University of Delaware

Greenhouse Gas Inventory for the

2013 – 2014 Academic Year

June 5, 2015

Introduction

The University of Delaware (UD) became a signatory to the American College & University Presidents' Climate Commitment (ACUPCC) in 2008. ACUPCC is a voluntary program designed to address global warming by documenting institutional commitments from college and universities to increase awareness around climate change and eliminate net greenhouse gas (GHG) emissions from their own operations. UD, as part of its ACUPCC requirements, submitted an initial GHG inventory report detailing its carbon emissions for the 2007-2008 academic year in 2009 and, in 2010, filed a Climate Action Plan specifying future emissions reduction targets.

The next action required by UD's commitments to the ACUPCC is to submit a GHG inventory for the 2013-2014 academic year. This report summarizes the results of UD's carbon accounting activities to date.

This report indicates that although University emissions have fallen, they have primarily fallen due to changes in the power industry. Further, an improvement in national fuel economy has offset an overall increase UD transportation activity, resulting in only a slight increase in mobile emissions. This report does not summarize university actions undertaken in the previous several years in energy efficiency or renewable energy as the intent is to document university emissions as of 2014.

Overview of 2007-2008 GHG Inventory Approach and Results

UD's 2007-2008 academic year carbon inventory was compiled by a team of students and faculty in 2009. Data associated with building electricity consumption, natural gas and heating oil combusted at the university's utility plants, fuels utilized by university-owned fleet vehicles, waste produced, and fertilizer used was all contemplated in the carbon accounting exercise. The team also conducted a survey to evaluate the commuting habits of UD faculty, staff, and students in an effort to estimate this component of the institution's carbon footprint.

In addition to direct data gathering efforts for emission calculations, building audits were performed to develop estimated emission allocations by source activities such as lighting, heating, cooling and commuting.

Several sources of UD GHG emissions had been excluded because sufficient data was unavailable, but these sources are de minimis and do not have a material impact on the organizational carbon footprint. The omitted activities include university-related ground travel where UD fleet vehicles were not utilized and air travel associated with UD business. Individuals commonly make their own travel arrangements precluding any ability to collect data on travel distances or trip frequencies.

The UD total GHG emissions for the 2007-2008 academic year were estimated to be 152,542 metric tons of carbon dioxide equivalent (MT CO_2e). Significant sources of emissions included purchased electricity (52%), combustion of natural gas (23%), and gasoline consumed by student/staff vehicles (20%).

When compiling UD's GHG inventory for 2011-2012, the decision was made to switch to the EPA eGRID as the source of emission factors for purchased electricity. This adjustment was made to improve the reproducibility of UD's carbon accounting approach while ensuring these carbon accounting practices are well aligned with industry best practices. In light of this change, emissions for the 2007-2008 year were recalculated and restated. This was done so as to bring the methodology in line with that used in 2011-2012, and to provide a more meaningful benchmark against these and future results. Two modifications were made:

1. The emission factor for purchased electricity was changed to the eGRID 2007, RFC East subregion.
2. Transmission and distribution losses associated with purchased electricity were split off from the Scope 2 Electricity total and are now reported separately as a Scope 3 emission. These emissions were originally included with Scope 2 in the 2007-2008 inventory. The source for the loss percentage (6.471 %) was the eGRID 2010, East region.

Table 1 depicts the 2007-2008 GHG emissions as recorded in the original UD inventory report published in 2009, while Table 2 includes the restated Scope 2 emissions calculated using the revised emission factors. These refactored emissions are used in all subsequent comparisons between 2007-2008 and 2013-2014. A detailed breakout of the restated 2007-2008 GHG emissions is provided in Table 2, and broken down by emissions scope[1], source, and energy commodity in Figure 1.

Table 1: 2007-2008 Total Consumption and GHG Emissions by Source (Originally Reported)

Source	Sector	Category	Consumption	Unit	Emissions (MT CO2e)
Natural Gas	Buildings	1	642,625	MCF	35,087
Fuel Oil #2		1	154,525	gal	1,569
Electricity		2	137,925,068	kWh	79,958
Gasoline	Transportation	1	229,697	gal	2,022
		3	3,470,617	gal	30,558
Diesel Fuel		1	72,451	gal	735
Jet Fuel		3	2,162	gal	21
Mixed Solid Waste	Waste	3	2,937	tons	2,144
Food Waste	Food Services	3	506	tons	394
Fertilizer	Landscaping	1	13,427	lb	54
Total Emissions				**MT**	**152,542**

