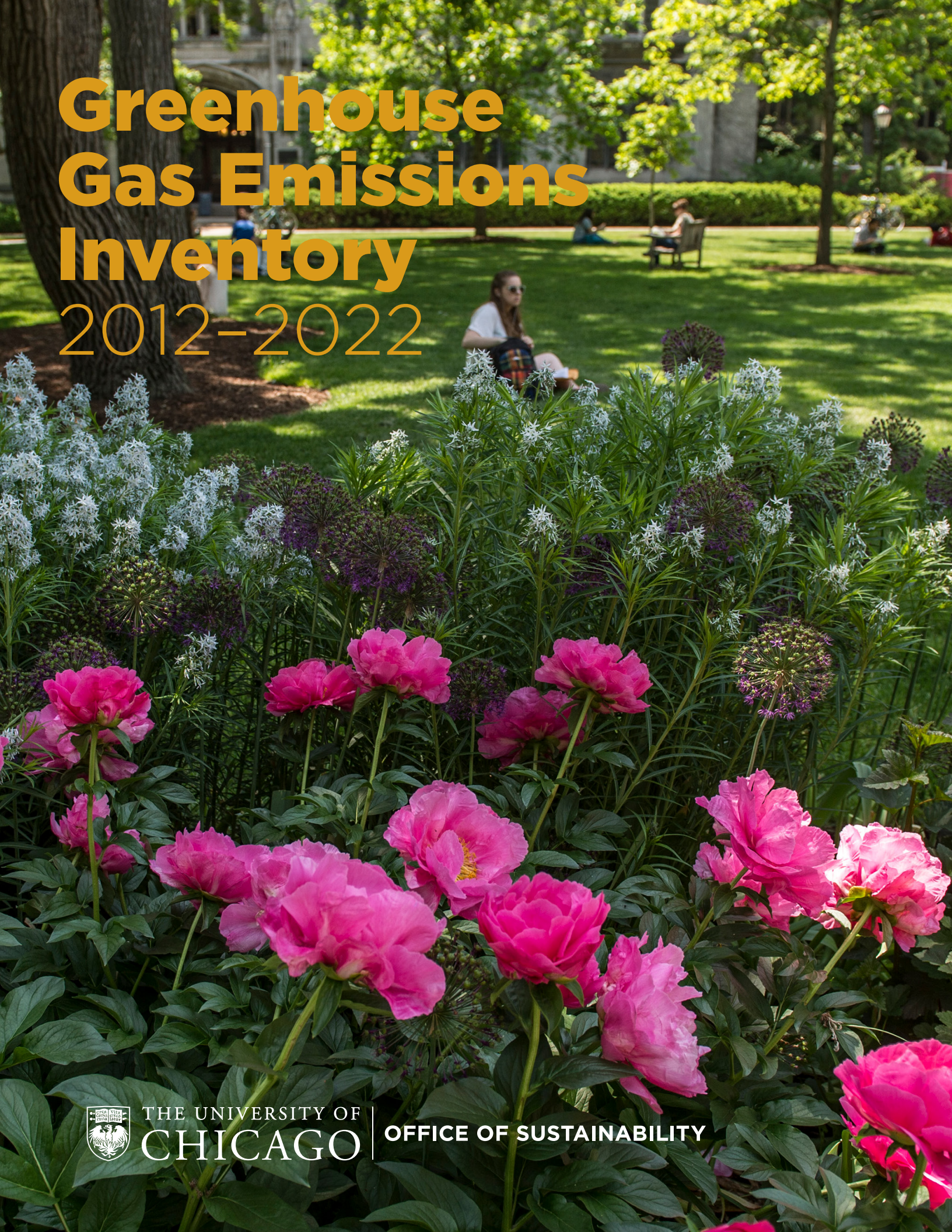
Greenhouse Gas Emissions Inventory

2012–2022



THE UNIVERSITY OF CHICAGO | OFFICE OF SUSTAINABILITY

Acknowledgments

Collecting the data required for the University of Chicago greenhouse gas emissions inventory was a collaborative effort, involving contributions from many University departments and individuals. The Office of Sustainability offers a sincere thank you to everyone who contributed.

