

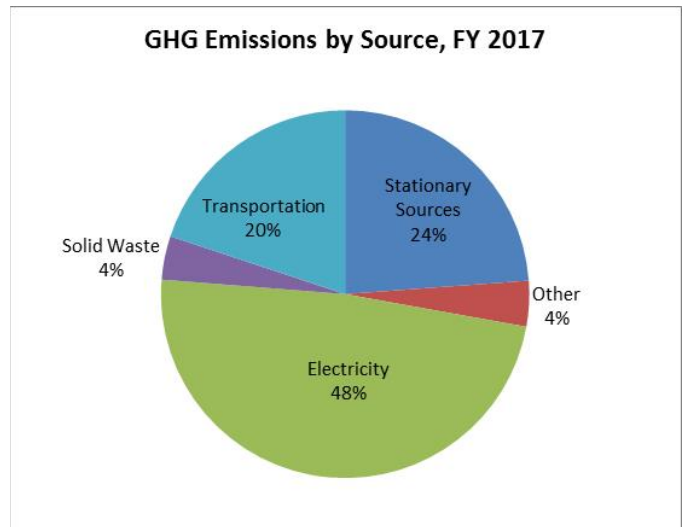
# GREENHOUSE GAS INVENTORY FY 2017 UPDATE

## OVERVIEW

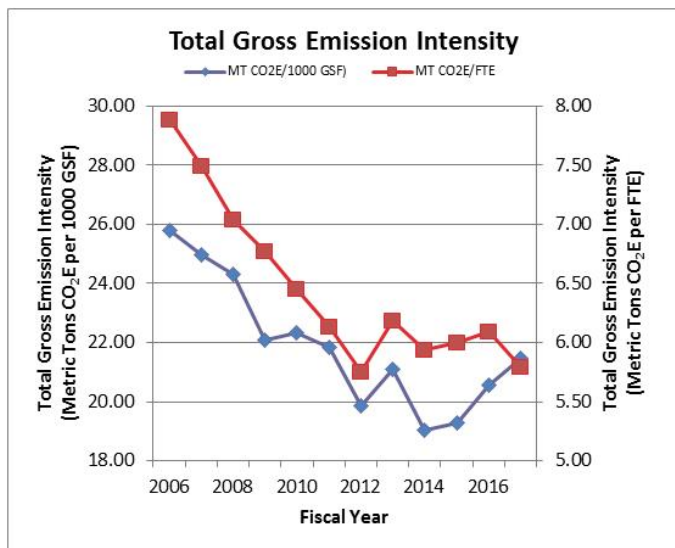
Temple University (Temple) has prepared a greenhouse gas (GHG) inventory program in support of its participation in Second Nature’s Climate Commitment. This inventory is an update which summarizes Temple’s fiscal year (FY) 2017 GHG emissions and supplements the previously published inventory for fiscal years 2006 through 2016.

In FY 2017, Temple University’s total gross emissions were 207,311 metric tons of carbon dioxide equivalent (MTeCO<sub>2</sub>). Of the total emissions, 48% were attributable to purchased electricity consumption, 24% to stationary sources, 20% to transportation activities with a large portion attributable to commuting and 4% to solid waste. Mobile sources (university fleet), refrigerants, fertilizers, purchased steam, and transmission and distribution losses made up the remainder, approximately 4% of the total emissions. Temple’s total gross emissions were reduced to a net of 184,867 MTeCO<sub>2</sub> through carbon offsets.

The primary emission sources were: purchased electricity, stationary combustion, and commuting (student, faculty and staff). This collectively accounted for approximately 87% of total annual gross emissions.



## TRENDS FROM FY 2016 TO FY 2017



Total gross emissions decreased by 1% from FY 2016 to FY 2017 which is due primarily to the decrease of greenhouse gasses attributed to stationary sources and refrigerants. Temple’s gross emissions reduction of almost 3% since FY 2006 equates to the annual energy usage of 630 homes.

Normalizing emissions by variables such as square footage and population is helpful to establish trends. In FY 2017, total gross emission intensity per 1000 gross square feet (GSF) increased relative to FY 2016 and total gross emission intensity per full-time equivalent students (FTE) decreased relative to FY 2016. Overall, Temple’s gross emission intensity has decreased since FY 2006 (17% for GSF and 32% for FTE).