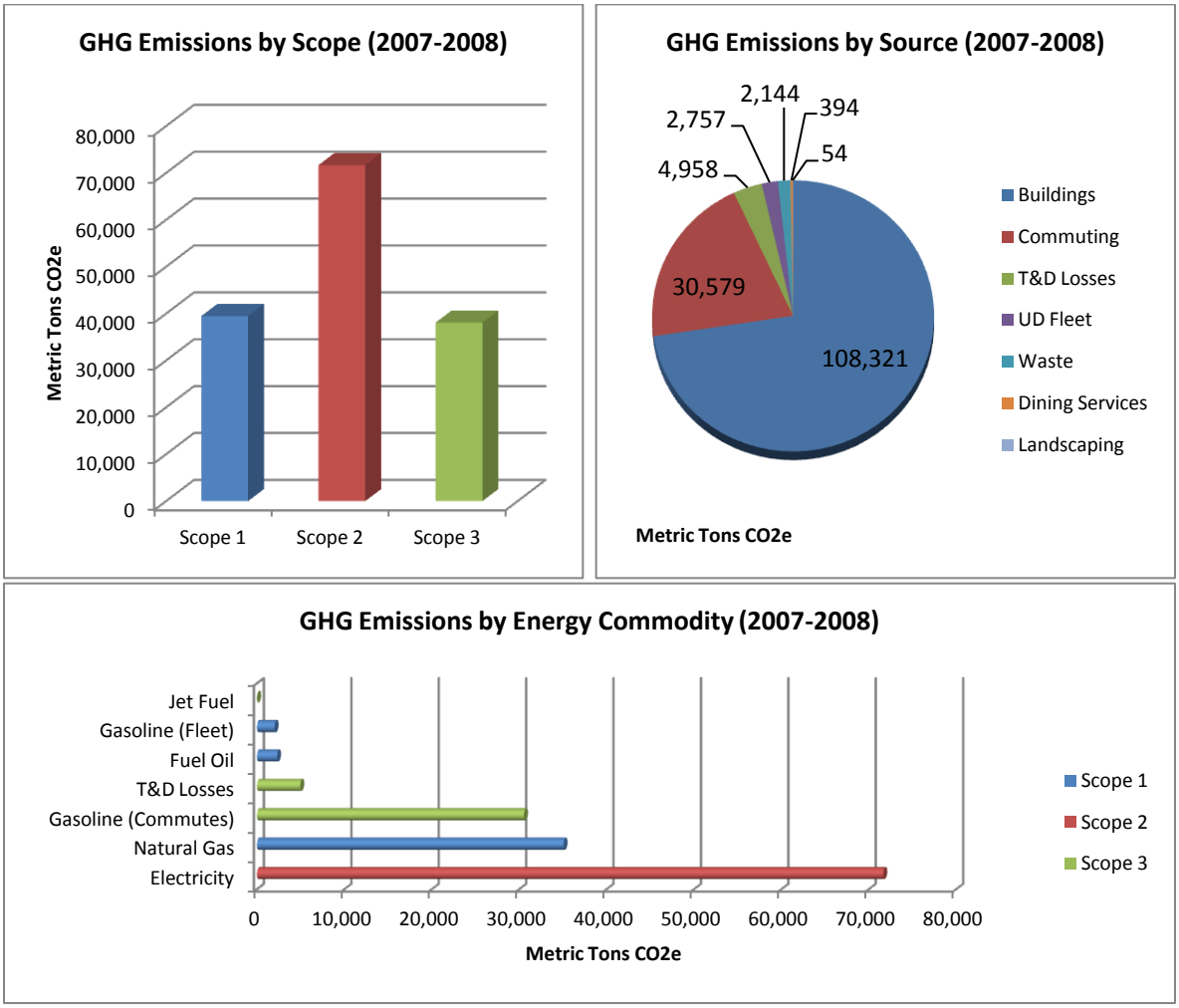
Table 2: 2007-2008 Total Consumption and GHG Emissions by Source (Restated)

Source	Sector	Category	Consumption	Unit	Emissions (MT CO2e)
Natural Gas	Buildings	1	642,625	MCF	35,087
Fuel Oil #2		1	154,525	Gal	1,569
Electricity		2	137,925,068	kWh	71,665
	T&D Losses	3	9,542,635	kWh	4,958
Gasoline	Transportation	1	229,697	Gal	2,022
		3	3,470,617	Gal	30,558
Diesel Fuel		1	72,451	Gal	735
Jet Fuel		3	2,162	Gal	21
Mixed Solid Waste	Waste	3	2,937	Tons	2,144
Food Waste	Food Services	3	506	Tons	394
Fertilizer	Landscaping	1	13,427	Lb	54
Total Emissions				**MT**	**149,207**

[1] The standard definitions of GHG emissions scopes is as follows:

- Scope 1 – direct GHG emissions; sources include stationary combustion, fleet vehicles, and process and fugitive emissions.
- Scope 2 – indirect GHG emissions; typically includes purchased electricity, steam, and chilled water.
- Scope 3 – other Indirect GHG emissions; sources include student, faculty and staff commuting, business travel, waste disposal, etc.

Figure 1: 2007-2008 GHG Emissions (Restated)



Overview of 2013-2014 GHG Inventory Approach and Results

Siemens worked with UD personnel to compile the 2013-2014 academic year GHG inventory. The aim of this effort was to replicate the scope and approach of the 2007-2008 GHG inventory and generate a brief, written update for comparison to the 2007-2008 benchmark. This process allows for direct correlations between the two records while measuring the benefits of carbon mitigation actions taken during the intervening six years.

Direct data records were compiled for building energy use, UD owned fleet vehicles, organic waste outputs, and fertilizer used. Estimates were utilized to assess fuel consumption associated with commuting activities as was required for the 2007-2008 academic year GHG inventory. However, it was not practical to replicate the survey conducted during the 2007-2008 effort so the 2013-2014 commuting activity level was estimated by making adjustments the 2007-2008 value based on changes in student population, the number of parking permits issued, and national average fuel efficiency (see Appendix B for calculations.)

