Ursinus College

FY 2010-2013 Greenhouse Gas Inventory Report

Prepared for Submission to the ACUPCC

by

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Introduction

This report accompanies the third greenhouse gas inventory completed by Ursinus College. This inventory was completed in January 2014. It includes the data from FY 1990 (much of the older emissions data is estimated) through FY 2013. We used Clean Air-Cool Planet's Campus Carbon Calculator (Version 6.9) to calculate our emissions and track our data. This data was collected by our campus sustainability planner in the Office of Sustainability. Emissions are reported in metric tons of carbon dioxide equivalent (MT eCO_2). The calculator also tracks kg CH_4 (methane) and kg N_2O (nitrous oxide) emissions.

Between FY 1990 and FY 2013, Ursinus increased its student body by approximately 600 students (a 58 percent increase) and increased its building area by 344,000 square feet (a 42 percent increase). This increase in student population and building square footage makes decreasing our emissions that much more difficult.

This report quantifies the carbon footprint of Ursinus College and provides a qualitative description to interpret the quantifiable data. We seek to inform every member of the Ursinus College community of the impact they have and the impact the overall College has on the environment. The inventory results show the direct connection between daily college operations, College community members' behavior, and greenhouse gas emissions.

For the purposes of accounting for emissions, the GHG Protocol (a widely used accounting international tool for understanding, quantifying and managing GHGs) suggests using a concept called scopes. (GHG Protocol Initiative 2011) Scopes delineate emissions by type, which helps with structuring decisions about how to address any individual emission while also helping institutions avoid double counting emissions (or strategies to address them). In this approach, ownership or control over emissions is the main factor in determining whether an institution is responsible for addressing them. The three levels are: 1) full ownership or control of the emission source; 2) use of a non-owned/controlled emission source where the use is directly linked to on-campus energy consumption (i.e., purchased energy); 3) use of a non-owned/controlled emission source where the use is associated with the institution (i.e., commuting, study abroad travel, business travel). (Clean Air-Cool Planet 2010) Table 1 below defines the three scopes and gives on campus examples of each.

Table 1: Greenhouse Gas emissions types, or "scopes", by definition and examples.

	Definition	On Campus Examples
Scope 1	Emissions directly resulting from sources owned or controlled by the institution.	• On-Campus Stationary Sources Emissions from all on-campus fuel combustion (non vehicular) • Direct Transportation Sources - emissions from all fuel used in the institution's fleet • Refrigerants • Agriculture - N_2O emissions from fertilizer use
Scope 2	Indirect emissions from sources that are neither owned nor controlled by the institution, and which are directly linked to on-campus energy consumption	• Purchased electricity • Purchased steam • Purchased chilled water
Scope 3	All other indirect emissions associated with the activities of the institution, but produced by sources not owned or controlled by the institution	Schools are only required to report on: • Air travel paid for by the institution (business travel) • Travel influenced or encouraged by the institution (study abroad travel, daily commuting to and from work (not travel over breaks) • Solid waste Schools are not required to report on: • Upstream emissions

Methods & Data Collection

We used the most recent Clean Air-Cool Planet (CA-CP) carbon calculator to determine our emissions for the purposes of this inventory. The calculator is one of several created for the purpose of developing a strategic plan to reduce greenhouse gas emissions with the ultimate goal of achieving carbon neutrality. We chose Clean Air-Cool Planet in part because it is the program that we have been using, and in part because it is in the process of developing on online calculator.[1]

To determine an institution's carbon footprint, the calculator demands past data (dating back to 1990 if possible, in order to track trends) and current data pertaining to institutional demographics, purchased electricity, on campus stationary sources of emissions, transportation, agriculture, solid waste, refrigeration/chemicals, and emissions offsets. There were several areas of potential emissions that do not apply to the operations of Ursinus College and were therefore excluded from the inventory. These include: on-campus co-generation plant, incinerated waste, coal, and animal agriculture. The current inventory includes updated data estimates back to 1990 for most items.

It is important to acknowledge that while the GHG inventory reporting requirements cover most major aspects of greenhouse gas emissions, they do not cover all areas. For example, reporting emissions associated with transporting purchased supplies (food or office) to the institution are not required. As the tools to measure emissions like these increase, the inventory calculator tools may begin to address these omissions that put focus on the impacts that our actions have beyond the boundaries of the campus.

The current report reflects a more accurate picture of the College's emissions. We have made updates in the data for almost all specific emissions sources. Institutional data has been updated/corrected in this iteration of the GHG inventory. Most notable is our Scope 3 transportation emissions. We now include data on faculty or staff commuting, data on all college financed travel. Additionally, we have updated data on solid waste-related emissions. Table 2 below shows the specific data that is collected in order to complete the greenhouse gas inventory. It shows the scope, the area within each scope, and the specific data points that are collected within each area.

[1] See http://www.cleanair-coolplanet.org/ for more information.

Table 2: Data points collected for the GHG inventory, by scope and area.

Scope	Area	Specific Data Point
Institutional Data	Budget	operating, research and energy
	Population	full-time, part-time, and summer school students, faculty and staff
	Physical Size	total building space (square feet) and total research building space (square feet)
Scope 1	On-Campus Stationary Sources	Heating oil (for the heat plant and for some houses), natural gas (heat plant and most houses), propane
	Direct Transportation	Gasoline used by fleet vehicles, Diesel fuel used by fleet vehicles, Bio-Diesel used by fleet vehicles
	Refrigerants & Chemicals	Loss of refrigerants (e.g., HCFC-22/R-22), Fertilizer
Scope 2	Purchased Electricity	Electricity used on campus and in campus houses
Scope 3	Commuting	Faculty/Staff commuting (by mode of transportation); student commuting (for students who do not live on campus)
	Directly Financed Outsourced Travel	Air travel (faculty/staff, student), Train, Taxi/Ferry/Rental Car, Bus, Personal Mileage Reimbursement
	Study Abroad Travel	Air miles
	Solid Waste	Landfilled waste (by type of landfill)
	Waste Water	Septic (gallons)
	Paper	Purchased paper (lbs.)

Data for the inventory was collected from campus offices, including: the facilities services department, the business office, the international programs office, student affairs, the office of sustainability, the registrar, and purchasing. Data and information were also collected from independent contractors such as J.P. Mascaro (waste) and the local water authority. The nature of the data requested was troublesome at certain points during collection as much of the information the calculator wanted is simply not kept or is unavailable, leading us to have a final product of both specific/accurate data and data estimations needed to fill in the gaps.

