SIEMENS

University of Delaware

Greenhouse Gas Inventory for the

2015 – 2016 Academic Year

November 29, 2016

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.

This report has been prepared to address UD's commitment to the ACUPCC to submit a GHG emissions inventory for the 2015-2016 academic year. Results of UD's carbon accounting activities since 2009 are summarized in this document in an effort to provide a complete record.

Although University emissions have fallen, these reductions are primarily the result of changes in the power industry. 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 2016.

Overview of 2015-2016 GHG Inventory Approach and Results

Siemens worked with UD personnel to compile the 2015-2016 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 2015-2016 commuting activity level was estimated by making adjustments the 2007-2008 value based on changes in student population and national average fuel economy (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 2014-2015 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 eGRID2012 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 eGRID2012 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 14. This is an updated version of the same source used in the 2007-2008 report.

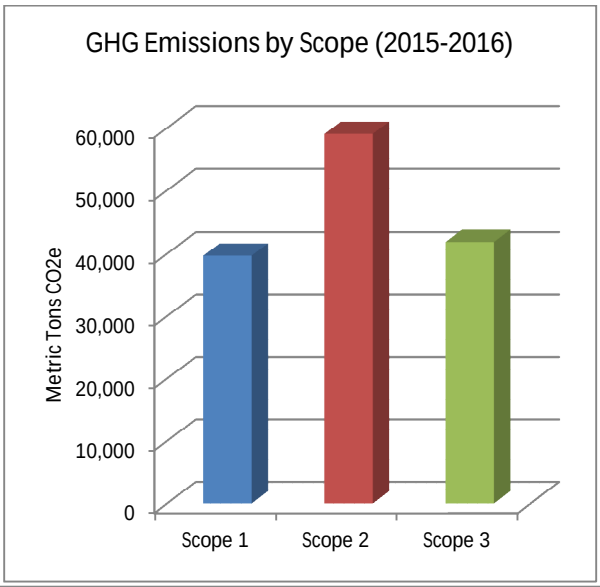
GHG emissions resulting from usage of nitrogen fertilizer were calculated with an emission factor derived from the U.S. EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2001 (April 2003). This is the same value that was used in the 2007-2008 report.

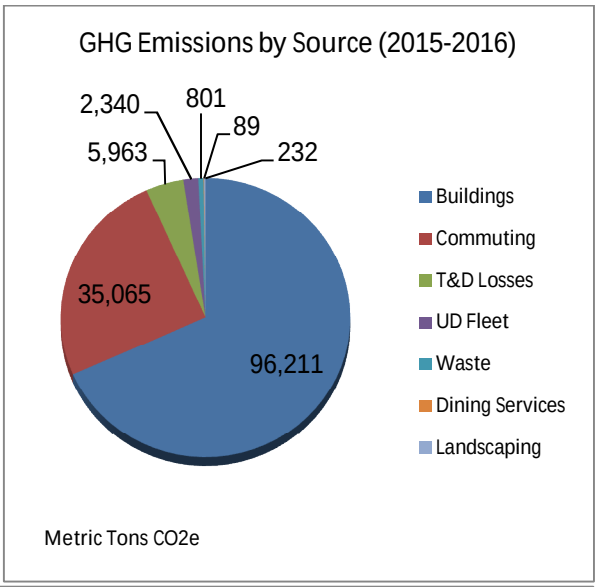
UD's 2015-2016 total GHG emissions were estimated at 140,701 MT CO_2e and detailed emission results by source are presented in Table 1 while Figure 2 provides a summary of the results by emissions scope, source, and energy commodity. Significant sources of emissions included Scope 2 purchased electricity (42% of the total), combustion of natural gas (25%), and gasoline consumed by student/staff vehicles (26%). Building audits were not repeated for the 2015-2016 inventory report so, source-specific allocations of emissions were not determined.