Emission factors for the combustion of natural gas, fuel oil, gasoline, diesel fuel, and jet fuel were obtained from the U.S. EPA Mandatory Reporting Rule for Greenhouse Gases (MRR), Table C-1, in keeping with the accounting methodology specified by The Climate Registry's *General Reporting Protocol (GRP)*. This represents a slight departure from the 2007-2008 approach which relied upon emission

factors from the U.S. Energy Information Administration (EIA). Another change is that methane (CH_4) and nitrous oxide (N_2O) emissions associated with fuel combustion were considered in the 2013-2014 report while only CO_2 emissions were documented in the 2007-2008 report. These modifications are warranted however, because they align UD's GHG accounting approach with current best practices and the resulting difference is less than 1% for all commodities, so this change does not substantially impact the emission totals.

Emission factors for purchased electricity, in keeping with *GRP* methodology, were derived from the U.S. EPA's eGRID 9th Edition tables. UD is located within the RFC East Subregion, so the published GHG emission factors representing the fuel mix used in generating electricity in this region were used. This source differs from the one used for the 2007-2008 report, but the eGRID system is a universally accepted source which is regularly updated so, adopting this standard will facilitate future emissions inventory calculations. Scope 3 transmission and distribution losses associated with purchased electricity were calculated based on the loss percentages published in the eGRID 9th Edition for the East region.

Scope 3 GHG emissions from the disposal of mixed waste, food waste, and food composting were calculated using emission factors obtained from the U.S. EPA WARM Model, version 13. This is an updated version of the same source used in the 2007-2008 report.

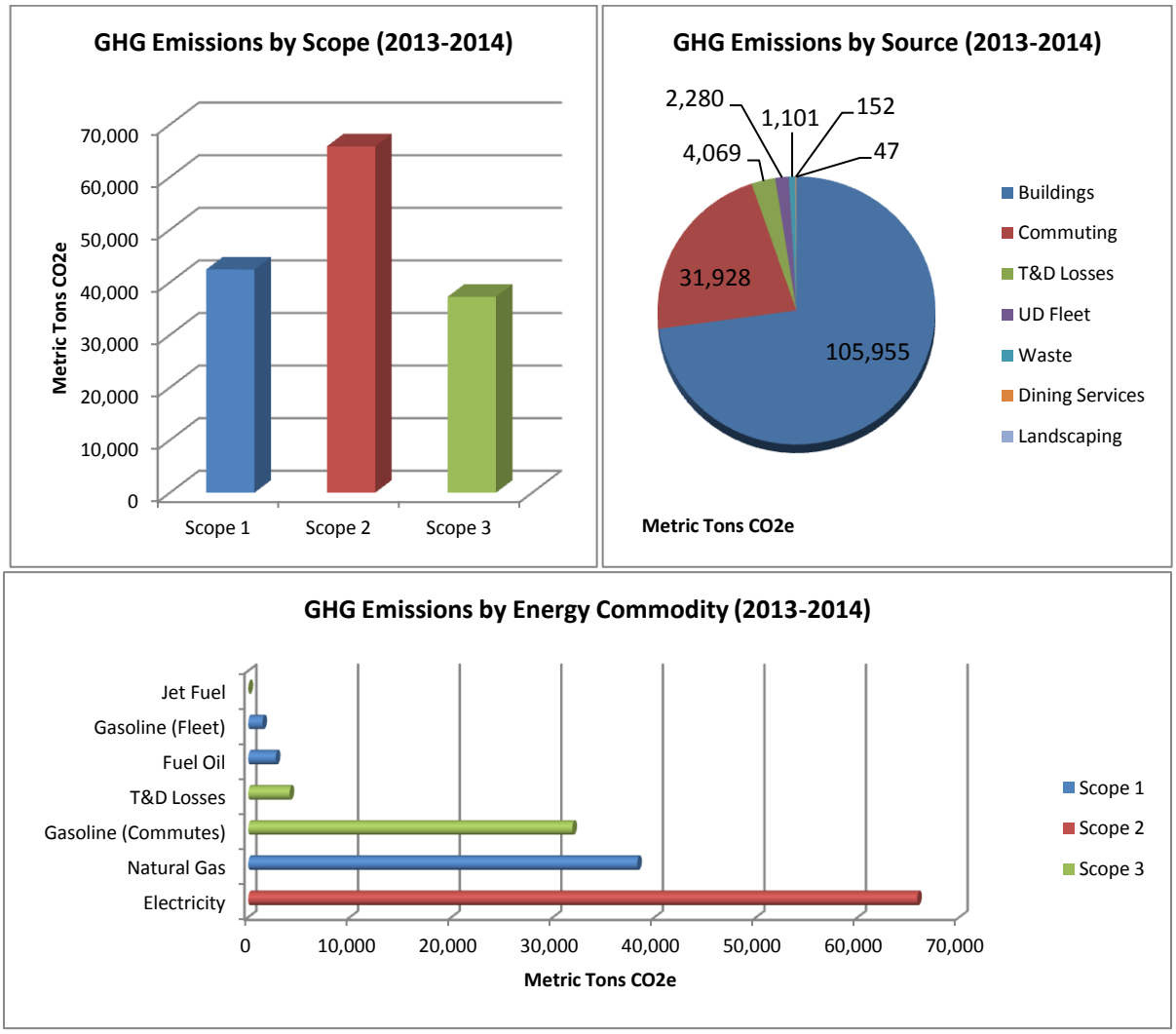
GHG emissions resulting from usage of nitrogen fertilizer were calculated with an emission factor derived from the U.S. EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2001 (April 2003). This is the same value that was used in the 2007-2008 report.

