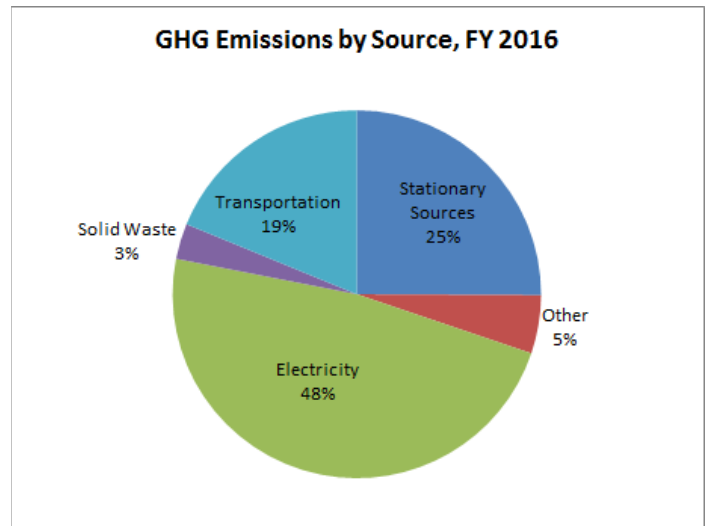


GREENHOUSE GAS INVENTORY FY 2016 UPDATE

OVERVIEW

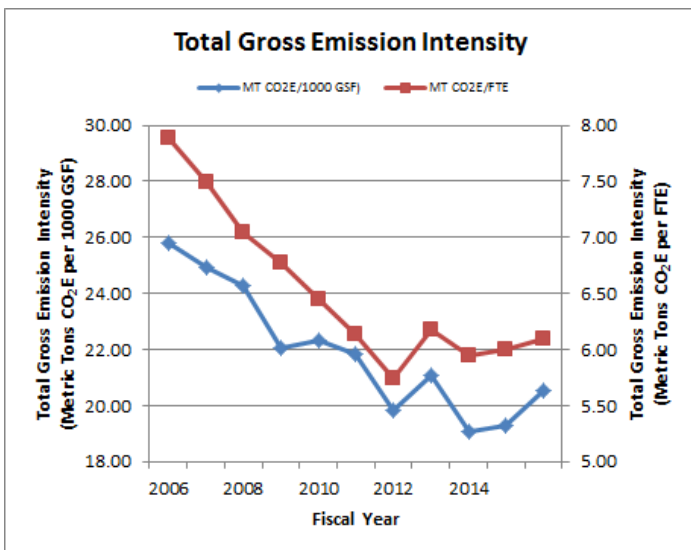
Temple University (Temple) has prepared a greenhouse gas (GHG) inventory program in support of its participation in Second Nature’s Climate Commitment. This inventory is an update which summarizes Temple’s fiscal year (FY) 2016 GHG emissions and supplements the previously published inventory for fiscal years 2006 through 2015.

In FY 2016, Temple University’s total gross emissions were 209,813 metric tons of carbon dioxide equivalent (MTeCO₂). Of the total emissions, 48% were attributable to purchased electricity consumption, 25% to stationary sources, 19% to transportation activities with a large portion attributable to commuting and 3% to solid waste. Mobile sources (university fleet), refrigerants, fertilizers, purchased steam, and transmission and distribution losses made up the remainder, approximately 5% of the total emissions. Temple’s total gross emissions were reduced to a net of 170,558 MTeCO₂ through carbon offsets.



The primary emission sources were: purchased electricity, stationary combustion, and commuting (student, faculty and staff). This collectively accounted for approximately 88% of total annual gross emissions.

TRENDS FROM FY 2015 TO FY 2016



Total gross emissions increased by 3% from FY 2015 to FY 2016 which is attributed primarily to the increase of emissions attributed to commuting.

In FY 2016, total gross emission intensity per 1000 gross square feet (GSF) and total gross emission intensity per full-time equivalent students (FTE) increased relative to FY 2015. Normalizing emissions by variables such as square footage and population is helpful to establish trends. As of September 2016, average emission intensities for reporting Second Nature peer institutions were 16.8 MTeCO₂/1000 GSF and 7.11 MTeCO₂/FTE. When compared to its peer institutions, Temple’s emission intensity of 20.54 MTeCO₂/1000 GSF is higher and 6.09 MTeCO₂/FTE is lower. Overall, Temple’s emission intensity has decreased by over 20% relative to FY 2006.