Core Project Team

Sara Popenhagen, sustainability manager
Brian Bozell, energy and utilities manager
James Cook, space information manager
Andres Castillo, data analyst
UChicago ABIS Team, IT Services

Inquiries

Please direct inquiries to the Office of Sustainability at officeofsustainability@uchicago.edu.

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About

This document contains the University of Chicago Greenhouse Gas emissions inventory for fiscal years 2012 through 2022. This document is the latest release of the inventory and has been updated from all prior releases. **Dashboards** for this inventory, including the organizational boundary, are located at the Office of Sustainability website.

For inventory background information, context, and methodology, refer to **the University of Chicago Greenhouse Gas Emissions Inventory Supplemental Information**.

Reporting and methodology

2030 GOAL

The University has a goal to reduce its absolute greenhouse gas emissions by 50% by 2030. The 2030 goal is based on scope 1 and scope 2 absolute greenhouse gas emissions and is analyzed by comparing 2030 greenhouse gas emissions to the target base year greenhouse gas emissions. Scopes 1 and 2 emissions are more than 70% of University emissions in any given fiscal year, and are an area with an opportunity to make the biggest impact. Scope 3 emissions, while voluntary reporting, are included in this report for transparency reasons where verifiable and reliable data is available.

TARGET BASE YEAR

The target base year is an average of greenhouse gas emissions from fiscal years 2012, 2013, and 2014. The target base year is used as a "baseline" to compare subsequent years.

Executive summary

Scopes 1 and 2 absolute greenhouse gas emissions declined 1% from the target base year to fiscal year 2022. Electricity emissions factors had the most significant impact on the reduction of greenhouse gas emissions. Refer to the **Absolute Greenhouse Gas Emissions by Source, Scope, and Fiscal Year dashboard** for the full inventory. See figures 1 and 2 on the following pages for an inventory summary, and Appendix A for a full inventory analysis.

> **Scopes 1 and 2 absolute greenhouse gas emissions declined 1% from the target base year to fiscal year 2022.**

Results *location based*

Below is a discussion of the greenhouse gas emissions inventory location-based method shown on the Office of Sustainability **website** and Figures 1 and 2 on the following pages.

Scopes 1 and 2 absolute greenhouse gas emissions declined 1% from the target base year to fiscal year 2022. Emissions did not decrease as much as the previous reporting period largely due to the absence of offsets in fiscal year 2022.

OVERVIEW

ELECTRICITY EMISSIONS FACTORS
Greenhouse gas emissions from the target base year to fiscal year 2022 declined slightly due to electricity emissions factors. Electricity usage increased 28% from the target base year to fiscal year 2022, but electricity emissions decreased 9% in the same period. The increase in electricity usage can be explained by a 15% increase in the organizational boundary
Facilities Inventory Classification Manual (FICM) gross area in the same time period. Emissions decreased while usage increased due to U.S. EPA regional eGRID emissions factors as a result of the electrical grid transition to lower and zero carbon emissions.

THE COVID-19 GLOBAL PANDEMIC
The pandemic had a significant impact on emissions in scopes 1, 2, and 3.

Fuel usage for scope 1 University-owned fleet increased from fiscal year 2021 and is approaching the pre-pandemic emissions levels seen in fiscal year 2019.

Various factors impacted energy usage in campus buildings during fiscal year 2022, impacting scopes 1 and 2.

Even though occupant density decreased from pre-pandemic levels as many employees worked remotely or on a hybrid schedule, and some classes were in a hybrid format. Research operated at pre-pandemic population density levels in fiscal year 2022. Since research is the most energy intensive activity on campus, energy usage did not decline.

In addition, in accordance with Centers for Disease Control and Prevention (CDC) guidelines, energy efficiency settings were removed early in the pandemic. For example, all occupancy sensor controls were shut down and air handling units ran around the clock at maximum output and with maximum outside air. Further, MERV 13 filters were used which are less energy efficient. Since fan energy is approximately 40% of Scope 2, the result is less than optimal energy performance regardless of campus population density. These settings and filters are now transitioning back to pre-pandemic settings.

Scope 3 University greenhouse gas emissions from the target base year to fiscal year 2022 in areas of domestic and international air travel for business needs and study abroad programs and ground transport declined significantly due to the pandemic. Therefore, fiscal year 2022 scope 3 emissions do not represent a typical pre-pandemic year in the University's greenhouse gas emissions inventory.