While data was not always available from as far back as 1990, much of the data was available back to either 2000 or 1995, depending on the data set. For data sets that stop prior to 1990, estimates were used to fill in the earlier years to prevent the appearance of a substantial increase in emissions starting in the year that data tracking began. This GHG inventory report includes updated and more accurate institutional data obtained from audited financial reports as well as updated numbers in many other data areas.

In order to calculate emissions more accurately and avoid having years for which data reflected no emissions, the CACP spreadsheet data for back years was populated with data that shows approximations of items such as building square footage and recycled paper content, for those years (1990-2004). Some of the data was available for only one or a few years, or as in the case of College-funded travel data, was too time consuming to calculate for more than one year. These data sets were estimated back in time using the actual data for the current year (or when possible an average of several years) and calculating for the number of faculty/staff members at Ursinus for back years. This allowed us to get an imperfect yet justifiable number for some areas, such as commuting (faculty, staff and students), college-funded travel, and purchased paper.

This is the first year that Ursinus has reported any travel data other than international student program travel. For commuting data, survey results from a 2013 survey of commuting patterns at Ursinus was used to estimate back. The numbers were adjusted for numbers of faculty and staff, percentages of travel by various modes was also calculated. Mileage for student commuting (those who live off campus) was calculated based on the number of students who commute multiplied by the average mileage for the current year's commuting students. We do not count student travel between home and school at the beginning and end of the semester toward our emissions. College funded travel numbers were gleaned from budget reports, as we do not currently track distances traveled on our travel forms. Study abroad data for all years prior to FY 2007 are estimates based in part of FY 2007 data and in part on an internal report on the study abroad program. Data for the FY2012 and FY 2013 years were not available, so FY2011 numbers were used.

Directly financed outsourced travel (travel for business) accounts for much of the College's transportation-related emissions. However, this data is not directly accounted for by the College. For the purposes of this report, the data was estimated by calculating actual numbers for FY2013, and calculating back years based on the numbers of faculty and staff.

Waste data sets were available back to 2004, however not specific data for the landfill prior to that. Waste numbers were estimated at low tonnage and then assigned to the type of landfill treatment(no CH4 recovery, recovery and flaring, or recover and electricity generation) used by our current landfill over the past 23 years.

The emissions data in this main sections of this report is presented first in an overview format for the most recent reporting year: FY2013, with a discussion of the three scopes that the ACUPCC uses for reporting data. Trends are then addressed, followed by a section about how to move forward from this point.

Greenhouse Gas Inventory – Current Numbers

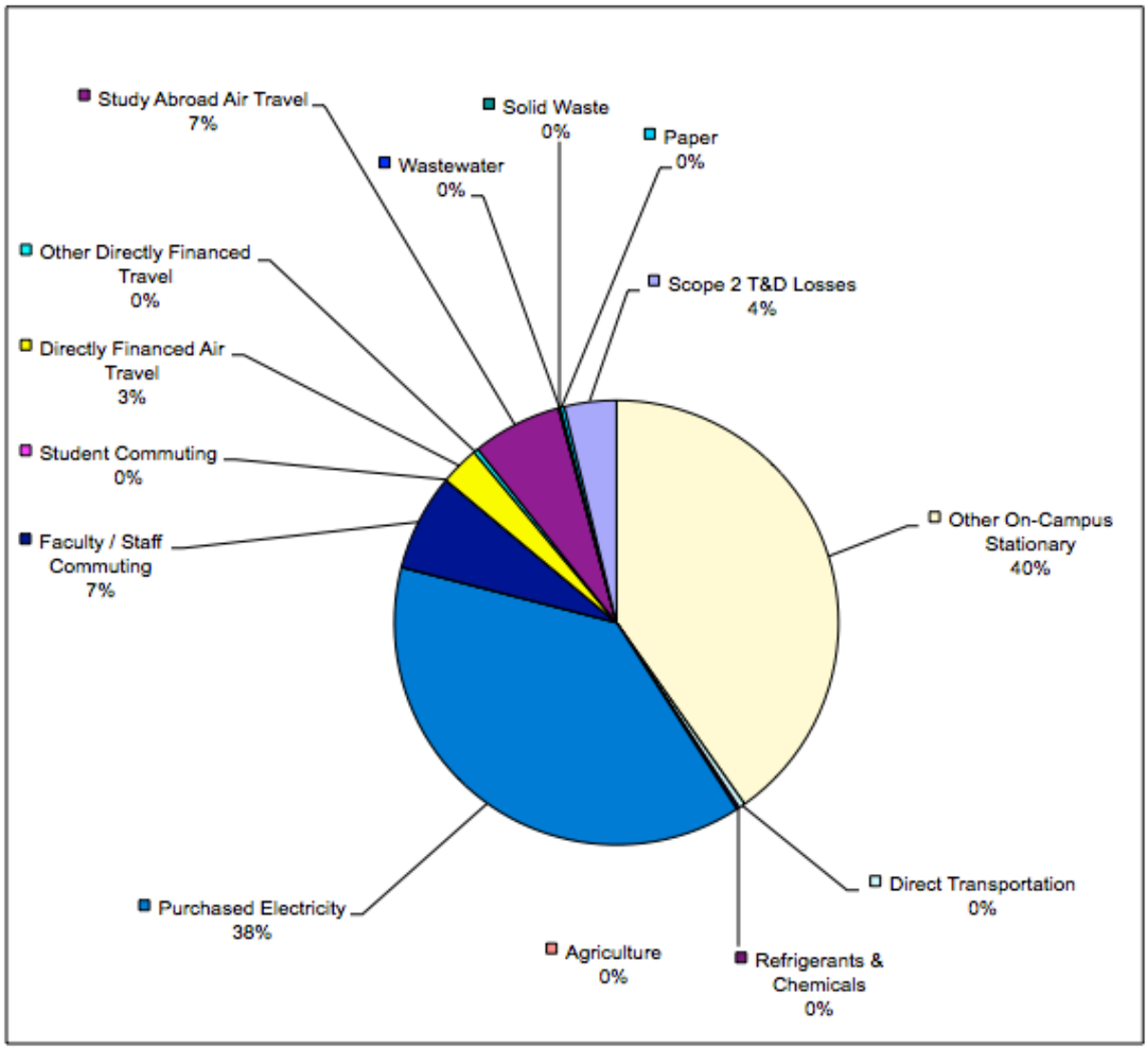
Ursinus College's current quantified GHG emissions are the equivalent of approximately 10,700 metric tons of carbon dioxide equivalent (MT eCO_2). Approximately 41 percent is sourced from on-campus stationary generation and on campus transportation (Scope 1); 38 percent of that amount is sourced from purchased electricity (Scope 2); and another 21 percent is related to waste, commuting and study abroad travel (Scope 3). Table 3 directly below was imported from Ursinus College's GHG Inventory calculator. It shows CO_2 (carbon dioxide), CH_4 (methane), and N_20 (nitrous oxide) in kilograms (kg) as well as metric tons of CO_2 equivalent for fiscal year (FY) 2013 (July 1, 2012-June 30, 2013).

