	8,669.5	791,009.0	12.3	3.1	792.3
	Offsets	Additional				
	Non-Additional					-
Totals	Scope 1	46,851.9	2,512,229.1	260.2	92.6	2,553.4
	Scope 2	87,658.4	7,997,980.0	124.2	31.7	8,010.5
	Scope 3	208,475.4	15,146,960.3	11,042.7	1,012.7	15,969.3
	All Scopes	342,985.6	25,657,169.4	11,427.1	1,137.1	26,533.2
	All Offsets					-
	Net Emissions:					

## Annual Summary

### Fiscal Year – 2008

MODULE	Summary					
WORKSHEET	Overview of Annual Emissions					
UNIVERSITY	Lakeland Community College					
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
Scope 1	Co-gen Electricity	-	-	-	-	-
	Co-gen Steam	-	-	-	-	-
	Other On-Campus Stationary	46,053.1	2,441,732.8	242.9	4.9	2,449.3
	Direct Transportation	1,496.8	107,144.3	21.0	7.1	109.8
	Refrigerants & Chemicals	-	-	-	-	7.0
	Agriculture	-	-	-	47.9	14.3
Scope 2	Purchased Electricity	90,044.4	8,215,680.6	127.6	32.6	8,228.6
	Purchased Steam / Chilled Water	-	-	-	-	-
Scope 3	Faculty / Staff Commuting	15,593.0	1,112,613.0	234.1	78.3	1,141.8
	Student Commuting	190,658.4	13,610,038.2	2,837.3	949.9	13,964.0
	Directly Financed Air Travel	149.9	30,324.2	0.3	0.3	30.4
	Other Directly Financed Travel	422.8	30,301.5	5.8	2.0	31.0
	Study Abroad Air Travel	-	-	-	-	-
	Solid Waste	-	-	5,914.8	-	147.9
	Wastewater	-	-	2,144.3	15.1	58.1
	Paper	-	-	-	-	244.4
	Scope 2 T&D Losses	8,905.5	812,539.8	12.6	3.2	813.8
Offsets	Additional					-
	Non-Additional					-
Totals	Scope 1	47,549.8	2,548,877.1	264.0	59.8	2,580.3
	Scope 2	90,044.4	8,215,680.6	127.6	32.6	8,228.6
	Scope 3	215,729.6	15,595,816.7	11,149.2	1,048.8	16,431.5
	All Scopes	353,323.8	26,360,374.4	11,540.7	1,141.2	27,240.5
	All Offsets					-
						Net Emissions: 27,240.5

## Annual Summary

### Fiscal Year - 2009

MODULE	Summary					
WORKSHEET	Overview of Annual Emissions					
UNIVERSITY	Lakeland Community College					
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
Scope 1	Co-gen Electricity	-	-	-	-	-
	Co-gen Steam	-	-	-	-	-
	Other On-Campus Stationary	44,830.1	2,376,893.6	236.5	4.7	2,384.2
	Direct Transportation	1,492.1	106,811.6	21.0	7.1	109.4
	Refrigerants & Chemicals	-	-	-	-	7.0
	Agriculture	-	-	-	31.3	9.3
Scope 2	Purchased Electricity	78,590.7	7,227,599.3	114.5	29.2	7,239.2
	Purchased Steam / Chilled Water	-	-	-	-	-
Scope 3	Faculty / Staff Commuting	15,804.8	1,127,721.9	237.2	79.3	1,157.3
	Student Commuting	191,228.4	13,651,823.5	2,840.8	951.3	14,006.3
	Directly Financed Air Travel	141.7	28,655.5	0.3	0.3	28.8
	Other Directly Financed Travel	424.7	30,441.0	5.8	2.0	31.2
	Study Abroad Air Travel	-	-	-	-	-
	Solid Waste	-	-	5,914.8	-	147.9
	Wastewater	-	-	1,633.8	11.5	44.3
	Paper	-	-	-	-	244.4
	Scope 2 T&D Losses	7,772.7	714,817.5	11.3	2.9	716.0
Offsets	Additional					-
	Non-Additional					-
Totals	Scope 1	46,322.3	2,483,705.2	257.4	43.1	2,510.0
	Scope 2	78,590.7	7,227,599.3	114.5	29.2	7,239.2
	Scope 3	215,372.2	15,553,459.4	10,644.0	1,047.3	16,376.1
	All Scopes	340,285.2	25,264,763.9	11,016.0	1,119.7	26,125.3
	All Offsets					-
	Net Emissions:					26,125.3