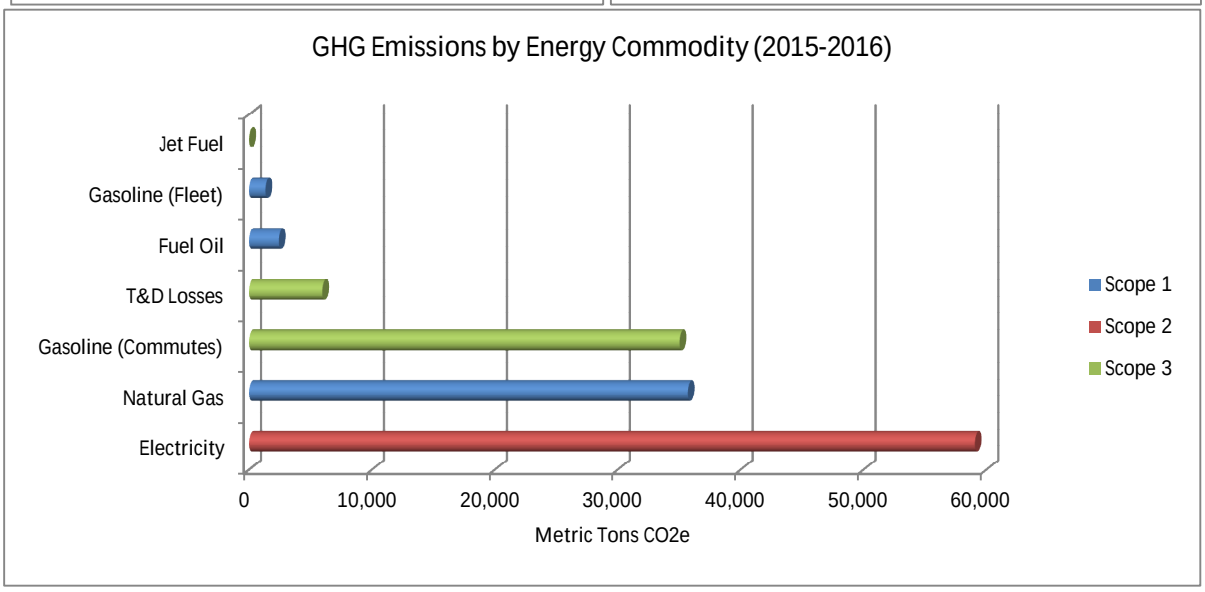
Table 1: 2015-2016 Total Consumption and GHG Emissions by Source

Source	Sector	Category	Consumption	Unit	Emissions (MT CO_2e)
Natural Gas	Buildings	1	654,081	MCF	35,712
Fuel Oil #2		1	139,197	gal	1,430
Electricity		2	150,959,567	kWh	59,069
	T&D Losses	3	15,240,551	kWh	5,963
Gasoline	Transportation	1	152,808	gal	1,341
		3	3,991,976	gal	35,040
Diesel Fuel		1	97,829	gal	999
Jet Fuel		3	2,552	gal	25
Mixed Solid Waste	Waste	3	2,288	tons	801
Food Waste	Food Services	3	164	tons	89
Fertilizer	Landscaping	1	58,000	lb	232
Total Emissions				MT	140,701

Figure 1: 2015-2016 GHG Emissions







Comparison of 2015-2016 Results to 2007-2008 Results

UD's measured GHG emissions declined from 149,207 MT CO_2e during the 2007-2008 academic year to 140,701 MT CO_2e during 2015-2016. This GHG emissions reduction of 8,506 MT CO_2e represents an approximate 6% decline.

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 20,306 FTEs in 2015-2016. In 2007-2008, 8.5 MTCO_2e were emitted for each FTE student. In 2015-2016 that ratio dropped to 6.9 MTCO_2e per FTE student, a decrease of 19%.