Table 3: Summary of GHG emissions for FY 2013

MODULE	Summary					
WORKSHEET	Overview of Annual Emissions					
UNIVERSITY	Ursinus College					
Select Year -->	2013	Energy Consumption	CO_2	CH_4	N_2O	eCO_2
		MMBtu	kg	kg	kg	Metric Tons
Scope 1		-	-	-	-	-
	Co-gen Steam	-	-	-	-	-
	Other On-Campus Stationary	77,760.5	4,299,543.0	453.9	12.6	4,314.6
	Direct Transportation	694.9	48,679.7	9.2	3.1	49.8
	Refrigerants & Chemicals	-	-	-	-	22.2
	Agriculture	-	-	-	12.6	3.7
Scope 2	Purchased Electricity	50,380.9	4,085,788.5	65.0	16.0	4,092.2
	Purchased Steam / Chilled Water	-	-	-	-	-
Scope 3	Faculty / Staff Commuting	10,330.0	737,938.9	153.8	51.4	757.1
	Student Commuting	5.9	423.2	0.1	0.0	0.4
	Directly Financed Air Travel	1,552.4	302,771.0	3.0	3.4	303.9
	Other Directly Financed Travel	534.4	37,554.4	6.4	2.2	38.4
	Study Abroad Air Travel	3,581.5	698,494.3	6.9	8.0	701.0
	Student Travel to/from Home (OPTIONAL)	-	-	-	-	-
	Solid Waste	-	-	(600.0)	-	(15.0)
	Wastewater	-	-	4.6	0.0	0.1
	Paper	-	-	-	-	31.5
	Scope 2 T&D Losses	4,982.7	404,089.0	6.4	1.6	404.7
Offsets	Additional					-
	Non-Additional					-
Totals	Scope 1	78,455.4	4,348,222.7	463.1	28.3	4,390.4
	Scope 2	50,380.9	4,085,788.5	65.0	16.0	4,092.2
	Scope 3	20,987.0	2,181,270.7	(418.8)	66.7	2,222.1
	All Scopes	149,823.3	10,615,281.9	109.3	111.0	10,704.7
	All Offsets					-
					Net Emissions:	**10,704.7**

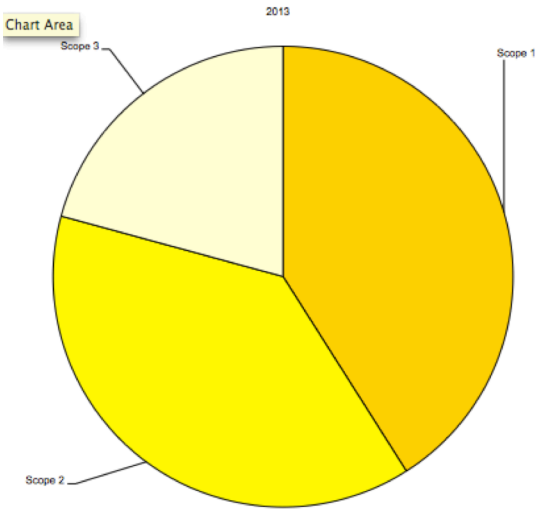
Figure 1 below indicates a breakdown of our GHG emissions sources by percentage. This is the same information shown in Table 3 above, but in visual presentation format. This shows that about equal parts of the College's emissions are produced by our heat plant and purchased electricity. Commuting, study abroad travel, air travel and T&D Losses being substantial contributors as well.

Figure 1: Total emissions by sector (Metric Tons eCO2) for Ursinus College: 1990-2013.



Finally, the pie chart to the right in Figure 2 shows a breakdown of the College's GHG emissions by scope. This chart is a simplified presentation of the information shown in Figure 1 above. It shows that Scope 1 emissions (those that we create on campus primarily from our heat plant) and Scope 2 emissions are our primary source of emissions.

Figure 2: Ursinus College's FY 2013 GHG emissions by scope.



(Source: the "S_Annual" spreadsheet in the CA-CP Calculator. *©2001-2009 Clean Air-Cool Planet, Inc. All rights reserved*)

Scope 1: (Heating, Fleet Fuels, Refrigerants, Fertilizers)

According to UC's GHG inventory data, on-campus stationary sources of energy (i.e., heating via residual and distillate oil, natural gas, and propane) are responsible for 41 percent of the College's GHG emissions. Though this percentage has gone down substantially since our last GHG inventory report, when the percentage was 66 percent, our Facilities Services staff is still committed to decreasing our emissions output with a mind toward economic savings. They do this by staying on top of maintenance issues for our heat plant and by changing heat set points. These two approaches (maintenance and behavioral) will have to go hand in hand in order for institutions to afford the shift to carbon neutrality. Our heat plant is beyond its expected life cycle, but has been well maintained and is still functioning. However, we expect that we will have to replace our heat plant in the coming 10-15 years. At that time, we hope to be able to make a substantial reduction to our emissions through a more energy efficient system.

We have been using less gas every year since 2007, however this is offset by the fact that we have decreased the size of our fleet and now rent vans for some academic use. We use primarily organic fertilizers on the grounds.