From the target base year to fiscal year 2022, emissions from scope 3 business air travel declined by 43%, ground transport emissions declined by 45%, and study abroad air travel emissions declined by 11%. With the increased use of technology, business air travel emissions have a potential to remain lower than pre-pandemic levels, as some employees may opt to attend virtual conferences and events.

In fact, scope 3 emissions decreased in all areas except solid waste. Solid landfilled waste absolute emissions increased by 3% from the target base year, primarily attributed to the increased shipping of personal items in student housing. The increase of campus population during the same time and the increase of disposables due to COVID-19

Results *location based*

were also factors.

SCOPE 2 ELECTRICITY
As indicated in figures 1 and 2, electricity is the largest contributor to campus greenhouse gas emissions and was 50% of overall campus emissions in fiscal year 2022.

From the target base year to fiscal year 2022, emissions due to scope 2 electricity declined by 9% while electricity usage increased by 28%. Usage increased due to the increase in FICM gross area in the organizational boundary as previously discussed. Emissions declined while usage went up because of U.S. EPA the regional eGRID emissions factors as noted above.

SCOPE 1 ON-CAMPUS STATIONARY
On-campus stationary sources are the largest contributors to scope 1 greenhouse gas emissions and include natural gas and distillate fuel oil #2. On-campus stationary sources were the second largest contributor to overall campus greenhouse gas emissions at 33% of scopes 1, 2, and 3 emissions in fiscal year 2022. Distillate fuel oil #2 emissions are negligible when compared to natural gas emissions in fiscal year 2022, as usage was due to testing of equipment. (Distillate fuel oil is available on campus as required by code to support UChicago Medicine in case of a natural gas disruption.)

Natural gas usage increased by 14% and emissions by 14% from the target base year to fiscal year 2022. This is attributed to an increase in the organizational boundary FICM gross area of 15% as mentioned previously. Despite this increase, overall scope 1 and 2 emissions still decreased from the target base year due to the factors discussed above.

In addition to on-campus stationary sources, scope 1 includes direct transportation (UGo shuttles and University owned fleet) at 1% of overall campus greenhouse gas emissions, and agriculture (nitrogen in fertilizer) at less than 1% of overall campus greenhouse gas emissions. Refer to figures 1 and 2, and the **dashboards** for additional information.

SCOPE 3
While scope 3 is not part of the 2030 goal, it is important to note that the third largest contributor to overall campus greenhouse gas emissions is business air travel in most years including fiscal year 2022. However, due to COVID-19 and behavioral changes as discussed above, fiscal year 2022 emissions from air travel are only about half of pre-pandemic levels. Business air travel contributed to 10% of campus emissions in fiscal year 2022. Pre-pandemic, it was typically about 20%.

The fourth largest contributor to greenhouse gas emissions in fiscal year 2022 was transmission and distribution losses from scope 2 electricity at 3%. When added with scope 2 electricity emissions, emissions from electricity are approximately 53% of campus emissions in fiscal year 2022.