UD's 2013-2014 total GHG emissions were estimated at 145,532 MT CO_2e and detailed emission results by source are presented in Table 1 while Figure 2 provides a summary of the results by emissions scope, source, and energy commodity. Significant sources of emissions included Scope 2 purchased electricity (45% of the total), combustion of natural gas (26%), and gasoline consumed by student/staff vehicles (22%). Building audits were not repeated for the 2013-2014 inventory report so, source-specific allocations of emissions were not determined.

Table 3: 2013-2014 Total Consumption and GHG Emissions by Source

Source	Sector	Category	Consumption	Unit	Emissions (MT CO2e)
Natural Gas	Buildings	1	700,564	MCF	38,292
Fuel Oil #2		1	176,493	gal	1,813
Electricity		2	144,169,799	kWh	65,850
	T&D Losses	3	8,909,198	kWh	4,069
Gasoline	Transportation	1	158,257	gal	1,389
		3	3,634,721	gal	31,905
Diesel Fuel		1	87,258	gal	891
Jet Fuel		3	2,417	gal	23
Mixed Solid Waste	Waste	3	2,077	tons	1,101
Food Waste	Food Services	3	220	tons	152
Fertilizer	Landscaping	1	11,795	lb	47
Total Emissions				**MT**	**145,532**

Figure 2: 2013-2014 GHG Emissions



Comparison of 2013-2014 Results to 2007-2008 Results

UD's measured GHG emissions declined from 149,207 MT CO_2e during the 2007-2008 academic year to 145,532 MT CO_2e during 2013-2014. This GHG emissions reduction of 3,675 MT CO_2e represents an approximate 2% decline.

The most significant GHG emission decrease, not surprisingly, originated from UD's largest emission source, purchased electricity. Despite a 5% increase in the quantity of electricity consumed, the emissions associated with Scope 2 purchased electricity fell by 5,815 MT CO_2e, an 8% drop from 2007-2008. This accounts for 158% of the total reduction in GHG emissions since the 2007-2008 report. This decrease is primarily due to the decline of coal generated power in the University's power region and the increase of natural gas driven power generation. Additionally, regional and national policies increasing the amount of renewable energy resources in the power region also contributed to the decline in carbon intensity of power generation resources in the region. These declines did not occur as a result of any direct university action, however it does accurately portray the university's emissions. While the University undertook energy efficiency investments during this time period, it largely prevented the growth in purchased electricity from being greater than the 5% increase.

Another emission source that represented a substantial fraction of the emissions reductions was Scope 3 emissions associated with solid waste disposal. UD was able to decrease its solid waste and food scraps output by 33% since the 2007-2008 report. This led to a 51% decrease in emissions associated with the Scope 3 waste category, and represents 35% of the total reduction in GHG emissions since the 2007-2008 report.

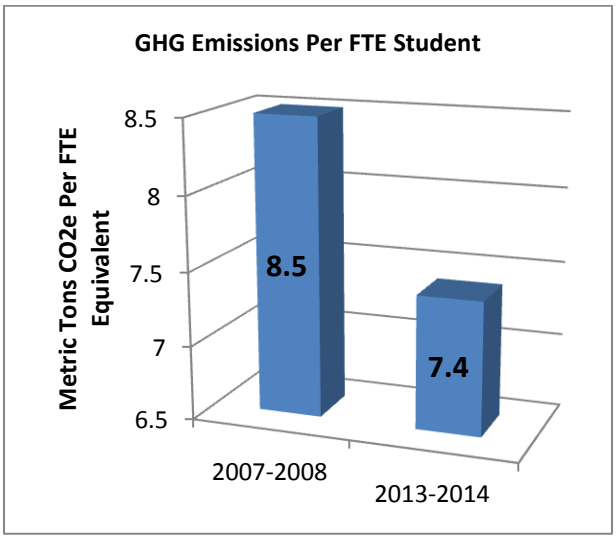
Finally, 13% of the emissions reduction since 2007-2008 has been attributable to reduced fuel usage by the UD vehicle fleet. Scope 1 mobile emissions have declined by 17%.

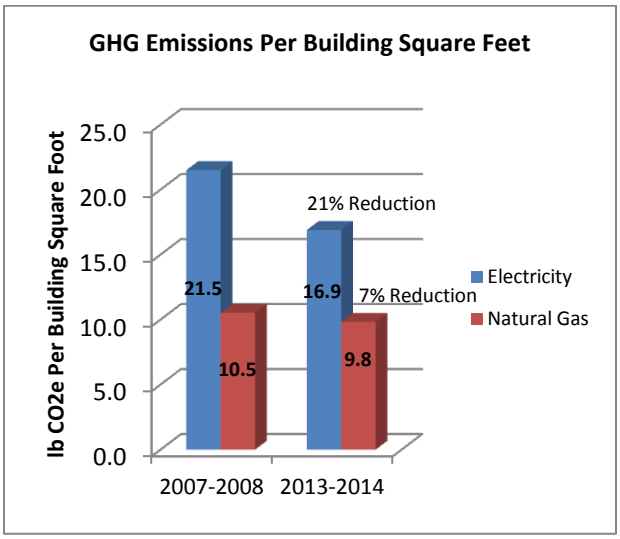
Sources with material increases in emissions since 2007-2008 include stationary fuel combustion, which increased by 9%. This includes a 9% increase for natural gas and a 14% increase in fuel oil, and can be primarily attributed to exceptionally cold winter temperatures. Another source with a material increase in emissions since the 2007-2008 report include was Scope 3 transportation emissions, including student and staff commuting and dorm resident trips home, which increased by 4%.