Scope 2 (Purchased Electricity)

The production of our purchased electricity currently contributes 38 percent of our greenhouse gas emissions. Up until January 2011, Ursinus purchased its electricity from Exelon Corporation. Eighty percent of its electricity was nuclear, 10 percent was coal-generated, 5 percent was hydroelectric, and 5 percent was generated by wind and landfill gases. However, Ursinus now purchases its electricity from Constellation Energy. Constellation's fuel mix in Pennsylvania for electrical generation (i.e., the percentage of difference sources for electricity) is as follows:

- 39 percent Coal
- 34 percent Nuclear
- 24 percent Natural Gas
- 1 percent Hydroelectric
- 3 percent "other"

Of the College's sources for purchased electricity, coal is the most significant source of carbon emissions. Nuclear power plants do not generate greenhouse gases, however, their waste is extremely hazardous. While nuclear power does not stand in the way of carbon neutrality, it is an aspect of Ursinus College operations that should be analyzed carefully in the face of environmental sustainability and human health.

When the College next negotiates our contract for purchased electricity, we need to include energy sources as one of the factors in the decision-making process. We need to work right away to find a provider that has a substantial percentage of "green" power sourcing so that when we need to make a decision about energy providers, we have this information available. Behavior change programs will also play a substantial role in lowering our use of electricity. Our Climate and Sustainability Action Plan has many suggestions for how to do this. We will be implementing a green office and green dorm room certification program over the next year which will be aimed at actions such as computer settings, and use of lighting and heating.

Scope 3 (Transportation and Waste)

The greenhouse gas calculator divides Scope 3 emissions into six main categories: 1) commuting: student and faculty/staff; 2) directly financed outsourced travel; 3) study abroad travel; 4) solid waste; 5) waste water; and 6) paper. The Scope 3 emissions make up 21 percent of our overall emissions.

Commuting patterns will be challenging to change at Ursinus. The College is not located in an area abundant with public transportation. We will be looking at encouraging faculty/staff members who live on the SEPTA line to make use of this transportation option, but we have few real incentives to offer since we have free parking on campus. We can, however, encourage more people who live within a mile of the campus will walk to work (or bike within 5 miles). We do encourage this through a collaboration with an employee health group called New U. This group gives credit to faculty and staff who walk or bike to work. The credit counts toward a discount on health care. We will be investigating other options to incentivize public transportation, carpooling and car sharing.

Directly financed outsourced travel (business travel) is an area that will be easier to calculate going forward as our business office has recently updated the College's travel form. Budgets are likely to drive expenditures in this area as much as anything at this point. Additionally, the travel form places more limitations on what will be reimbursed. This will likely also have an impact on choices that are made regarding travel.

Study abroad travel, run through the College's International Programs office, is likely to stay relatively flat. We encourage the experiences afforded students who choose to study abroad as it exposes students to other cultures and to the issues faced by people in other parts of the world. We have discussed the option of offering students the ability to pay for travel offsets. This is an ongoing topic to address as we move forward.

Solid waste is an area in which we have made a great deal of progress. We have a thriving recycling program, a move-in program that diverts cardboard and Styrofoam during the move-in period at the beginning of the academic year, a composting program in our dining halls, and a successful move-out program at the end of the year to divert reusable items from the landfill. One of our academic committees also ended the College's printer program (where every first year student was given his/her own printer). The demise of this program will greatly diminish our waste emissions. As we move forward we will focus on streamlining and expanding our recycling and composting programs and expanding our move-out program. We are also going to be focusing on encouraging UC community members to purchase fewer items – and only those that they actually need. Again, budget considerations help with this approach.

Greenhouse Gas Inventory – Trends

Between FY 1990 and FY 2013, Ursinus increased its student body by approximately 600 students (a 58 percent increase) and increased its building area by 344,000 square feet (a 42 percent increase). GHG emissions fluctuated during this time period, beginning at 11,353 MT eCO_2 in FY90 to a high of 14,669 MT eCO_2 in FY04. The College's total emissions in FY13 were 10,705 MT eCO_2, our lowest emissions in the recording period and a 15 percent decrease from our 1990 emissions. This decrease in emissions is a result of a number of factors: sustainability measures adopted by our Facilities Services Department, the fuel mix of our purchased electricity, and the College's switch from oil to natural gas. Of course, weather also plays a large part year to year, determining the amount of heating and cooling required. Lowering our emissions is a substantial achievement, given the growth of our campus.

Our methane emissions (kg CH_4) have also decreased substantially over estimated emissions from the 1990s (we do not have accurate data on our waste disposal beyond 2004). This was due largely to the change in the way the landfill handled waste. Another factor in this is likely related to the way that waste has been weighed for some of our containers (weight estimates vs. actual weights). Prior to 1998, waste was simply landfilled; between 1998 and 2009 the landfill recovered methane and flared it; starting in 2009 the landfill began generating electricity. As a result, the College's methane emissions went from approximately 125,000 kg CH_4 in 1990 to 109 kg CH_4 in 2013. Even considering only the past three years, when we have the best numbers, we have decreased the amount of waste substantially over the course of those years. This decrease indicates the real impact that industry changes and vendor choice can have on institutional emissions.

Ursinus began implementing sustainability projects in 2002, before we became signatories of the ACUPCC and have ramped up from there. Projects have included switching from oil to natural gas as our primary heat plant fuel, retrofitting buildings with energy efficient lights, weather-proofing buildings, and coordinating our heating/cooling schedule with the building use calendar, among many others. The emissions impact of these projects can be seen in Table 4 below, which shows our emissions between 1990 and 2013. Our emissions have increased and decreased in these years, however, it is worth noting that while the College has increased its number of students, its building square footage, and its study abroad programming during this time period, it's overall numbers have fallen. The major fall off between FY 2006 and FY 2007, occurred as a result of the switch from using oil to natural gas for our heat plant.

Also shown in Table 4 are the number of full time students and building square footage during the period between 1990-2013 as well as the percent change between 1990 levels of

emissions and each successive year. This shows that we have decreased our total emissions of CO_2 by 15 percent compared to 1990 levels. This table does show that our emissions went up from 2012 to 2013; this is indicative of the very hot summer that we had. Expectations are that the 2014 emissions will also be higher because of the hot summer in 2013 and the cold winter temperatures that we are experiencing in early 2014.