Newark Campus's aggregate building area also increased from 6,863,991 square feet in 2007-2008 to 8,409,484 square feet in 2015-2016. However, efficiencies caused the GHG emissions rate per building square foot to outpace this facility growth and emissions intensity fell by 33% for electricity (from 23.0 lb CO_2e per square foot to 15.5) and fell by 17% for natural gas (11.3 to 9.4 lb CO_2e per square foot). These results are summarized in Figure 2.

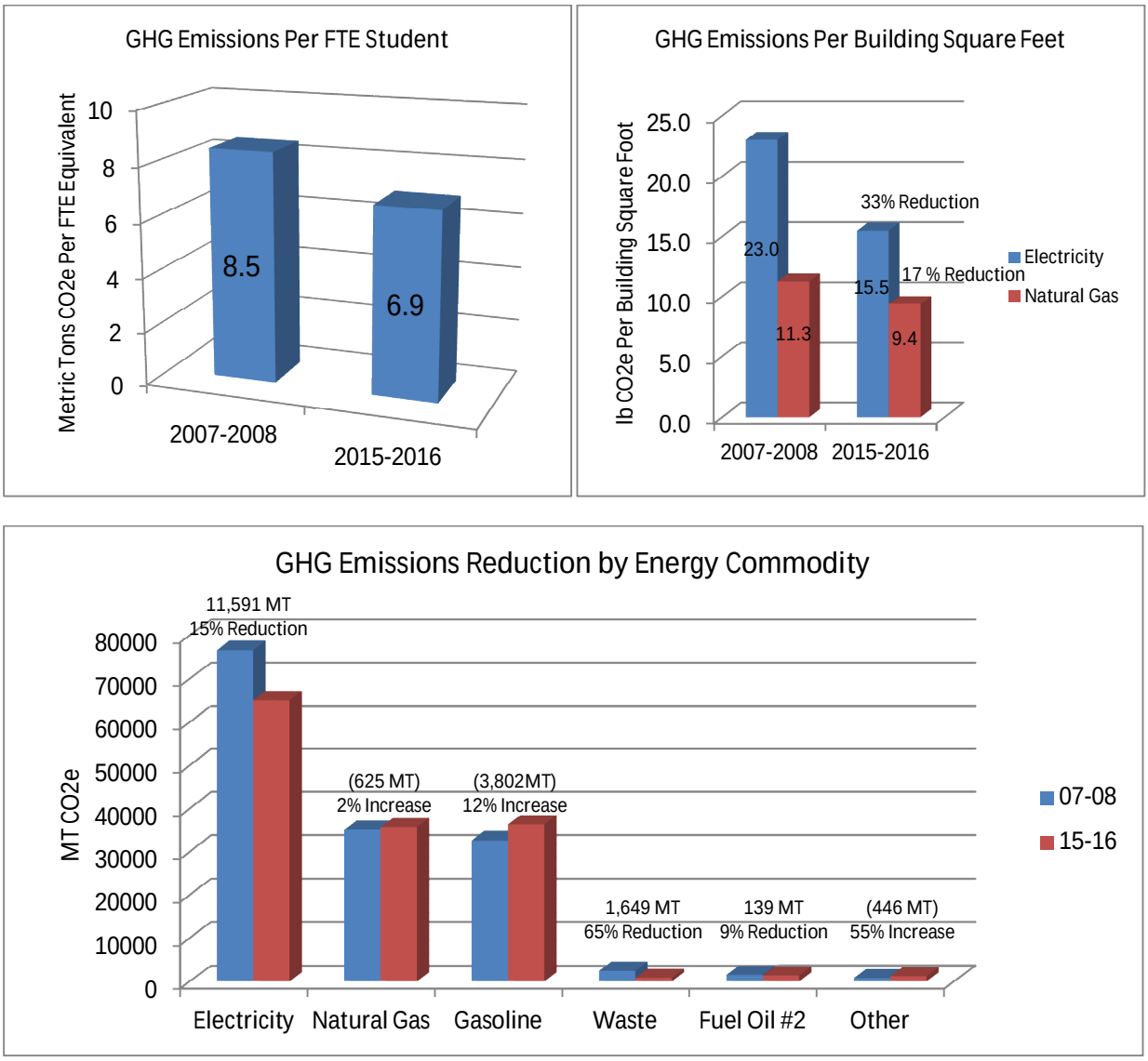
The most significant source of GHG emission decrease was UD's largest emission source, purchased electricity. Despite a 9% increase in the quantity of electricity consumed, the emissions associated with Scope 2 purchased electricity fell by 12,596 MT CO_2e, an 18% drop from 2007-2008. This accounts for 148% of the total reduction in GHG emissions since the 2007-2008 report. This decrease in emissions was due to a cleaner electricity supply resulting from the decline of coal and the increase of natural gas and renewable power generation in the University's power region. Additionally, energy efficiency improvements undertaken by the University helped prevent a greater increase in purchased electricity, despite a 15% growth in enrollment during the same period.