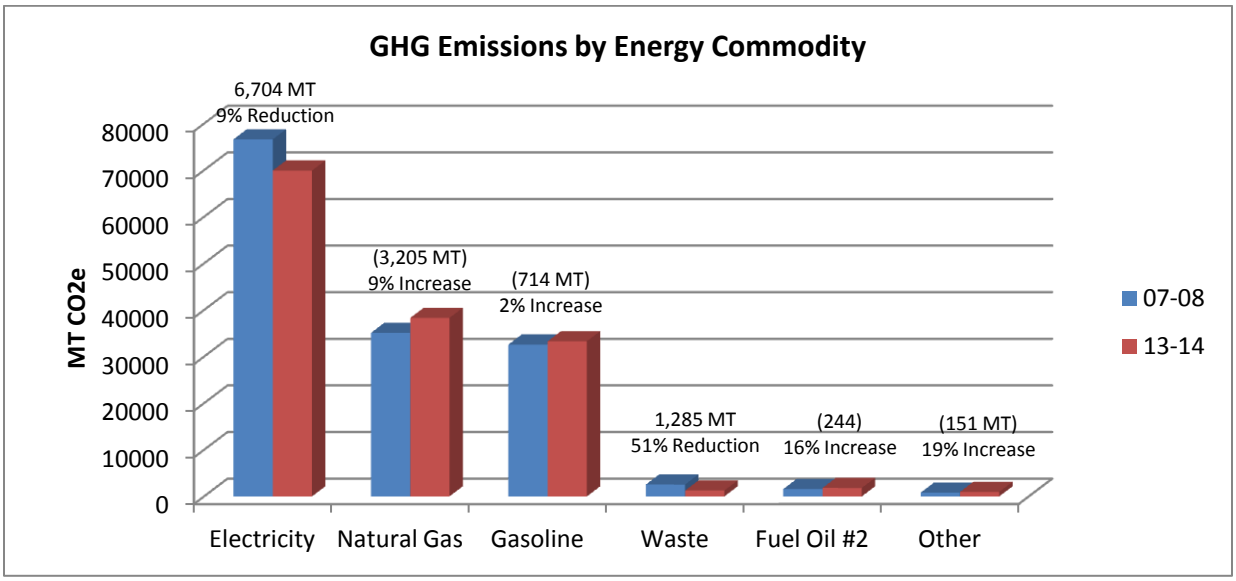
A net emissions reduction was achieved despite the fact that student enrollment at the University increased from 17,631 Full-Time Equivalents (FTE) in 2007-2008 to 19,707 FTEs in 2013-2014. In 2007-2008, 8.5 $MTCO_2e$ were emitted for each FTE student. In 2013-2014 that ratio dropped to 7.4 $MTCO_2e$ per FTE student, a decrease of 13%.

UD's aggregate building area also increased from 7,347,902 square feet in 2007-2008 to 8,592,873 square feet in 2013-2014. However, efficiencies caused the GHG emissions rate per building square foot to outpace this facility growth and emissions intensity fell by 21% for electricity (from 21.5 lb CO_2e per square foot to 16.9) and fell by 10% for natural gas (10.5 to 9.8.) These results are summarized in Figure 3.

Figure 3: 2007-2008 v 2013-2014 GHG Emissions Comparisons







[1] "Electricity" includes emissions from both consumption (Scope 2) and T&D losses (Scope 3)
[2] "Gasoline" includes emissions from both UD fleet (Scope 1) and student/staff commuting (Scope 3)
[3] "Other" category includes emissions from fleet diesel fuel and nitrogen fertilizer (Scope 1) and jet fuel (Scope 3)