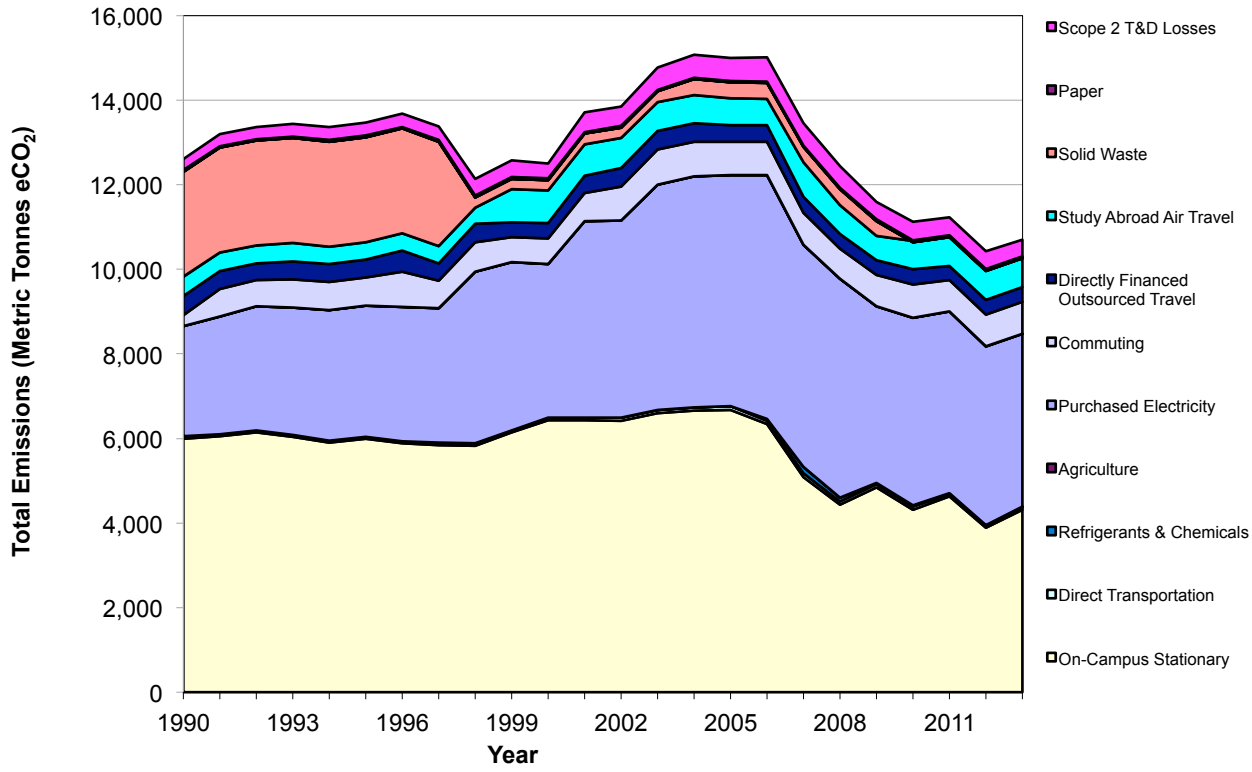
Table 4: Total MT eCO_2 emissions for FY 1990 through FY 2013.

Fiscal Year	Number of FT Students	Building Square Footage	Total Scope 1	Total Scope 2	Total Scope 3	Biogenic	Total Emissions	% Change from 1990 levels
			MT eCO_2	MT eCO_2	MT eCO_2	MT eCO_2	MT eCO_2	
1990	1,052	816,727	6,050.9	2,609.7	3,944.6	-	12,605.2	-
1991	1,017	816,727	6,105.1	2,774.1	4,312.3	-	13,191.5	0.05
1992	1,097	816,727	6,195.3	2,930.3	4,242.4	-	13,368.0	0.06
1993	1,131	816,727	6,090.6	3,005.1	4,340.9	-	13,436.6	0.07
1994	1,146	816,727	5,949.7	3,085.3	4,329.9	-	13,364.8	0.06
1995	1,230	816,727	6,043.0	3,098.9	4,325.3	-	13,467.3	0.07
1996	1,184	816,727	5,934.5	3,178.0	4,568.7	-	13,681.2	0.09
1997	1,174	816,727	5,903.3	3,182.5	4,289.5	-	13,375.2	0.06
1998	1,213	816,727	5,883.8	4,059.1	2,203.1	-	12,146.0	(0.04)
1999	1,226	816,727	6,195.3	3,983.3	2,392.3	-	12,570.9	(0.00)
2000	1,252	816,727	6,487.9	3,633.3	2,387.0	-	12,508.1	(0.01)
2001	1,308	816,727	6,490.1	4,646.3	2,574.0	-	13,710.4	0.09
2002	1,352	1,001,661	6,487.7	4,667.7	2,697.1	-	13,852.4	0.10
2003	1,468	1,048,049	6,673.6	5,334.8	2,764.9	-	14,773.3	0.17
2004	1,484	1,048,049	6,731.5	5,472.9	2,871.2	-	15,075.6	0.20
2005	1,552	1,048,049	6,762.7	5,472.9	2,764.5	-	15,000.0	0.19
2006	1,548	1,108,320	6,458.9	5,774.6	2,783.8	-	15,017.3	0.19
2007	1,544	1,108,320	5,331.0	5,242.0	2,878.6	-	13,451.6	0.07
2008	1,560	1,160,464	4,606.7	5,165.5	2,670.5	0.5	12,442.7	(0.01)
2009	1,656	1,160,464	4,944.0	4,176.3	2,472.5	1.1	11,592.7	(0.08)
2010	1,718	1,160,464	4,414.4	4,438.9	2,269.7	1.1	11,123.1	(0.12)
2011	1,787	1,160,464	4,700.9	4,301.9	2,226.4	1.2	11,229.2	(0.11)
2012	1,754	1,160,464	3,951.1	4,229.3	2,245.2	1.1	10,425.6	(0.17)
2013	1,661	1,160,464	4,390.4	4,092.2	2,222.1	1.1	10,704.7	(0.15)

(Source: G-Total Emissions worksheet in the CACP workbook)

Figure 3 below provides a visual image of our total emissions between 1990-2013. It provides the additional information about the sources for those emissions. This shows that purchased electricity (Scope 2 – in the large blue section of the graph) has come to produce a larger portion of our emissions since 1990, that heating (Scope 1 – the cream colored section at the bottom) now creates less of our emissions. The other notable emission source is waste (in the orangey-pink toward the top of the chart). Waste emissions have gone from a substantial portion at the beginning of the reporting period to a very small portion in 1998 when the landfill started capturing and flaring emitted gases to next to no emissions in 2010, when they began generating electricity from the captured gas.