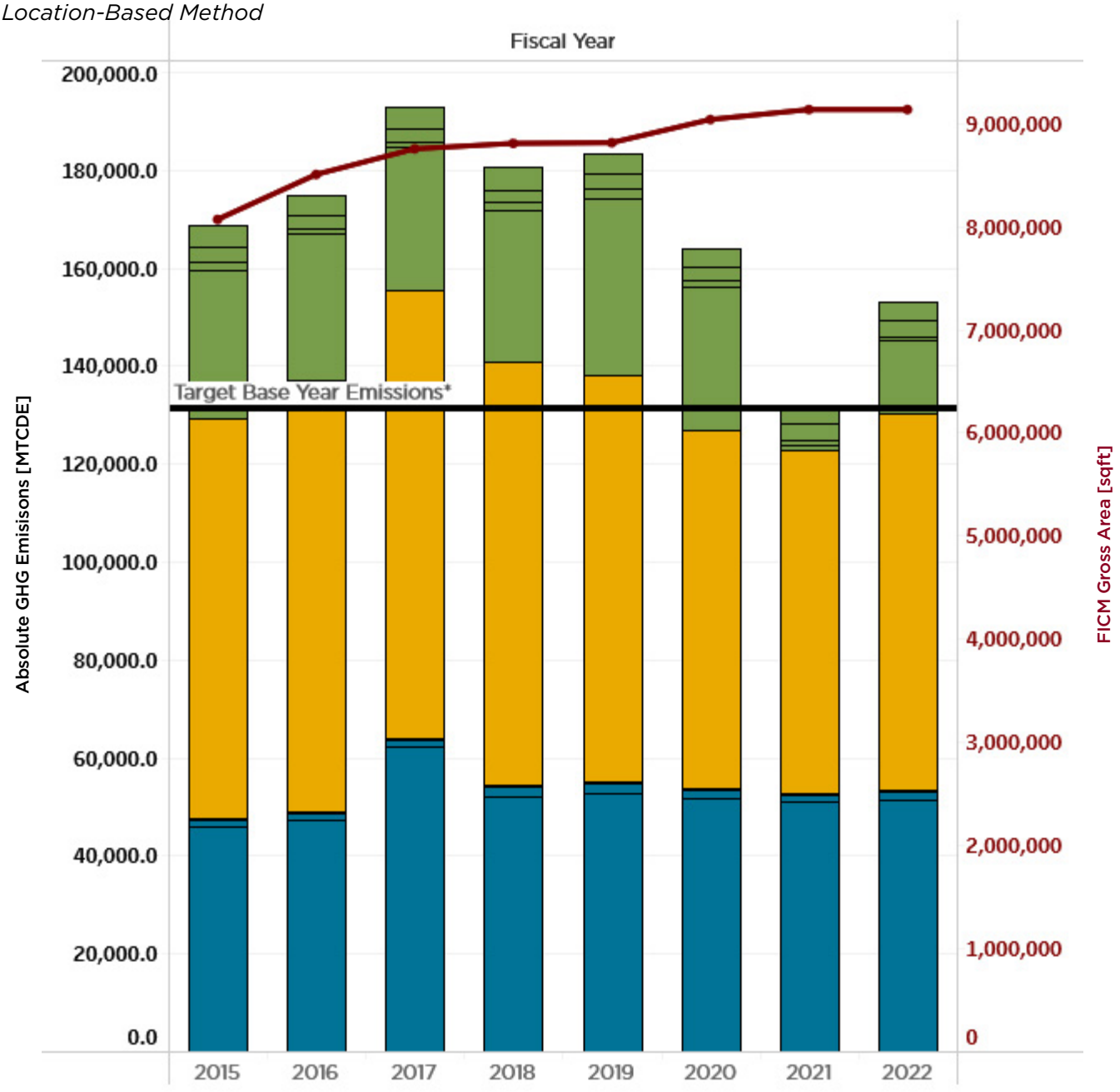
Other sources of scope 3 emissions in fiscal year 2022 included solid landfilled waste (2%), study abroad travel (1%), and business automobile travel (less than 1%).

Total scope 3 emissions were 16% of overall campus greenhouse gas emissions in fiscal year 2022. In pre-pandemic years, scope 3 emissions were typically about 30% of campus emissions. This decline is expected due to the COVID-19 pandemic and associated behavioral changes as previously discussed. Refer to figures 1 and 2, and the **dashboards** for additional information.

Results *location based*

Figure 1: Scopes 1, 2, and 3 Absolute Greenhouse Gas Emissions by Source, Scope, and Fiscal Year [MT eCO_2]

Location-Based Method



Listed in order of appearance on Figure 1:

- T&D losses
- Solid waste
- Other Directly Financed Travel
- Directly Financed Outsourced Travel Air
- Electricity
- Agriculture*
- Direct Transportation
- Other On-Campus Stationary
- FICM Gross Area

*value is too small to display

SCOPE 1 natural gas, distillate fuel oil #2, University-owned fleet and UGo shuttles, nitrogen in fertilizer

SCOPE 2 electricity

SCOPE 3 directly financed air travel, directly financed automobile travel, study abroad travel, solid landfilled waste, T&D losses

Results *location based*

Figure 2: Scopes 1, 2, and 3 Absolute Greenhouse Gas Emissions by Source, Scope, and Fiscal Year [MT eCO_2]