Comparison Against Climate Action Plan

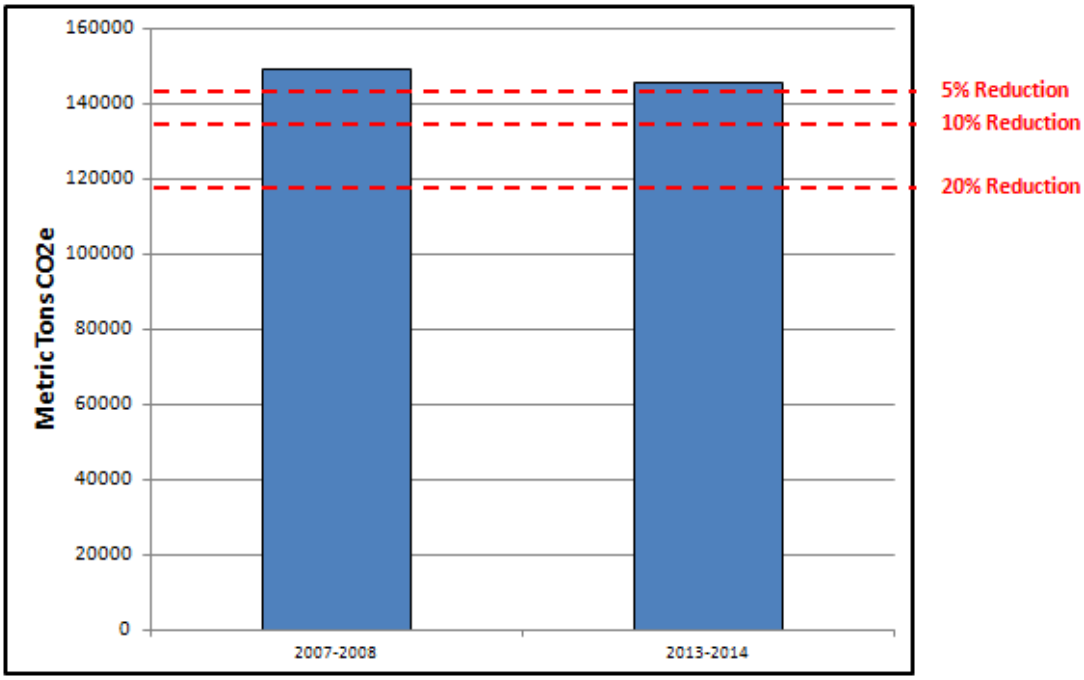
UD, as part of the ACUPCC Climate Action Plan, adopted emission reduction target milestones to be achieved by 2013 (a 5% reduction target from 2007-2008), 2015 (10%), and 2020 (20%).

The results of the 2013-2014 GHG inventory report, which identified a GHG emission reduction of 2%, indicate that UD remains 3% above the 2013 emission reduction target, 8% above the 2015 emissions reduction targets, and 18% above its 2020 target.

It is important to note that largest component of the university's absolute emissions reduction was a result of the shift from coal to natural gas and renewable resources due to state, regional, and national policy changes, and the corresponding reduction in emissions attributable to purchased electricity. Also significant is the degree of year-over-year variability in this generation mix as well as in winter weather.

Finally, due to increases in enrollment, UD's FTE-normalized emissions declined by a much greater proportion than did absolute emissions.

Figure 4: Emissions Progress Against 2020 Climate Action Plan Target



Appendix A: Data

Emission Factors:

Scope	Source	Commodity	Usage	Unit	CO2 Factor	CO2 Unit	CH4 Factor	N2O Factor	CH4/N2O Unit
1	Building	Natural Gas	700,564	MCF	0.0545	Kg/CF	5	0.1	g/mmBtu
1	Building	Fuel Oil #2	176,493	Gal	10.21	Kg/gal	11	0.6	g/mmBtu
1	Fleet	Gasoline	158,257	Gal	8.7775	Kg/gal	0.000788	0.0008717	g/gal
1	Fleet	Diesel	87,258	Gal	10.21	Kg/gal	0.000027	0.0000531	g/gal
1	Landscaping	Fertilizer	11,795	lb	0.004	MT/lb			
2	Building	Electricity	144,169,799	kWh	1,001.7	lb/MWh	27.0711	15.3298	lb/GWh
3	Waste	MSW	2,077	Tons	0.53	MT/ton			
3	Waste	Food Comp.	111	Tons	0.69	MT/ton			
3	Waste	Dining Waste	109	Tons	0.69	MT/ton			
3	Commuting	Gasoline (Daily)	3,364,669	Gal	8.7775	Kg/gal	0.000788	0.0008717	g/gal
3	Commuting	Gasoline (Trips)	270,052	Gal	8.7775	Kg/gal	0.000788	0.0008717	g/gal
3	Commuting	Jet Fuel (Trips)	2,417	Gal	9.5684	Kg/gal	0.27	0.31	g/gal
3	T&D Losses	Electricity	8,909,198	kWh	1,001.7	lb/MWh	27.0711	15.3298	lb/GWh

Emission Totals (Metric Tons):

Scope	Source	Commodity	CO2	CH4	CH4 CO2e	N2O	N2O CO2e	Total CO2e
1	Building	Natural Gas	38,181	3.6009	90.0	0.07202	21.5	38,292
1	Building	Fuel Oil #2	1,802	0.2679	6.7	0.01461	4.4	1,813
1	Fleet	Gasoline	1,389	0.00013	0.003	0.00014	0.04	1,389
1	Fleet	Diesel	891	0.000002	0.00005	0.000004	0.001	891
1	Landscaping	Fertilizer	47					47
2	Building	Electricity	65,507	1.7703	44.3	1.0025	300.7	65,850
3	Waste	MSW	1,101					1,101
3	Waste	Food Comp.	77					77
3	Waste	Dining Waste	75					75
3	Commuting	Gasoline (Daily)	29,533	0.00265	0.07	0.00293	0.9	29,534
3	Commuting	Gasoline (Trips)	2,370	0.00021	0.005	0.00024	0.07	2,370
3	Commuting	Jet Fuel (Trips)	23	0.00065	0.02	0.00075	0.2	23
3	T&D Losses	Electricity	4,048	0.1094	2.3	0.0619	19.2	4,069

Notes:

Sources: EPA Final Mandatory Reporting of Greenhouse Gases, Table C-1 (CO2 factors for Natural Gas, Fuel Oil, Gasoline, Diesel, Jet Fuel), EPA Climate Leaders (CH4/N2O factors for Gas, Fuel Oil, Gasoline, Diesel, Jet Fuel), EPA Inventory of Emissions and Sinks (Fertilizer), EPA WARM Model v13 (MSW Waste, Food Waste), EPA eGRID (Electricity)

CO_2e calculations are based on IPCC Global Warming Potential Factors (CH_4 = 25; N_2O = 298)

Fertilizer and Waste emission factors are expressed in their source documents terms of CO_2e.