Figure 3: Total Emissions by Source (Metric Tons of Carbon Dioxide Equivalent – MT eCO_2)), 1990-2013



The chart below in Figure 4 shows CO_2 emissions only. This chart is very similar to the chart above, except that it does not indicate methane or nitrous oxide. Carbon Dioxide is the primary greenhouse gas emitted by human activities. (U.S. Environmental Protection Agency 2013) The primary contributors to Ursinus' emissions of CO_2 are our heat plant and purchased electricity (the bottom two areas on the chart).

Figure 4: Total CO_2 emissions by source (kg CO_2)), 1990-2013

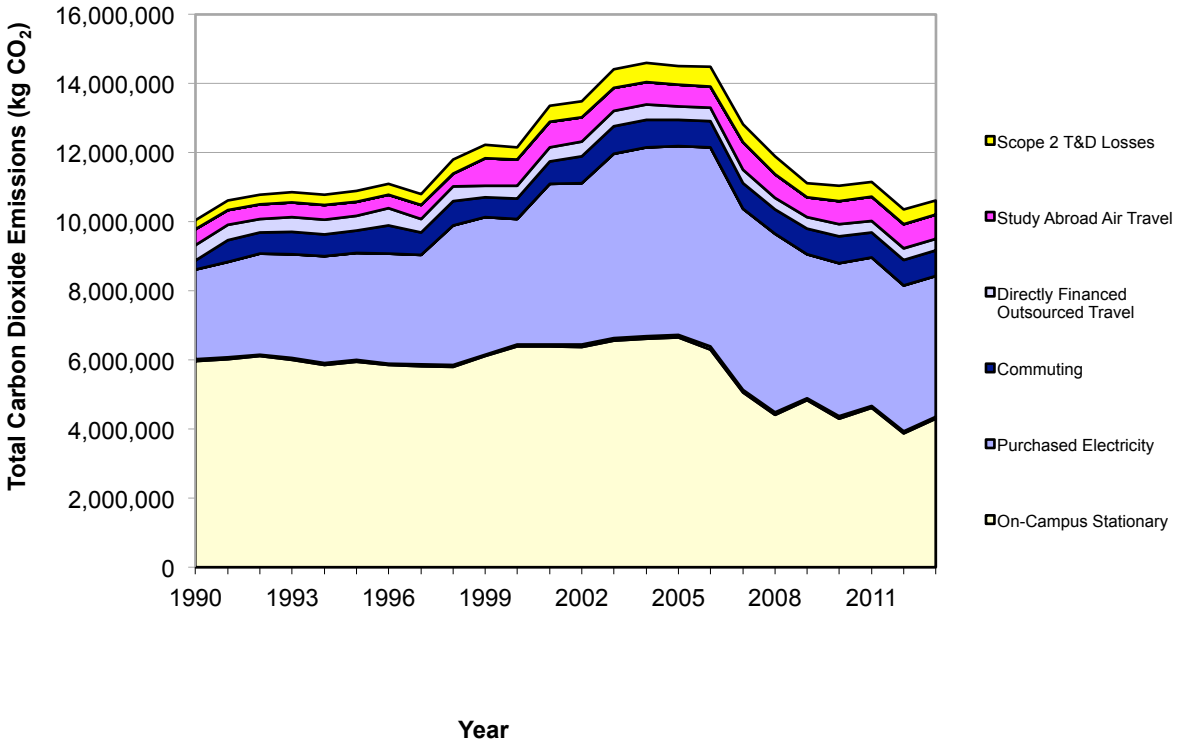


Figure 5 below shows the total nitrous oxide (N_2O) emissions. The emissions account for a small portion of our overall emissions. Sources of N_2O emissions on campus are primarily our heat plant, fertilizers (in purple), purchased electricity and commuting.

Figure 5: Total Nitrous Oxide emissions by source (kg N_2O), 1990-2013

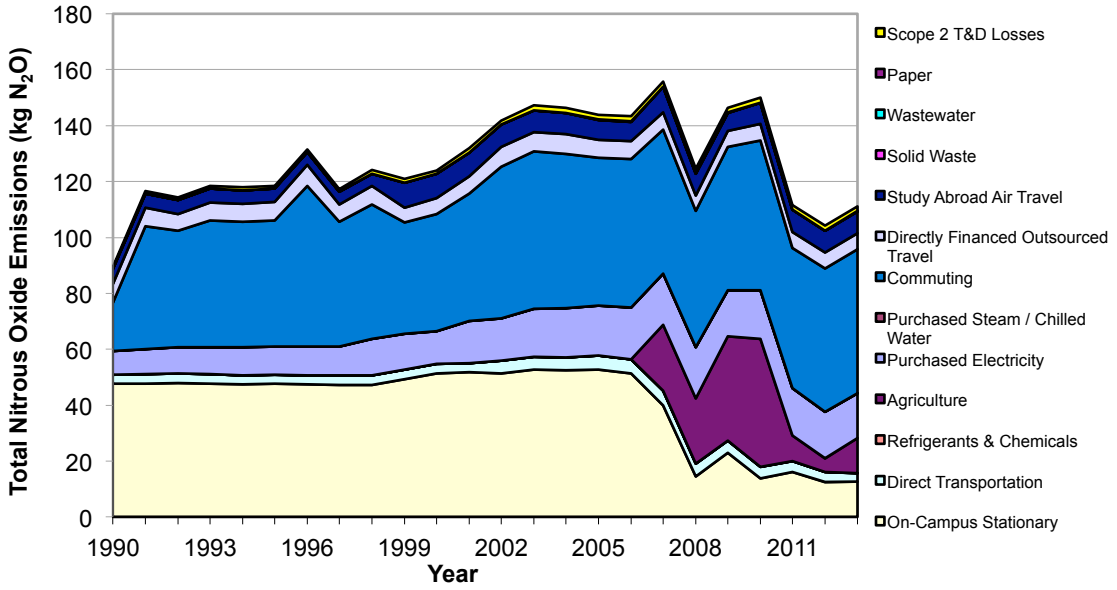
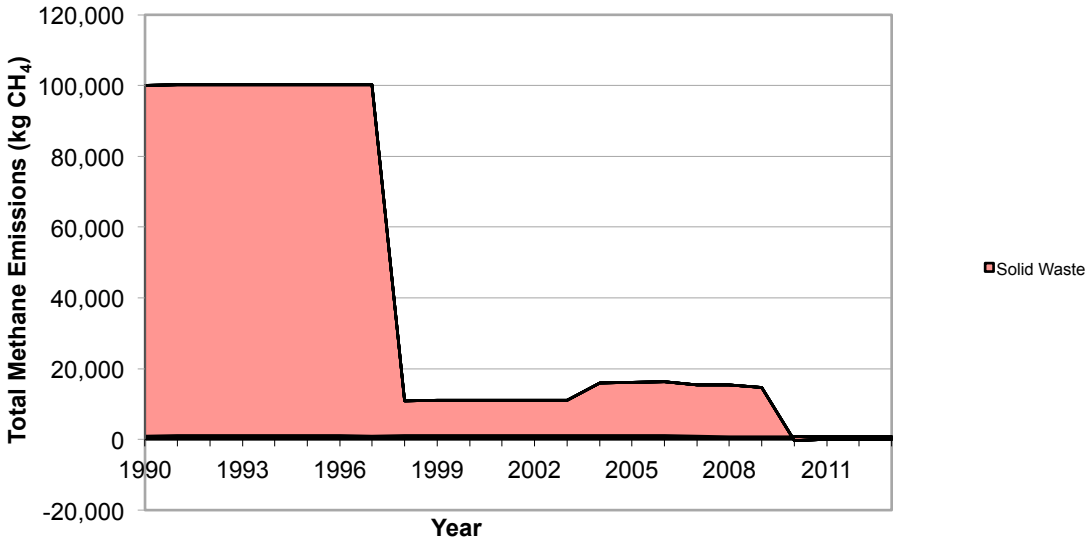