## Annual Summary Fiscal Year – 2010

ODULE	Summary					
WORKSHEET	Overview of Annual Emissions					
UNIVERSITY	Lakeland Community College					
Select Year -->	2010	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
Scope 1	Co-gen Electricity	-	-	-	-	-
	Co-gen Steam	-	-	-	-	-
	Other On-Campus Stationary	32,326.2	1,713,934.6	170.5	3.4	1,719.2
	Direct Transportation	1,426.7	102,647.7	17.9	6.1	104.9
	Refrigerants & Chemicals	-	-	-	-	7.0
	Agriculture	-	-	-	42.6	12.7
Scope 2	Purchased Electricity	62,530.3	5,750,607.2	91.1	23.3	5,759.8
	Purchased Steam / Chilled Water	-	-	-	-	-
Scope 3	Faculty / Staff Commuting	15,468.2	1,103,711.1	232.2	77.6	1,132.7
	Student Commuting	202,281.8	14,442,546.7	2,998.2	1,004.4	14,816.8
	Directly Financed Air Travel	137.4	27,792.3	0.3	0.3	27.9
	Other Directly Financed Travel	424.8	30,446.1	5.8	2.0	31.2
	Study Abroad Air Travel	-	-	-	-	-
	Solid Waste	-	-	5,251.4	-	131.3
	Wastewater	-	-	1,325.8	9.3	35.9
	Paper	-	-	-	-	148.6
	Scope 2 T&D Losses	6,184.3	568,741.4	9.0	2.3	569.7
Offsets	Additional					-
	Non-Additional					-
Totals	Scope 1	33,752.9	1,816,582.3	188.4	52.1	1,843.9
	Scope 2	62,530.3	5,750,607.2	91.1	23.3	5,759.8
	Scope 3	224,496.6	16,173,237.5	9,822.7	1,095.9	16,894.0
	All Scopes	320,779.8	23,740,427.0	10,102.1	1,171.3	24,497.7
	All Offsets					-
					Net Emissions:	24,497.7

## Annual Summary

### Fiscal Year – 2011

MODULE	Summary					
WORKSHEET	Overview of Annual Emissions					
UNIVERSITY	Lakeland Community College					
Select Year -->	2011	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
Scope 1	Co-gen Electricity	-	-	-	-	-
	Co-gen Steam	-	-	-	-	-
	Other On-Campus Stationary	29,504.5	1,564,329.4	155.6	3.1	1,569.1
	Direct Transportation	1,428.0	102,736.0	17.9	6.1	105.0
	Refrigerants & Chemicals	-	-	-	-	7.0
	Agriculture	-	-	-	44.3	13.2
Scope 2	Purchased Electricity	59,002.3	5,426,149.5	86.0	22.0	5,434.8
	Purchased Steam / Chilled Water	-	-	-	-	-
Scope 3	Faculty / Staff Commuting	15,686.0	1,119,247.7	235.4	78.7	1,148.6
	Student Commuting	203,458.6	14,523,501.3	3,028.6	1,013.9	14,901.4
	Directly Financed Air Travel	137.4	27,792.3	0.3	0.3	27.9
	Other Directly Financed Travel	424.8	30,446.1	5.8	2.0	31.2
	Study Abroad Air Travel	-	-	-	-	-
	Solid Waste	-	-	5,198.1	-	130.0
	Wastewater	-	-	1,643.2	11.6	44.5
	Paper	-	-	-	-	148.0
	Scope 2 T&D Losses	5,835.4	536,652.2	8.5	2.2	537.5
	Offsets	Additional				
	Non-Additional					-
Totals	Scope 1	30,932.5	1,667,065.3	173.5	53.5	1,694.4
	Scope 2	59,002.3	5,426,149.5	86.0	22.0	5,434.8
	Scope 3	225,542.2	16,237,639.5	10,119.9	1,108.7	16,969.0
	All Scopes	315,476.9	23,330,854.3	10,379.4	1,184.2	24,098.3
	All Offsets					-
	Net Emissions:					

## Annual Summary Fiscal Year – 2012

MODULE	Summary					
WORKSHEET	Overview of Annual Emissions					
UNIVERSITY	Lakeland Community College					
Select Year -->	2012	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
Scope 1	Co-gen Electricity	-	-	-	-	-
	Co-gen Steam	-	-	-	-	-
	Other On-Campus Stationary	20,452.8	1,084,408.1	107.9	2.2	1,087.7
	Direct Transportation	1,428.0	102,736.0	17.9	6.1	105.0
	Refrigerants & Chemicals	-	-	-	-	7.0
	Agriculture	-	-	-	44.2	13.2
Scope 2	Purchased Electricity	57,408.2	5,279,553.1	83.6	21.4	5,288.0
	Purchased Steam / Chilled Water	-	-	-	-	-
Scope 3	Faculty / Staff Commuting	15,634.0	1,115,534.9	234.7	78.5	1,144.8
	Student Commuting	192,778.5	13,763,941.6	2,857.8	957.3	14,120.7
	Directly Financed Air Travel	137.4	27,792.3	0.3	0.3	27.9
	Other Directly Financed Travel	424.8	30,446.1	5.8	2.0	31.2
	Study Abroad Air Travel	-	-	-	-	-
	Solid Waste	-	-	4,563.2	-	114.1
	Wastewater	-	-	1,594.7	11.2	43.2
	Paper	-	-	-	-	148.0
	Scope 2 T&D Losses	5,677.7	522,153.6	8.3	2.1	523.0
Offsets	Additional					-
	Non-Additional					-
Totals	Scope 1	21,880.8	1,187,144.1	125.8	52.5	1,213.0
	Scope 2	57,408.2	5,279,553.1	83.6	21.4	5,288.0
	Scope 3	214,652.4	15,459,868.4	9,264.6	1,051.4	16,152.8
	All Scopes	293,941.4	21,926,565.6	9,474.1	1,125.3	22,653.8
	All Offsets					-
	Net Emissions:					22,653.8