GREENHOUSE GAS EMISSIONS SUMMARY

Emissions Source		FY 2006 Baseline	FY 2015	FY 2016	% Change FY06 to FY16	% Change FY15 to FY16
Scope 1 Emissions (MTCO ₂ E)	Stationary (<i>oil, natural gas, propane</i>)	57,166	57,885	52,633	-7.9%	-9.1%
	Mobile (<i>University fleet</i>)	628	879	868	38.2%	-1.3%
	Fugitive & Process (<i>Refrigerants, CO₂, fertilizer</i>)	1,945	2,516	2,548	31.0%	1.3%
	Total Gross Emissions Scope 1	59,739	61,280	56,049	-6.2%	-8.5%
Scope 2 Emissions (MTCO ₂ E)	Purchased Electricity	104,685	94,869	100,466	-4.0%	5.9%
	Purchased Steam	278	1,029	1,126	305.3%	9.4%
	Total Gross Emissions Scope 2	104,962	95,898	101,592	-3.2%	5.9%
Scope 3 Emissions (MTCO ₂ E)	Commuting	22,616	26,019	32,374	43.1%	24.4%
	University Funded Travel	5,726	8,276	7,045	23.0%	-14.9%
	Solid Waste	13,761	6,338	6,545	-52.4%	3.3%
	Transmission & Distribution Losses	6,469	5,863	6,208	-4.0%	5.9%
	Total Gross Emissions Scope 3	48,573	46,496	52,172	7.4%	12.2%
Scope 1-3 Gross Emissions (MTCO ₂ E)	Total Gross Emissions	213,274	203,673	209,813	-1.6%	3.0%
	Gross Square Footage (GSF)	8,266,175	10,564,903	10,212,488	23.5%	-3.3%
	Full-time Equivalent Students (FTE)	27,055	33,955	34,450	27.3%	1.5%
	Total Gross Emission Intensity/1000 GSF	25.80	19.28	20.54	-20.4%	6.6%
	Total Gross Emission Intensity/FTE Student	7.88	6.00	6.09	-22.7%	1.5%
Scope 1-3 Net Emissions (MTCO ₂ E)	Offsets	-125	-3,101	-39,255	31223.9%	1165.9%
	Total Net Emissions	213,149	200,573	170,558	-20.0%	-15.0%
	Total Net Emission Intensity/1000 GSF	25.79	18.98	16.70	-35.2%	-12.0%
	Total Net Emission Intensity/FTE	7.88	5.91	4.95	-37.2%	-16.2%

TOTAL GROSS EMISSIONS REPORTED TO ACUPCC¹

226,219

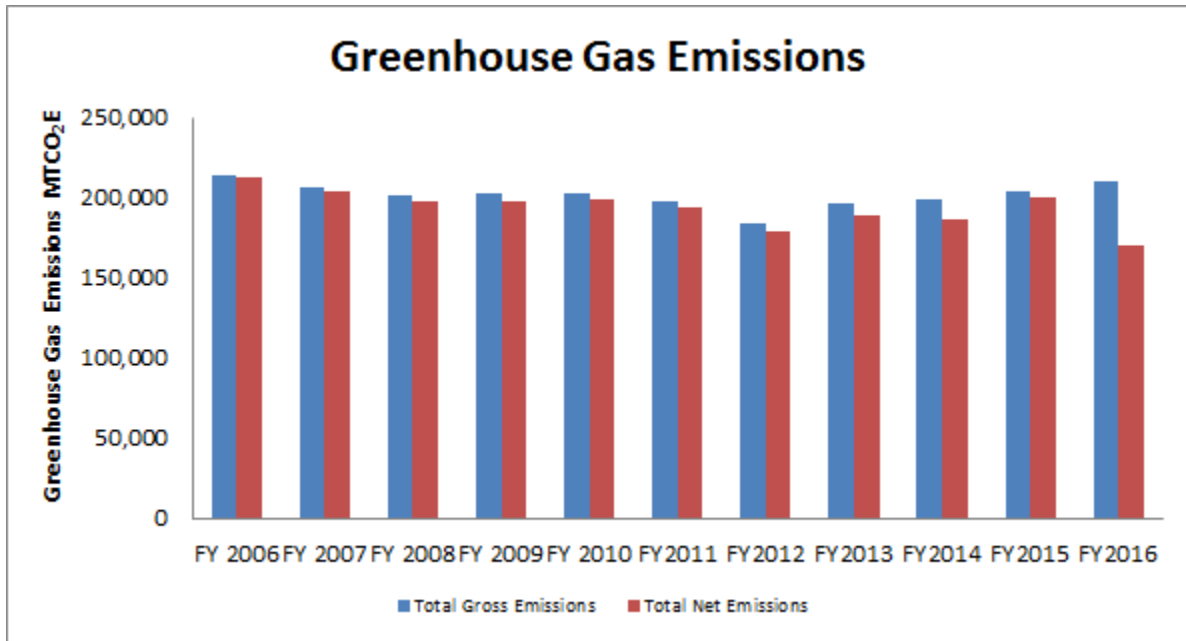
The increase in total gross emissions from FY 2015 to FY 2016 came primarily from Scope 3 commuting sources. Temple calculates commuting emissions from a transportation survey conducted every three years. A new survey was launched in 2016 and reflects changes in commuting habits since 2013.