The other 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 22% since the 2007-2008 report. This led to a 62% decrease in emissions associated with the Scope 3 waste category, and represents 16% of the total reduction in GHG emissions since the 2007-2008 report.

Finally, 5% 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 15%.

Sources with material increases in emissions since 2007-2008 include Scope 3 transportation emissions, including student and staff commuting and dorm resident trips home, which increased by 15%.

Figure 2: 2007-2008 v 2015-2016 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

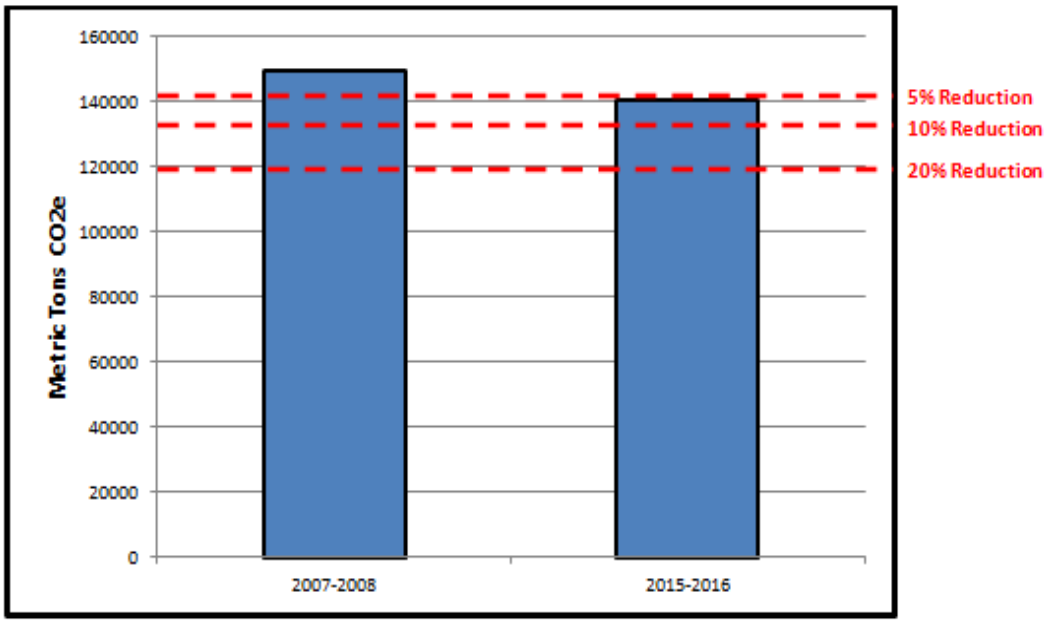
UD, as part of the ACUPCC Climate Action Plan, adopted emission reduction target milestones to be achieved by 2013 (a 5% reduction target from 2007-2008), 2015 (10%), and 2020 (20%).