For Natural Gas and Fuel Oil #2, heat content values of 1.028 mmBtu/MCF and 0.138 mmBtu/gal, respectively, were assumed (EPA).

CH_4 and N_2O factors for transportation emissions are mileage-based in sources, and have been converted to volume-based factors based on national average fuel economy.

T&D Loss Percentages are based on EPA eGRID 9th Edition (5.82 %.)

Appendix B: Scope 3 Transportation Estimates

Below are the estimates of fuel consumption associated with student and staff commuting, and with dorm room resident trips home during 2007-2008. These estimates were based on a University transport survey conducted in 2008:

Daily Commutes (gasoline): 3,213,717 gallons

Dorm Resident Trips Home (gasoline): 256,900 gallons

Dorm Resident Trips Home (jet fuel): 2,162 gallons

Because insufficient information was available about the data used and assumptions that were made to produce these estimates, it was determined that rather than creating new estimates for the 2013-2014 inventory report, the above values would be adjusted according to some relevant statistics.

Daily Commutes (gasoline): According to the University of Delaware Parking and Transportation Services, the number of annual parking permits sold increased from 10,242 to 11,112 during the past six years (a 13.5% increase), indicating an increase in the number of commuting vehicles. Additionally, based on a USDOT transportation study, it was estimated that average fuel efficiency improved by 3.5% (study is linked below.) The 2007-2008 quantity of gasoline consumption was adjusted downward by these proportions for an estimated 2013-2014 value of 3,364,669 gallons of gasoline attributable to commuting.

3,213,717 + (8.5% increase in parking permits) = 3,486,704

3,486,704 – (3.5% fuel efficiency improvement) = **3,364,669 (2013-2014 estimate)**

Fuel Economy Study:

http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/publications/national_transportation_statistics/html/table_04_23.html

Dorm Room Trips Home (gasoline): According to the University of Delaware facts and figures page (http://www.udel.edu/IR/fnf/resid.html) the total University population of students plus employees increased by 8.9% between 2007-2008 and 2013-2014, so a corresponding 8.9% increase in the quantity of gasoline consumed on trips home was assumed. This was partially offset by increases in the national average fuel economy (see above), so the adjusted estimate for gasoline consumption attributable to trips home in 2013-2014 was 270,052 gallons.

256,900 + (8.9% increase in student/staff population) = 277,145

279,847 – (3.5% fuel efficiency improvement) = **270,052 (2013-2014 estimate)**

Dorm Room Trips Home (jet fuel): It was assumed that all air trips home were undertaken by non-resident students. According to the facts and figures page (see above) the number of non-resident students increased by 11.8% between 2007-2008 and 2013-2014. So, the quantity of jet fuel consumed on trips home was adjusted upward by 11.8% for a new value for 2013-2014 of 2,416 gallons.

2,162 + (11.8% increase in non-resident students) = **2,416 (2013-2014 estimate)**

Appendix C: Emissions Without Scope 3

While the ACUPCC reporting protocol encourages the reporting of Scope 3 emissions, many other reporting programs do not require these to be reported. This is in part due to the inherent difficulties associated with quantifying these types of emissions.

Below is a comparison of only UD's Scope 1 and Scope 2 emission sources between the 07-08 and 13-14 academic years. Note that this represents a 3% decline in GHG emissions.

2007-2008

Source	Sector	Category	Consumption	Unit	Emissions (MT CO2e)
Natural Gas	Buildings	1	642,625	MCF	35,087
Fuel Oil #2		1	154,525	gal	1,569
Electricity		2	137,925,068	kWh	71,665
Gasoline	Transportation	1	229,697	gal	2,022
Diesel Fuel		1	72,451	gal	735
Fertilizer	Landscaping	1	13,427	lb	54
Total Emissions				MT	111,132

2013-2014

Source	Sector	Category	Consumption	Unit	Emissions (MT CO2e)
Natural Gas	Buildings	1	700,564	MCF	38,292
Fuel Oil #2		1	176,493	gal	1,813
Electricity		2	144,169,799	kWh	65,850
Gasoline	Transportation	1	158,257	gal	1,389
Diesel Fuel		1	87,258	gal	891
Fertilizer	Landscaping	1	11,795	lb	47
Total Emissions				MT	108,282

Appendix D: ACUPCC GHG Report Inputs

Below are the input values for 2013-2014 for the ACUPCC GHG Report:

Summary Statistics:

	Total (MT CO2e)	Per Full-Time Enrollment	Per 1000 Square Feet	% Offset
Gross Emissions (Scope 1 + 2)	108,282	5.5	12.6	0%
Gross Emissions (Scope 1 + 2 + 3)	145,532	7.4	16.9	0%
Net Emissions	145,532	7.4	16.9	N/A

Emissions Inventory Methodology and Boundaries:

Start date of the 12-month period covered in this report:

July 1, 2013

Consolidation methodology used to determine organizational boundaries:

The University of Delaware greenhouse gas inventory covered all buildings which the university controls operations at on its Newark Campus.