The largest reduction in greenhouse gas emissions from FY 2015 to FY 2016 came from Scope 1 stationary sources, including natural gas and oil. While there was an increase in electricity usage, overall emissions attributed to building operations decreased by 2% from FY 2015. The demolition of Barton Hall, an energy intensive building, contributed to the overall reduction in energy usage. Another significant emissions reduction came from university funded travel sources which includes air and rail travel.

Temple reduced its FY 2016 GHG gross emissions from 209,813 MTeCO₂ to 170,558 MTeCO₂ (a 39,255 MTeCO₂ reduction) through offsets generated by the following activities:

- The purchase of renewable energy credits. In FY 2016, Temple purchased renewable energy credits to offset 20% of its annual electricity usage;
- University computer reuse and recycling;
- Construction waste recycling.

¹ Refer to Reporting Methodology section of this report



REPORTING METHODOLOGY

The Greenhouse Gas Inventory quantifies Temple’s anthropogenic GHG emissions from energy consumption, waste disposal, agricultural activities, use of chemicals and refrigerants, and commuter transportation choices and tracks emissions of three primary greenhouse gases: carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). Greenhouse Gas reporting includes only those campuses where the university has operational control and can enforce a change in policy (Main, Ambler, Health Sciences, Podiatric and Tyler campuses).

Using the methodology of CarbonMAP (<http://campuscarbon.com>)², GHG emissions are expressed in Metric Tons of Carbon Dioxide Equivalents (MTeCO₂). The individual greenhouse gases are converted to carbon dioxide equivalent values using the global warming potential (GWP) of the respective gases to convert them to common units. The total MTeCO₂ is the sum of the emissions from each source. Previous inventories were generated using Clean Air – Cool Planet’s Campus Carbon Calculator. Temple’s emissions data is recalculated annually to reflect updates to emission factors and global warming potentials.

ACKNOWLEDGEMENTS

The Office of Sustainability would like to thank the following Temple University affiliates who contributed information and data to the FY 2015 GHG Inventory: Peter Bloomer, Facilities Management; Kurt Bresser, Facilities Management; Phil Carpenter, Liacouras Center; Janice Dietz, Campus Safety Services; Mark H. Gottlieb, Facilities Management; Joe Imszennik, Facilities Management; Vincent James, Athletics; Jonathan Latko, Computer Recycling Center; Jason Levy, Division of Student Affairs; Tom McCreesh, Facilities Management; David J. McDonough, Environmental Health & Radiation Safety; Andrew McGinley, Office of Research Administration; Anthony Morris, Facilities Management Podiatric Medicine; Kurt Pflugfelder, Scheduling and Space Management; Domenic Rudi, Jr., Office of University Housing; Lydia Perez, Accounts Payable; Rodney Timmons, Facilities Management; and, Delores Tyler, Purchasing. The Office of Sustainability would also like to thank Alice Henderson from Gold Medal.