The results of the 2015-2016 GHG inventory report, which identified a GHG emission reduction of 6%, indicate that UD's 15-16 emissions were 1% below the 2013 emission reduction target, but remained 5% 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 electricity supply generation shifts from coal to natural gas and renewable resources due to state, regional, and national policy changes. 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 3: 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	654,081	MCF	0.0544	Kg/CF	5	0.1	g/mmBtu
1	Building	Fuel Oil #2	139,197	Gal	10.21	Kg/gal	11	0.6	g/mmBtu
1	Fleet	Gasoline	152,808	Gal	8.7775	Kg/gal	0.000788	0.0008717	g/gal
1	Fleet	Diesel	97,829	Gal	10.21	Kg/gal	0.000027	0.0000531	g/gal
1	Landscaping	Fertilizer	58,000	lb	0.004	MT/lb			
2	Building	Electricity	150,959,567	kWh	858.56	lb/MWh	26.44	11.49	lb/GWh
3	Waste	MSW	2,288	Tons	0.35	MT/ton			
3	Waste	Food Comp.	164.25	Tons	0.54	MT/ton			
3	Waste	Dining Waste	Incl. w/ Food						
3	Commuting	Gasoline (Daily)	3,696,476	Gal	8.7775	Kg/gal	0.000788	0.0008717	g/gal
3	Commuting	Gasoline (Trips)	295,491	Gal	8.7775	Kg/gal	0.000788	0.0008717	g/gal
3	Commuting	Jet Fuel (Trips)	2,552	Gal	9.5684	Kg/gal	0.27	0.31	g/gal
3	T&D Losses	Electricity	15,240,551	kWh	858.56	lb/MWh	26.44	11.49	lb/GWh

Emission Totals (Metric Tons):

Scope	Source	Commodity	CO2	CH4	CH4 CO2e	N2O	N2O CO2e	Total CO2e
1	Building	Natural Gas	35,608	3.3554	83.9	0.06711	20.0	35,712
1	Building	Fuel Oil #2	1,421	0.2113	5.3	0.01153	3.4	1,429
1	Fleet	Gasoline	1,341	0.00013	0.003	0.00014	0.04	1,341
1	Fleet	Diesel	999	0.000003	0.00007	0.000005	0.002	999
1	Landscaping	Fertilizer	232					232
2	Building	Electricity	58,789	1.81	45.3	0.787	234.5	59,069
3	Waste	MSW	801					801
3	Waste	Food Comp.	89					89
3	Waste	Dining Waste						
3	Commuting	Gasoline (Daily)	32,446	0.0031	0.08	0.0034	1.0	32,447
3	Commuting	Gasoline (Trips)	2,594	0.00025	0.006	0.00027	0.08	2,594
3	Commuting	Jet Fuel (Trips)	24	0.00069	0.02	0.00079	0.2	24
3	T&D Losses	Electricity	5,935	0.183	3.8	0.079	24.6	5,965

Notes:

Sources: EPA Final Mandatory Reporting of Greenhouse Gases, Table C-1 (CO_2 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 v14 (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 1.026 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 eGRID2012 Edition (9.17 %.)

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 2015-2016 inventory report, the above values would be adjusted according to some relevant statistics.

Daily Commutes (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 12.9% between 2007-2008 and 2015-2016, so a corresponding 12.9% increase in the quantity of gasoline consumed by commuters was assumed. Based on a USDOT transportation study, it was estimated that average fuel economy declined by 1.8% from 2008 to 2014 (study is linked below.) The 2007-2008 quantity of gasoline consumption was adjusted downward by these proportions for an estimated 2015-2016 value of 3,696,476 gallons of gasoline attributable to commuting.

3,213,717 + (12.9% increase in students/employees) = 3,629,873

3,629,873 – (-1.8% fuel efficiency improvement) = **3,696,476 (2015-2016 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): Based on the changes to student and employee population described above, a corresponding 12.9% increase in the quantity of gasoline consumed on trips home was also assumed. Accounting for changes in national average fuel economy (see above) the adjusted estimate for gasoline consumption attributable to trips home in 2015-2016 was 295,491 gallons.