## Annual Summary Fiscal Year – 2013

MODULE	Summary					
WORKSHEET	Overview of Annual Emissions					
UNIVERSITY	Lakeland Community College					
Select Year -->	2013	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
Scope 1	Co-gen Electricity	-	-	-	-	-
	Co-gen Steam	-	-	-	-	-
	Other On-Campus Stationary	23,988.5	1,271,870.0	113.7	2.3	1,275.4
	Direct Transportation	1,428.2	102,750.1	17.9	6.1	105.0
	Refrigerants & Chemicals	-	-	-	-	7.3
	Agriculture	-	-	-	44.2	13.2
Scope 2	Purchased Electricity	54,620.3	4,966,596.6	79.6	20.3	4,974.6
	Purchased Steam / Chilled Water	-	-	-	-	-
Scope 3	Faculty / Staff Commuting	13,411.0	956,922.3	201.4	67.3	982.0
	Student Commuting	180,975.8	12,921,330.6	2,683.6	898.7	13,256.2
	Directly Financed Air Travel	132.6	25,860.9	0.3	0.3	26.0
	Other Directly Financed Travel	424.8	30,451.2	5.8	2.0	31.2
	Study Abroad Air Travel	-	-	-	-	-
	Student Travel to/from Home (OPTIONAL)	-	-	-	-	-
	Solid Waste	-	-	1,973.7	-	49.3
	Wastewater	-	-	1,630.1	11.3	44.1
	Paper	-	-	-	-	124.3
	Scope 2 T&D Losses	3,376.0	306,974.6	4.9	1.3	307.5
Offsets	Additional					-
	Non-Additional					-
Totals	Scope 1	25,416.7	1,374,620.0	131.6	52.6	1,400.9
	Scope 2	54,620.3	4,966,596.6	79.6	20.3	4,974.6
	Scope 3	198,320.2	14,241,539.5	6,499.8	980.9	14,820.7
	All Scopes	278,357.2	20,582,756.2	6,711.0	1,053.9	21,196.2
	All Offsets					-
	Net Emissions:					21,196.2

## Annual Summary Fiscal Year – 2014

MODULE	Summary					
WORKSHEET	Overview of Annual Emissions					
UNIVERSITY	Lakeland Community College					
Select Year -->	2014	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
Scope 1	Co-gen Electricity	-	-	-	-	-
	Co-gen Steam	-	-	-	-	-
	Other On-Campus Stationary	27,426.0	1,454,127.4	130.0	2.6	1,458.2
	Direct Transportation	1,428.2	102,750.1	17.9	6.1	105.0
	Refrigerants & Chemicals	-	-	-	-	7.3
	Agriculture	-	-	-	-	-
Scope 2	Purchased Electricity	54,994.7	5,000,640.2	80.1	20.5	5,008.7
	Purchased Steam / Chilled Water	-	-	-	-	-
Scope 3	Faculty / Staff Commuting	12,491.4	891,300.7	187.6	62.7	914.7
	Student Commuting	157,215.8	11,225,411.132	2,329.2	780.1	11,516.1
	Directly Financed Air Travel	132.6	25,860.9	0.3	0.3	26.0
	Other Directly Financed Travel	424.8	30,451.2	5.8	2.0	31.2
	Study Abroad Air Travel	-	-	-	-	-
	Student Travel to/from Home (OPTIONAL)	-	-	-	-	-
	Solid Waste	-	-	1,688.5	-	42.2
	Wastewater	-	-	1,615.2	11.2	43.7
	Paper	-	-	-	-	125.1
	Scope 2 T&D Losses	3,399.1	309,078.7	5.0	1.3	309.6
Offsets	Additional					(769.8)
	Non-Additional					-
Totals	Scope 1	28,854.2	1,556,877.5	147.9	8.7	1,570.5
	Scope 2	54,994.7	5,000,640.2	80.1	20.5	5,008.7
	Scope 3	173,663.8	12,482,102.7	5,831.5	857.6	13,008.6
	All Scopes	257,512.6	19,039,620.3	6,059.5	886.8	19,587.8
	All Offsets					(769.8)
	Net Emissions:					18,818.0

END OF REPORT