## GREENHOUSE GAS EMISSIONS SUMMARY

Emissions Source		FY 2006 Baseline	FY 2016	FY 2017	% Change FY06 to FY17	% Change FY16 to FY17
Scope 1 Emissions (MTCO <sub>2</sub> E)	Stationary ( <i>oil, natural gas, propane</i> )	57,166	52,633	49,395	-13.6%	-6.2%
	Mobile ( <i>University fleet</i> )	628	868	871	38.6%	0.3%
	Fugitive & Process ( <i>Refrigerants, CO<sub>2</sub>, fertilizer</i> )	1,945	2,548	172	-91.2%	-93.2%
	<b>Total Gross Emissions Scope 1</b>	<b>59,739</b>	<b>56,049</b>	<b>50,438</b>	<b>-15.6%</b>	<b>-10.0%</b>
Scope 2 Emissions (MTCO <sub>2</sub> E)	Purchased Electricity	104,685	100,466	100,380	-4.1%	-0.1%
	Purchased Steam	278	1,126	1,075	286.9%	-4.5%
	<b>Total Gross Emissions Scope 2</b>	<b>104,962</b>	<b>101,592</b>	<b>101,455</b>	<b>-3.3%</b>	<b>-0.1%</b>
Scope 3 Emissions (MTCO <sub>2</sub> E)	Commuting	22,616	32,374	30,811	36.2%	-4.8%
	University Funded Travel	5,726	7,045	10,462	82.7%	48.5%
	Solid Waste	13,761	6,545	7,942	-42.3%	21.4%
	Transmission & Distribution Losses	6,469	6,208	6,203	-4.1%	-0.1%
	<b>Total Gross Emissions Scope 3</b>	<b>48,573</b>	<b>52,172</b>	<b>55,418</b>	<b>14.1%</b>	<b>6.2%</b>
Scope 1-3 Gross Emissions (MTCO <sub>2</sub> E)	<b>Total Gross Emissions</b>	<b>213,274</b>	<b>209,813</b>	<b>207,311</b>	<b>-2.8%</b>	<b>-1.2%</b>
	Gross Square Footage (GSF)	8,266,175	10,212,488	9,665,936	16.9%	-5.4%
	Full-time Equivalent Students (FTE)	27,055	34,450	35,750	32.1%	3.8%
	Total Gross Emission Intensity/1000 GSF	25.80	20.54	21.45	-16.9%	4.4%
	Total Gross Emission Intensity/FTE Student	7.88	6.09	5.80	-26.4%	-4.8%
Scope 1-3 Net Emissions (MTCO <sub>2</sub> E)	Offsets	-125	-32,292	-22,444	17809.6%	-30.5%
	<b>Total Net Emissions</b>	<b>213,149</b>	<b>177,521</b>	<b>184,867</b>	<b>-13.3%</b>	<b>4.1%</b>
	Total Net Emission Intensity/1000 GSF	25.79	17.38	19.13	-25.8%	10.0%
	Total Net Emission Intensity/FTE	7.88	5.15	5.17	-34.4%	0.4%

TOTAL GROSS EMISSIONS REPORTED TO ACUPCC<sup>1</sup>

226,219

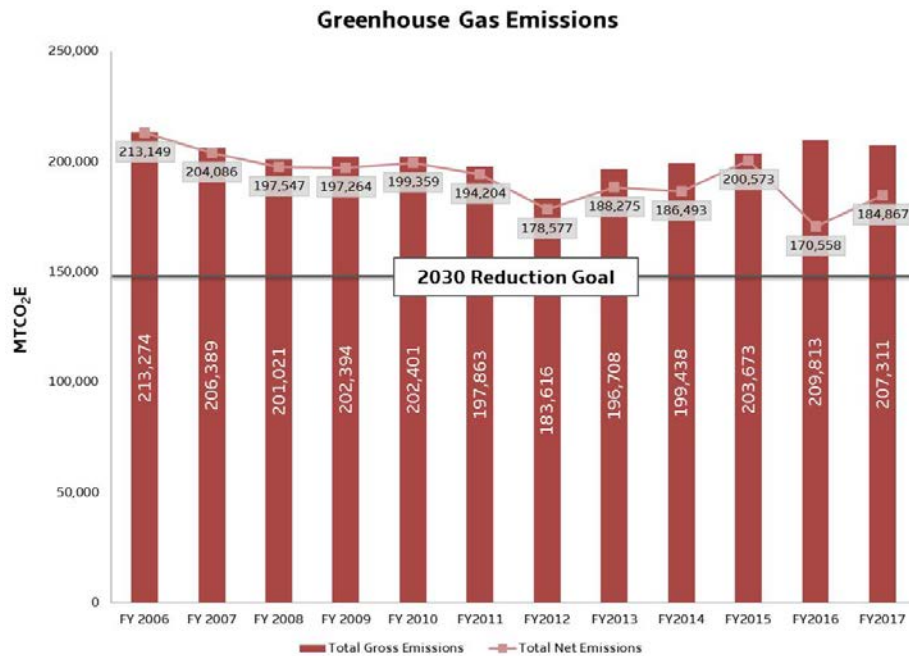
The reduction in greenhouse gas emissions from FY 2016 to FY 2017 came from Scope 1 sources. Temple saw a decrease in its overall energy consumption by 3.5%. The university continues to invest annually in building energy conservation measures as part of its sustainability commitment. In addition, emissions attributed to refrigerant leakage decreased by more than 2,000 MTeCO<sub>2</sub>.

The largest increase in greenhouse gas emissions from FY 2016 to FY 2017 came from university funded travel with almost a 50% increase in travel mileage. Another significant emissions increase came from solid waste.