256,900 + (12.9% increase in student/staff population) = 290,167

290,167 – (-1.8% fuel efficiency improvement) = **295,491 (2015-2016 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 18.0% between 2007-2008 and 2015-2016. So, the quantity of jet fuel consumed on trips home was adjusted upward by 18.0% for a new value for 2015-2016 of 2,552 gallons.

2,162 + (18.0% increase in non-resident students) = **2,552 (2015-2016 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 15-16 academic years. Note that this represents an 11% 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

2015-2016

Source	Sector	Category	Consumption	Unit	Emissions (MT CO2e)
Natural Gas	Buildings	1	654,081	MCF	35,712
Fuel Oil #2		1	139,197	gal	1,430
Electricity		2	150,959,567	kWh	59,069
Gasoline	Transportation	1	152,808	gal	1,341
Diesel Fuel		1	97,829	gal	999
Fertilizer	Landscaping	1	58,000	lb	232
Total Emissions				MT	98,783

Appendix D: ACUPCC GHG Report Inputs

Below are the input values for 2015-2016 for the ACUPCC GHG Report:

Summary Statistics:

	Total (MT CO2e)	Per Full-Time Enrollment	Per 1000 Square Feet	% Offset
Gross Emissions (Scope 1 + 2)	98,783	4.9	11.7	0%
Gross Emissions (Scope 1 + 2 + 3)	140,701	6.9	16.7	0%
Net Emissions	140,701	6.9	16.7	N/A

Emissions Inventory Methodology and Boundaries:

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

July 1, 2015

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. 2015-2016 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 eGRID2012 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 14.

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 2015-2016 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 2015-2016 commuting activity level was estimated by making adjustments the 2007-2008 value based on changes in student population 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	37142
Mobile Combustion	2340
Process Emissions	0.0
Fugitive Emissions	232
Total Scope 1 Emissions	39714

Scope 2 Emissions

Purchased Electricity	59069
Purchased Heating	0.0
Purchased Cooling	0.0
Purchased Steam	0.0
Total Scope 2 Emissions	59069

Scope 3 Emissions

Commuting	35040
Air Travel	25
Solid Waste	890
Transmission & Distribution Losses	5963
Total Scope 3 Emissions	41918

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	8,409,484
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)	20,306
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	4,096
Cooling Degree Days	1,260

Supporting Documentation:

(link to inventory here)

Auditing and Verification:

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

Appendix E: 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 2014-2015. 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.

[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.

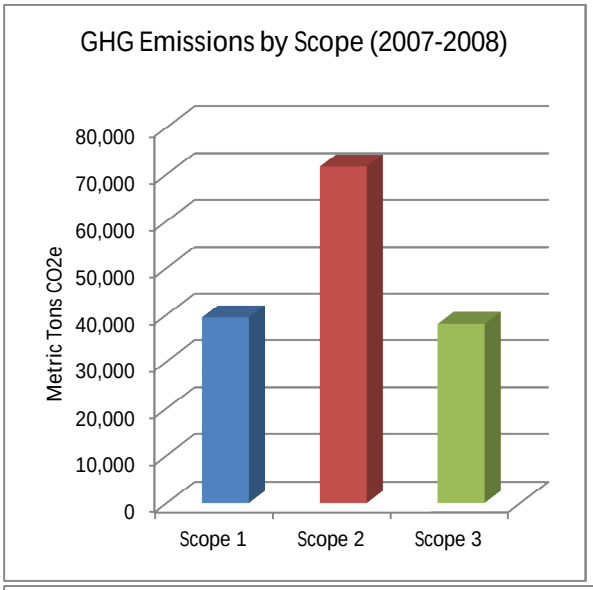
2007-2008 Total Consumption and GHG Emissions by Source (Originally Reported)