Emissions inventoried in this study address activities at the Newark Campus of the University of Delaware. This includes Laird Campus, the Main Campus, and South Campus. UD's off campus farm facilities were outside of the scope of this inventory, as were its Dover, Wilmington, Lewes and Georgetown satellite campuses.

Emissions calculation tool used:

ecolink™ by Siemens was used for the 2007-2008 base year calculations. 2013-2014 calculations were performed offline in Excel spreadsheets.

Please describe why this tool was selected.

Siemens' ecolink® tool was leveraged to assist with data management and emissions calculations. This platform ensures that all emissions factors are clearly documented and correctly applied. This tool also provides safe and transparent data warehousing which will allow UD to re-analyze its organizational carbon footprint or solicit external validation of the UD carbon accounting practices.

Please describe the source(s) of the emissions coefficients used.

Emission factors for the combustion of natural gas, fuel oil, gasoline, diesel fuel, and jet fuel were obtained from the U.S. EPA Mandatory Reporting Rule for Greenhouse Gases (MRR), Table C-1, in keeping with the accounting methodology specified by The Climate Registry's *General Reporting Protocol (GRP)*.

Emissions factors for purchased electricity, in keeping with *GRP* methodology, were derived from the U.S. EPA's eGRID 9th Edition tables. Specifically, UD is located within the RFC East Subregion, so the published GHG emission factors representing the fuel mix used in generating electricity in this region were used.

Scope 3 GHG emissions from the disposal of mixed waste, food waste, and food composting were calculated using emission factors obtained from the U.S. EPA WARM Model, version 13.

GHG emissions resulting from usage of nitrogen fertilizer were calculated with an emission factor derived from the U.S. EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2001 (April 2003).

Which version of IPCC's list of global warming potentials did you use?

Second Assessment Report

Who primarily conducted this emissions inventory?

Siemens

Please describe the process of conducting this inventory.

Siemens worked with UD personnel to compile the 2013-2014 academic year GHG inventory. The aim of this effort was to replicate the scope and approach of the 2007-2008 GHG inventory and generate a brief, written update for comparison to the 2007-2008 benchmark. This process allows for direct correlations between the two records while measuring the benefits of carbon mitigation actions taken during the intervening five years.

Direct data records were compiled for building energy use, UD owned fleet vehicles, organic waste outputs, and fertilizer used. Estimates were utilized to assess fuel consumption associated with commuting activities as was required for the 2007-2008 academic year GHG inventory. However, it was not practical to replicate the survey conducted during the 2007-2008 effort so the 2013-2014 commuting activity level was estimated by making adjustments the 2007-2008 value based on changes in student population, the number of parking permits issued, and national average fuel efficiency.

Please see the formal inventory for further detail.

Please describe any emissions sources that were classified as de minimis *and explain how a determination of the significance of these emissions was made.*

No emissions sources were excluded due to being classified as *de minimis*.

Please describe any data limitations related to this submission and any major assumptions made in response to these limitations.

Several sources of UD's emissions are excluded because of a lack of sufficient data. The omitted activities include: UD related ground travel for which the UD fleet was not used; and UD related air travel. At UD, it is common for individuals to make their own travel arrangements, which precludes any ability to collect data on number of miles traveled or frequency of trips. Furthermore, the UD transportation survey scope only extended to travel around campus. Obtaining UD-related travel data from individuals was deemed infeasible at this time.

In addition, data limitation prevented UD from estimating the potential value of carbon sinks due to UD vegetation.

Emissions Data

all values in MT CO2e

Scope 1 Emissions

Stationary Combustion	40105
Mobile Combustion	2280
Process Emissions	0.0
Fugitive Emissions	47

Total Scope 1 Emissions	**42433**

Scope 2 Emissions

Purchased Electricity	65850
Purchased Heating	0.0
Purchased Cooling	0.0
Purchased Steam	0.0
Total Scope 2 Emissions	**65850**

Scope 3 Emissions

Commuting	31904
Air Travel	23
Solid Waste	1253
Transmission & Distribution Losses	4069
Total Scope 3 Emissions	**38558**

Biogenic Emissions

Biogenic Emissions from Stationary Combustion	0.0
Biogenic Emissions from Mobile Combustion	0.0

Mitigation Data:

N/A

Normalization and Contextual Data:

Building space

Gross square feet of building space	8,592,873
Net assignable square feet of laboratory space	1,464,799
Net assignable square feet of health care space	27,265
Net assignable square feet of residential space	2,510,473

Population

Total Student Enrollment (FTE)	19,707
Residential Students	No information provided
Full-time Commuter Students	No information provided
Part-time Commuter Students	No information provided
Non-Credit Students	No information provided
Full-time Faculty	No information provided
Part-time Faculty	No information provided
Full-time Staff	No information provided

Part-time Staff	No information provided

Other Contextual Data

Endowment Size	No information provided
Heating Degree Days	No information provided
Cooling Degree Days	No information provided

Supporting Documentation:

(link to inventory here)

Auditing and Verification:

These emissions data have not been audited, verified, or peer-reviewed.