Figure 6 below shows Ursinus' total methane emissions. Methane is considered one of the most effective greenhouse gases because it traps heat from the sun much more effectively than carbon dioxide, but there is not much of it (note that it is measured in kilograms rather than in Metric Tons). Our methane emissions are now very low due to the type of landfill that we use.

Figure 6: Total Methane emissions by sector (kg CH4), 1990-2013 As some forms of waste management result in a net sink of carbon, this graph may have negative values.



Greenhouse Gas Inventory – Moving Forward

Ursinus' Climate and Sustainability Action Plan (CSAP) was signed by President Bobby Fong in June 2013. This plan gives us an additional tool as we approach lowering our greenhouse gas emissions. Within the plan are a multitude of options for the College to take as we continue to work toward carbon neutrality. The two most effective methods for reducing the College's GHG emissions will be in the two areas where it has the most control: the type of fuel we use to heat the campus (and the heat plant equipment that supplies that heat) and the source of our electricity. We will be able to make additional progress with our solid waste, and perhaps some with business travel, but it is unlikely at this juncture that we will limit our study abroad travel programs. It is also unlikely, given the lack of viable public transit options, that we will be able to influence commuting patterns substantially.

Table 5 below shows the carbon emissions goals for Ursinus as they appear in our CSAP, adjusted for updated data sets in this report. We have already decreased our emissions by almost 5 percent since 2010. Our 2020 goal is a 25 percent decrease

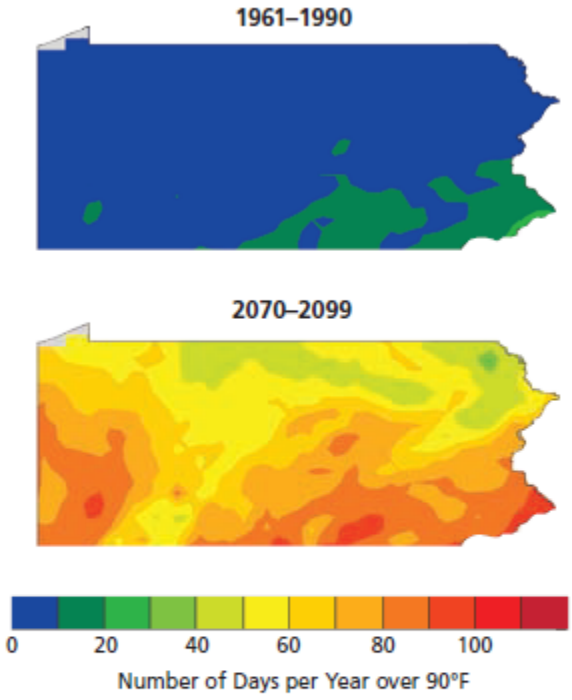
Table 5: Projected Carbon Emissions for Ursinus College with Implementation of the CSAP

	Year	MT CO2e
Baseline	2010	11,110
Current emissions	2013	10,705
25% Decrease from 2010 baseline	2020	8,336
50% Decrease	2030	5,555
75% Decrease	2040	2,778
Carbon Neutral	2060	0

The area that we will continue to address that will not show up elsewhere in this report is behavior change and education. As an institution of higher learning, we must emphasize the important role we play in educating generations of students who will graduate from Ursinus and become workers in the world. We must prepare them for the changes that are ahead and give them tools for how to limit their own impacts on global climate instability. In addition to the virtues of promoting a cleaner world, educating our community and becoming carbon neutral for environmental reasons, there are clear and convincing economic reasons for pursuing carbon neutrality. The costs of energy production are increasing, and projects costs associated with fossil fuels will continue to increase. On the other hand, costs associated with

alternative energy sources are decreasing as the technology develops and markets for these products continue to grow. Figure 7 below shows temperature rises from 1961 projected through 2099. It is a visual explanation of why we must all care about our emissions and limit them for future generations.

Figure 7: Temperature rise across Pennsylvania, historical and projected. Source: (Union of Concerned Scientists 2008)



Statewide, Pennsylvania is projected to experience dramatic increases in the number of extremely hot days over the coming century, especially under the higher-emissions scenario. The greatest warming will be in the southwest and southeast regions, where daytime temperatures by late century (2070–2099) could hover over 90°F for nearly the entire summer.

Greenhouse Gas Inventory – Going Neutral

An overview of the actions that are recommended to take place to achieve our goals for 2025 is included in the CSAP. Beyond that, new technologies will develop over the years, financial tools will change substantially, and these will need to be evaluated and addressed in a revised Climate & Sustainability Action Plan.

The primary recommendations of this plan include shifting the central heating plant to a summer shutdown, engaging in a power purchase agreement for alternative electricity sourcing, energy conservation measures, the affirmation and implementation of policies that are already in place, and additional policies that will help the College attain the 25 percent decrease from our 2010 GHG emissions by 2020. A report by the Intergovernmental Panel on Climate Change found that renewable energy accounted for nearly 13 percent of global energy supply. *(Edenhofer 2011)* At Ursinus, we currently get approximately 1 percent of our electrical energy from renewable energy, and none of our heating energy.