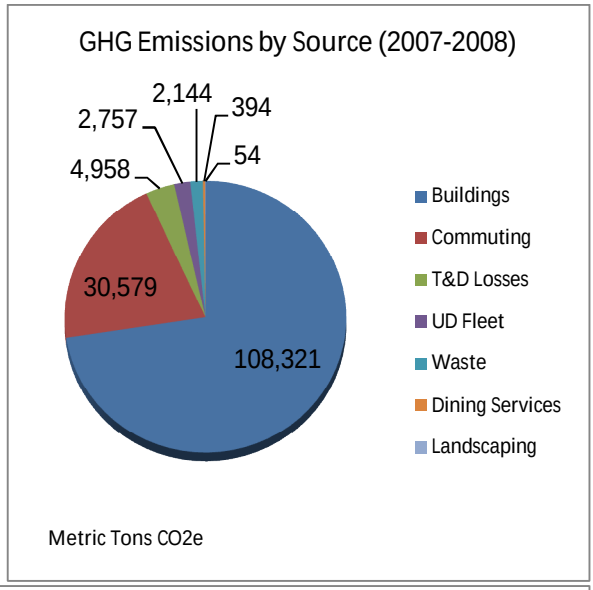
Source	Sector	Category	Consumption	Unit	Emissions (MT CO2e)
Natural Gas	Buildings	1	642,625	MCF	35,087
Fuel Oil #2		1	154,525	gal	1,569
Electricity		2	137,925,068	kWh	79,958
Gasoline	Transportation	1	229,697	gal	2,022
		3	3,470,617	gal	30,558
Diesel Fuel		1	72,451	gal	735
Jet Fuel		3	2,162	gal	21
Mixed 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

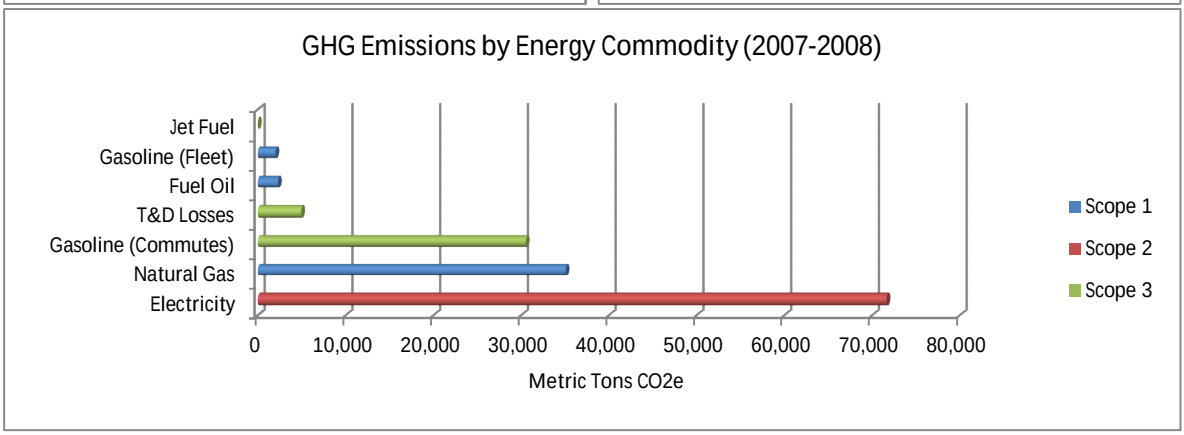
2007-2008 Total Consumption and GHG Emissions by Source (Restated)

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

2007-2008 GHG Emissions (Restated)







Appendix F: UD Historical Enrollment Data

FY	Total - All	FTE - All	Full Time - All	Part Time - All	Total - Newark	FTE - Newark	Full Time - Newark	Part Time - Newark
FY08	20,342	18,567	17,679	2,663	18,723	17,596	17,033	1,691
FY09	20,500	18,754	17,881	2,619	18,855	17,767	17,223	1,632
FY10	21,138	19,359	18,469	2,669	19,391	18,272	17,713	1,678
FY11	21,176	19,472	18,620	2,556	19,556	18,429	17,866	1,690
FY12	21,489	19,844	19,022	2,467	19,957	18,851	18,298	1,659
FY13	21,856	20,257	19,458	2,398	20,363	19,262	18,712	1,651
FY14	22,166	20,512	19,685	2,481	20,550	19,426	18,864	1,686
FY15	22,680	21,153	20,389	2,291	21,141	20,124	19,616	1,525
FY16	22,852	21,325	20,562	2,290	21,327	20,306	19,795	1,532