Location-Based Method

	Scope 1 [MTCDE]			Scope 2 [MTCDE]	Scope 3 [MTCDE]				
	Other On-Campus Stationary	Direct Transportation	Agriculture	Electricity	Directly Financed Outsourced Travel Air	Other Directly Financed Travel	Study Abroad Travel Air	Solid waste	T&D losses
2012	41,875.7	1,685.9	22.8	84,360.6	22,918.8	1,170.4	2,380.0	3,276.4	8,517.2
2013	44,982.1	1,820.9	6.8	83,797.5	25,911.2	1,332.6	2,430.4	3,160.8	8,460.3
2014	49,005.0	1,974.0	7.0	84,595.2	29,513.5	1,536.1	2,246.9	3,067.8	4,424.3
2015	45,769.8	1,962.7	9.9	81,477.5	30,389.6	1,597.2	2,476.7	3,227.7	4,261.2
2016	47,355.0	1,745.4	6.5	88,077.1	29,936.0	1,028.2	2,040.0	2,573.3	4,140.6
2017	62,161.8	1,944.2	6.4	91,365.0	29,347.5	1,066.6	2,249.5	2,603.8	4,295.1
2018	51,954.4	2,307.2	8.6	86,637.3	31,000.8	1,459.6	2,426.0	2,691.7	4,446.7
2019	52,866.7	2,109.2	8.5	83,031.5	36,072.7	2,241.4	2,466.6	2,809.7	4,261.6
2020	51,726.9	1,919.0	7.1	73,344.4	29,134.9	1,270.1	2,177.2	2,986.7	3,764.4
2021	51,055.5	1,744.0	2.0	70,102.7	872.6	1,234.8	181.6	3,205.9	3,598.0
2022	51,463.0	1,951.5	2.0	76,791.5	15,000.8	743.4	2,090.2	3,258.2	3,941.4

Appendix A

The University of Chicago Greenhouse Gas Emissions Inventory Analysis
RP7 FY2012 through FY2022 Location Based