² Electricity transmission and distribution losses are not accounted for in CarbonMAP and were calculated separately using 5.82% eGrid Gross Loss Factor

Greenhouse Gas Inventory Scorecard

Temple University
Philadelphia, Pennsylvania

	Units	Baseline Year FY2006	Previous Year FY 2015	Current Year FY 2016
INSTITUTIONAL DATA				
Population				
Full Time Equivalent Students		27,055	33,955	34,450
Full Time Staff		4,239	4,195	4,267
Part Time Staff			1,993	345
Full Time Faculty		2,239	2,089	2,149
Part Time Faculty			1,599	1,644
Budget				
Total Operating Budget	\$	804,240,000	1,262,639,737	1,343,405,000
Research Budget	\$	83,062,000	123,352,974	134,287,420
Energy Budget	\$	23,319,394	25,697,223	19,955,656
Physical Space				
Total Space	ft ²	8,266,175	10,564,903	10,212,488
Laboratory Space	ft ²	775,083	951,628	972,010
SCOPE 1 DATA				
On-Campus Stationary Sources				
Natural Gas	MMBtu	156,252	1,068,915	977,279
No. 2 Fuel Oil	Gallon	369,875	46,041	63,760
No. 6 Residual Oil	Gallon	3,982,568	49,633	0
Mobile Sources (owned/leased fleet)				
Diesel	Gallon	20,131	12,898	11,214
Gasoline	Gallon	43,804	63,883	60,593
Compressed Natural Gas	GGE	3,533	27,000	32,892
Fugitive Sources				
Cryogenic CO2 (Dry Ice)	Pounds	227,322	178,952	250,515
HFC-134a Refrigerant Leakage	Pounds	2,817	3,753	3,753
Fertilizer				
Organic	Pounds	50	5,400	320
Synthetic	Pounds	17,130	4,325	416
SCOPE 2 DATA				
Purchased Electricity	kWh	200,479,805	220,411,133	220,782,184
Purchased Steam	MMBtu	3,807	14,100	15,431
SCOPE 3 DATA				
Student Daily Commute				
Personal Car	Miles	18,880,359	20,226,885	28,923,221
Carpool	Miles	3,241,722	2,186,690	4,874,098
Bus	Miles	4,389,338	3,773,673	3,844,824
Subway	Miles	5,779,597	7,921,313	10,380,223
Rail	Miles	12,270,728	20,942,183	23,079,659
Faculty Daily Commute				
Personal Car	Miles	4,364,556	5,001,243	8,313,046
Carpool	Miles	212,905	97,681	245,180
Bus	Miles	65,700	99,884	194,035
Subway	Miles	424,467	577,270	843,603
Rail	Miles	2,190,545	2,334,050	3,460,087
Staff Daily Commute				
Personal Car	Miles	6,946,154	12,713,793	17,855,858
Carpool	Miles	987,656	534,193	763,707
Bus	Miles	960,100	1,210,481	1,175,743
Subway	Miles	1,775,972	2,397,458	2,489,534
Rail	Miles	2,774,440	4,275,253	6,279,991
University Funded Travel (Air)	Miles	9,076,920	14,046,495	14,585,686
University Funded Travel (Rail)	Miles	-	148,479	170,058

Greenhouse Gas Inventory Scorecard

Temple University
Philadelphia, Pennsylvania

	Units	Baseline Year FY2006	Previous Year FY 2015	Current Year FY 2016
SCOPE 3 DATA Continued				
Solid Waste				
Landfilled	U.S. Tons	4,440	2,052	2,121
Energy-from-Waste	U.S. Tons	0	775	858
Incinerated	U.S. Tons	35	17	115
OFFSETS				
Renewable Energy Credits	kWh	240,000	108,236	66,123,000
Composting (on-campus)	U.S. Tons	8	46	46
Computer Recycling	MTeCO ₂	0	2,563	2,203
Construction Waste Recycling	MTeCO ₂	0	491	6,963

INVENTORY NOTES

- 1) Inventory includes only those campuses where the university has operational control: Main, Tyler, Podiatry, Ambler, Health Sciences (excluding hospital buildings) and Residence Halls
- 2) Faculty and staff counts include Harrisburg, TUCC and Fort Washington campuses, but are assumed to be non material
- 3) FY 2009 is the first year that Athletic's vehicles included in inventory
- 4) Air travel mileage is not representative of all university air travel, only trips booked through Temple Concur