Appendix G: Historical Degree Day Data (Wilmington Airport)

FY	Date	HDD	CDD
FY09	Jul-08	0	412
FY09	Aug-08	0	255
FY09	Sep-08	18	163
FY09	Oct-08	301	12
FY09	Nov-08	592	0
FY09	Dec-08	818	0
FY09	Jan-09	1128	0
FY09	Feb-09	794	0
FY09	Mar-09	674	0
FY09	Apr-09	351	39
FY09	May-09	108	66
FY09	Jun-09	19	190
FY10	Jul-09	0	277
FY10	Aug-09	0	367
FY10	Sep-09	34	87
FY10	Oct-09	304	5
FY10	Nov-09	463	0
FY10	Dec-09	914	0
FY10	Jan-10	1008	0
FY10	Feb-10	949	0
FY10	Mar-10	527	0
FY10	Apr-10	277	20
FY10	May-10	101	116
FY10	Jun-10	3	352
FY11	Jul-10	0	460
FY11	Aug-10	0	374
FY11	Sep-10	7	184
FY11	Oct-10	254	10
FY11	Nov-10	546	0
FY11	Dec-10	1023	0
FY11	Jan-11	1128	0
FY11	Feb-11	814	0
FY11	Mar-11	701	0
FY11	Apr-11	295	29
FY11	May-11	76	119
FY11	Jun-11	0	277
FY12	Jul-11	0	494
FY12	Aug-11	0	317
FY12	Sep-11	32	180
FY12	Oct-11	278	8
FY12	Nov-11	459	0
FY12	Dec-11	727	0
FY12	Jan-12	859	0
FY12	Feb-12	725	0
FY12	Mar-12	424	3
FY12	Apr-12	356	13
FY12	May-12	52	121
FY12	Jun-12	13	239

FY	Date	HDD	CDD
FY13	Jul-12	0	478
FY13	Aug-12	0	358
FY13	Sep-12	42	139
FY13	Oct-12	239	27
FY13	Nov-12	675	0
FY13	Dec-12	700	0
FY13	Jan-13	905	0
FY13	Feb-13	849	0
FY13	Mar-13	761	0
FY13	Apr-13	342	16
FY13	May-13	125	89
FY13	Jun-13	0	251
FY14	Jul-13	0	452
FY14	Aug-13	0	266
FY14	Sep-13	72	104
FY14	Oct-13	229	49
FY14	Nov-13	629	0
FY14	Dec-13	844	0
FY14	Jan-14	1164	0
FY14	Feb-14	938	0
FY14	Mar-14	824	0
FY14	Apr-14	377	7
FY14	May-14	76	59
FY14	Jun-14	2	236
FY15	Jul-14	0	345
FY15	Aug-14	0	245
FY15	Sep-14	39	146
FY15	Oct-14	218	16
FY15	Nov-14	635	0
FY15	Dec-14	769	0
FY15	Jan-15	1069	0
FY15	Feb-15	1126	0
FY15	Mar-15	838	0
FY15	Apr-15	331	1
FY15	May-15	56	164
FY15	Jun-15	18	266
FY16	Jul-15	0	372
FY16	Aug-15	0	335
FY16	Sep-15	1	230
FY16	Oct-15	288	3
FY16	Nov-15	425	6
FY16	Dec-15	478	1
FY16	Jan-16	1015	0
FY16	Feb-16	822	0
FY16	Mar-16	504	2
FY16	Apr-16	383	11
FY16	May-16	175	78
FY16	Jun-16	5	222