ABSOLUTE EMISSIONS	INSTITUTIONAL	SCOPE 1			SCOPE 2	SCOPE 3					Offsets	SCOPE 1	SCOPE 2	SCOPE 3	SCOPES 1+2	SCOPES 1+2 LESS OFFSETS	SCOPES 1+2+3
	Area	Other On-Campus Stationary[1]	Direct Transportation[2]	Agriculture[3]	Electricity	Directly Financed Air Travel	Other Directly Financed Travel[4]	Study Abroad Air Travel	Solid Waste	Scope 2 T&D Losses[5]		TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL
Fiscal Year	[sqft]	[MT eCO_2]	[MT eCO_2]	[MT eCO_2]	[MT eCO_2]	[MT eCO_2]	[MT eCO_2]	[MT eCO_2]	[MT eCO_2]	[MT eCO_2]	[MT eCO_2]	[MT eCO_2]	[MT eCO_2]	[MT eCO_2]	[MT eCO_2]	[MT eCO_2]	[MT eCO_2]
2012	8,090,775.14	41,875.7	1,685.9	22.8	84,360.6	22,918.8	1,170.4	2,380.0	3,276.4	8,517.2	0.0	43,584.3	84,360.6	38,262.7	127,944.9	127,944.9	166,207.6
2013	7,963,979.98	44,982.1	1,820.9	6.8	83,797.5	25,911.2	1,332.6	2,430.4	3,160.8	8,460.3	0.0	46,809.9	83,797.5	41,295.3	130,607.4	130,607.4	171,902.7
2014	7,789,702.15	49,005.0	1,974.0	7.0	84,595.2	29,513.5	1,536.1	2,246.9	3,067.8	4,424.3	0.0	50,986.0	84,595.2	40,788.6	135,581.2	135,581.2	176,369.7
2015	8,063,020.20	45,769.8	1,962.7	9.9	81,477.5	30,389.6	1,597.2	2,476.7	3,227.7	4,261.2	0.0	47,742.4	81,477.5	41,952.4	129,219.9	129,219.9	171,172.2
2016	8,498,838.32	47,355.0	1,745.4	6.5	88,077.1	29,936.0	1,028.2	2,040.0	2,573.3	4,140.6	0.0	49,106.9	88,077.1	39,718.2	137,184.0	137,184.0	176,902.2
2017	8,747,503.02	62,161.8	1,944.2	6.4	91,365.0	29,347.5	1,066.6	2,249.5	2,603.8	4,295.1	0.0	64,112.4	91,365.0	39,562.6	155,477.4	155,477.4	195,040.0
2018	8,800,337.05	51,954.4	2,307.2	8.6	86,637.3	31,000.8	1,459.6	2,426.0	2,691.7	4,446.7	0.0	54,270.1	86,637.3	42,024.7	140,907.5	140,907.5	182,932.2
2019	8,807,078.16	52,866.7	2,109.2	8.5	83,031.5	36,072.7	2,241.4	2,466.6	2,809.7	4,261.6	0.0	54,984.4	83,031.5	47,852.1	138,015.9	138,015.9	185,868.0
2020	9,031,821.48	51,726.9	1,919.0	7.1	73,344.4	29,134.9	1,270.1	2,177.2	2,986.7	3,764.4	0.0	53,653.0	73,344.4	39,333.4	126,997.4	126,997.4	166,330.8
2021	9,128,250.16	51,055.5	1,744.0	2.0	70,102.7	872.6	1,234.8	181.6	3,205.9	3,598.0	10,000.8	52,801.5	70,102.7	9,093.0	122,904.2	112,903.4	131,997.1
2022	9,128,250.16	51,463.0	1,951.5	2.0	76,791.5	15,000.8	743.4	2,090.2	3,258.2	3,941.4	0.0	53,416.5	76,791.5	25,033.9	130,208.0	130,208.0	155,241.9
target base year	7,948,152.4	45,287.6	1,826.9	12.2	84,251.1	26,114.5	1,346.3	2,352.4	3,168.3	7,133.9	0.0	**47,126.7**	**84,251.1**	**40,115.5**	**131,377.8**	**131,377.8**	**171,493.4**
FY2022 % of total based on 1+2+3 w/o offsets	NA	33.2%	1.3%	0.0%	49.5%	9.7%	0.5%	1.3%	2.1%	2.5%	0.0%	34.4%	49.5%	16.1%	83.9%	83.9%	100.0%
FY2022 rank	NA	2	7	9	1	3	8	6	5	4	NA	NA	NA	NA	NA	NA	NA
TBY TO FY2022	**14.8%**	**13.6%**	**6.8%**	**-83.5%**	**-8.9%**	**-42.6%**	**-44.8%**	**-11.1%**	**2.8%**	**-44.8%**	**NA**	**13.3%**	**-8.9%**	**-37.6%**	**-0.9%**	**-0.9%**	**-9.5%**
FY2021 TO FY2022	0.0%	0.8%	11.9%	0.0%	9.5%	1619.1%	-39.8%	1051.1%	1.6%	9.5%	-100.0%	1.2%	9.5%	175.3%	5.9%	15.3%	17.6%

FOOTNOTES

[1] natural gas; distillate fuel oil #2
[2] University-owned fleet; UGo shuttles
[3] Nitrogen in fertilizer
[4] Rental car; personal mileage reimbursement
[5] T&D = transmission & distribution

TARGET BASE YEAR CALCULATION

To obtain the **target base year**, calculate the average greenhouse gas emissions from FY2012 through FY2014.

Conclusion

Managing greenhouse gas emissions is a top priority for the University of Chicago and it allows for progress in multiple areas of the **Sustainability Plan**.

The results of the UChicago 2012–2022 greenhouse gas emissions inventory indicate progress. However, there is a need for continued action, especially in area 2 of the Sustainability Plan, High Performance Buildings.

Since the 2030 goal is based on scopes 1 and 2 absolute emissions, and natural gas and electricity use in campus buildings contribute to over 70% of the University's greenhouse gas emissions in any given fiscal year, reducing electricity and natural gas consumption in campus buildings will make the biggest impact on reducing University greenhouse gas emissions.

Energy efficiency projects are outlined in **the University of Chicago Greenhouse Gas Emissions Reduction Plan (FY2022–FY2030)**.

Only by collaborating together as a campus community, will the 2030 goal be achieved. For ways to get involved, please visit **sustainability.uchicago.edu**.