Table 6 shows the ACUPCC's requirements of signatory institutions in one column and in the other column, it shows the measures already taken at Ursinus, as well as those measures proposed by the UCCASP. We are currently in compliance with the PCC's requirements with the exception of the timely submission of the College's Climate Action Plan. This plan has been extant in draft form for some time, however, the College was unfortunate to lose its long-time president, John Strassburger, in 2010. The involved departments felt that waiting to publish the CAP until our incoming president, Bobby Fong, was able to review and approve the plan was not only appropriate, but would facilitate implementation of the plan.

Table 6: Comparison of the ACUPCC's requirements to Ursinus College's Climate & Sustainability Action Plan

Presidents' Climate Commitment	Ursinus College Climate Action Plan
Set up a mechanism (committee, task force, office, etc.) within 2 months to guide the process.	**Yes**. We have an Office of Sustainability and are in the process of creating a sustainability committee on campus.
Complete an inventory of greenhouse gas emissions within 1 year.	**Yes**. We have completed three GHG inventories. One in FY 2008, FY 2009, and FY 2013.
Create and implementing a climate neutral plan (that includes a target date and interim milestones for achieving campus climate neutrality) within 2 years.	**Yes**. Our CSAP is now submitted to the ACUPCC. Our target goal for reaching climate neutrality is 2060.
The plan should include actions to expand research or other efforts necessary to achieve climate neutrality.	**Yes**. Ursinus is a small liberal arts college; we are able to address this through our CAP at a college-wide scale.
The plan should include actions to Integrate sustainability into the curriculum and making it part of the educational experience.	**Yes**. See section VIII. Academic Programs.
The plan should include mechanisms for tracking progress on goals and actions.	**Yes**. See section XII. Tracking Progress into the Future.
The action plan, inventory and periodic progress reports should be publicly available through AASHE	**Yes**. They are available.
Take two of the following seven immediate steps	**Yes**. We have either already accomplished or have

to reduce greenhouse gas emissions while the more comprehensive plan is being developed, as specified in the Commitment.	committed to four of the seven items.
1. Establish a policy that all new campus construction will be built to at least the U.S. Green Building Council's LEED Silver standard or equivalent.	**Yes**. We have done this.
2. Adopt an energy-efficient appliance purchasing policy requiring purchase of ENERGY STAR certified products in all areas for which such ratings exist.	**Yes**. We implement this policy.
3. Establish a policy of offsetting all greenhouse gas emissions generated by air travel paid for by our institution.	**No**. We are not currently able to commit to this type of policy.
4. Encourage use of and provide access to public transportation for all faculty, staff, students and visitors at our institution.	**Yes**. This is part of this plan.
5. Within one year of signing this document, begin purchasing or producing at least 15% of our institution's electricity consumption from renewable sources.	**No**. Our current electricity provider has changed and we now get only 1% from renewable resources. We will invest externally in green power after we have invested all we can internally to make our campus operate as energy efficiently as possible.
6. Establish a policy or a committee that supports climate and sustainability shareholder proposals at companies where our institution's endowment is invested.	**No**. We are not currently able to commit to this.
7. Participate in the Waste Minimization component of the national RecycleMania competition, and adopt 3 or more associated measures to reduce waste.	**Yes**. This is a prospective action in our CSAP.

Conclusions

Signing the American College and University Presidents' Climate Commitment (ACUPCC) has given Ursinus the opportunity to identify ways it can provide leadership in sustainability. When President Strassburger signed the ACUPCC, the college agreed to make its best effort to become carbon neutral and to educate the community about global climate instability and the challenges of sustainability. Under the leadership of President Bobby Fong, we strive to have the College be a sustainable institution.

Although we are in compliance with most of the ACUPCC requirements, there are several obstacles and constraints that will make fulfilling our commitment challenging.

A. Physical plant infrastructure, electricity and fuels

Like many campuses, Ursinus owns many old buildings that define the character and culture of the College, but use excessive energy. Old buildings, such as these, are costly to retrofit.

B. User Behavior

While about half of the College's energy use and carbon emissions are controlled by its physical infrastructure, the behavior of members of the campus community also affects energy consumption, recycling rates, and consumption of materials, such as paper and water. We plan to institute educational and engagement campaigns, however, the effectiveness of such efforts is hard to predict.

C. Institutional Constraints

Ursinus, like many small liberal arts institutions, is currently struggling with limited operating and capital budgets. This will likely be an impediment to investments in energy efficiency and GHG emission reduction programs. The limited financial flexibility will also influence the implementation of most of our programs. However, we look at this as a challenge to be met rather than an insurmountable barrier. We intend to continue the policy of creative problem solving that has characterized Ursinus' approach to dealing with sustainability issues.

Global climate instability is the most pressing environmental issue the world is faced with today. We see it increasingly in the storms that hit areas with increasing frequency and that bring with them financial and social impacts that have long-term effects. Through Ursinus College's Sustainability Committee and its CSAP as well as through various Office of Sustainability programs, the Ursinus community will be engaged and educated in ways to reduce greenhouse gas emissions on campus and in their everyday lives. Success will require faculty, students, and staff to collaborate on projects and to commit to individual actions. Within the context of an educational institution, we must look to our role in educating our students to leave campus as well-informed citizens who can make right choices as they face the changing world they will live in. Success in our mission to educate students will be dependent upon our willingness and ability to make changes in everything from curriculum to student

activities to administrative policies. Though it is a tall order, a campus-wide shift to a paradigm of sustainability is a one of the pillars necessary for a complete and comprehensive change.

This report has been prepared for the administration and our campus community. Cooperation between students, staff, and faculty will be necessary to achieve the goals in our plan.

Ursinus currently runs many sustainability-related programs, such as our office of sustainability's UCGreen Sustainability Fellows program, sustainable move-in and move-out, UCBikeshare, Real Food Challenge, the Ursinus organic farm, the College's recycling program, partnerships with local organizations and governments, and Environmental Roundtable meetings discussing issues with Senators or governmental elected officials. We are developing new programs as well.

Though Ursinus has made impressive progress toward lowering its GHG emissions, achieving carbon neutrality will be contingent upon the College taking a comprehensive, rather than piecemeal, approach. It needs specific institutional changes that have sustainability as the principal goal, and carbon neutrality as a component of overall sustainability.

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