Temple reduced its FY 2017 GHG gross emissions from 207,311 MTeCO<sub>2</sub> to 184,867 MTeCO<sub>2</sub> (a 22,444 MTeCO<sub>2</sub> reduction) through offsets generated by the following activities:

- The purchase of renewable energy credits. In FY 2017, Temple purchased renewable energy credits to offset 20% of its annual electricity usage;
- University computer reuse and recycling.

<sup>1</sup> 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 (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O). 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>)<sup>2</sup>, GHG emissions are expressed in Metric Tons of Carbon Dioxide Equivalents (MTeCO<sub>2</sub>). 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 MTeCO<sub>2</sub> 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 2017 GHG Inventory: Nicholas Beale, Facilities Management; Peter Bloomer, Facilities Management; Kurt Bresser, Facilities Management; Tim Buck, Liacouras Center; Janice Dietz, Campus Safety Services; Mark H. Gottlieb, Facilities Management; Joe Imszennik, Facilities Management; Vincent James, Athletics; Jonathan Latko, Computer Recycling Center; David J. McDonough, Environmental Health & Radiation Safety; Anthony Morris, Facilities Management Podiatric Medicine; Kurt Pflugfelder, Scheduling and Space Management; Domenic Rudi, Jr., Office of University Housing; Lydia Perez, Accounts Payable; and, Delores Tyler, Purchasing. The Office of Sustainability would also like to thank Alice Henderson from Gold Medal.

<sup>2</sup> 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 2016	Current Year FY 2017
<b>INSTITUTIONAL DATA</b>				
<b>Population</b>				
Full Time Equivalent Students		27,055	34,450	35,750
Full Time Staff		4,239	4,267	4,297
Part Time Staff			345	374
Full Time Faculty		2,239	2,149	2,205
Part Time Faculty			1,644	1,664
<b>Budget</b>				
Total Operating Budget	\$	804,240,000	1,343,405,000	1,394,900,000
Energy Expenditures	\$	23,319,394	19,955,656	17,935,552
<b>Physical Space</b>				
Total Space	ft <sup>2</sup>	8,266,175	10,212,488	9,665,936
Laboratory Space	ft <sup>2</sup>	775,083	972,010	969,904
<b>SCOPE 1 DATA</b>				
<b>On-Campus Stationary Sources</b>				
Natural Gas	MMBtu	156,252	977,279	919,104
No. 2 Fuel Oil	Gallon	369,875	63,760	7,935
No. 6 Residual Oil	Gallon	3,982,568	0	38,263
<b>Mobile Sources (owned/leased fleet)</b>				
Diesel	Gallon	20,131	11,214	14,057
Gasoline	Gallon	43,804	60,593	59,781
Compressed Natural Gas	GGE	3,533	32,892	29,741
<b>Fugitive Sources</b>				
Cryogenic CO2 (Dry Ice)	Pounds	227,322	250,515	224,312
HCFC-22/123 Refrigerant Leakage	Pounds	2,817	3,753	650
<b>Fertilizer</b>				
Organic	Pounds	50	320	320
Synthetic	Pounds	17,130	416	430
<b>SCOPE 2 DATA</b>				
Purchased Electricity	kWh	200,479,805	220,782,184	220,593,291
Purchased Steam	MMBtu	3,807	15,431	14,729
<b>SCOPE 3 DATA</b>				
<b>Student Daily Commute</b>				
Personal Car	Miles	18,880,359	28,923,221	30,145,105
Carpool	Miles	3,241,722	4,874,098	5,080,008
Bus	Miles	4,389,338	3,844,824	4,007,252
Subway	Miles	5,779,597	10,380,223	10,818,743
Rail	Miles	12,270,728	23,079,659	24,054,677
<b>Faculty Daily Commute</b>				
Personal Car	Miles	4,364,556	8,313,046	6,044,692
Carpool	Miles	212,905	245,180	178,279
Bus	Miles	65,700	194,035	141,089
Subway	Miles	424,467	843,603	613,412
Rail	Miles	2,190,545	3,460,087	2,515,945
<b>Staff Daily Commute</b>				
Personal Car	Miles	6,946,154	17,855,858	15,287,771
Carpool	Miles	987,656	763,707	653,868
Bus	Miles	960,100	1,175,743	1,006,644
Subway	Miles	1,775,972	2,489,534	2,131,482
Rail	Miles	2,774,440	6,279,991	5,376,782
University Funded Travel (Air)	Miles	9,076,920	14,585,686	21,668,577
University Funded Travel (Rail)	Miles	-	170,058	183,234

# Greenhouse Gas Inventory Scorecard

Temple University  
Philadelphia, Pennsylvania

	Units	Baseline Year FY2006	Previous Year FY 2016	Current Year FY 2017
<b>SCOPE 3 DATA Continued</b>				
<b>Solid Waste</b>				
Landfilled	U.S. Tons	4,440	2,121	2,572
Energy-from-Waste	U.S. Tons	0	858	890
Incinerated	U.S. Tons	35	115	69
<b>OFFSETS</b>				
Renewable Energy Credits	kWh	240,000	66,123,000	44,082,000
Composting (on-campus)	U.S. Tons	8	46	46
Computer Recycling	MTeCO2	0	2,203	2,385

## 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