

Greenhouse Gas Emissions Inventory Supplemental Information

last updated: January 2023

THE UNIVERSITY OF CHICAGO

The University of Chicago is located in the Hyde Park community on Chicago's South Side, 15 minutes south of the city center. Chicago's Hyde Park campus covers 217 acres and includes more than 135 buildings operated and managed by Facilities Services. These buildings host and support multiple academic programs, research, arts, and culture. Various space functions include classrooms, laboratories, administration, athletics, recreation, dining, and residential. Facilities Services (facilities.uchicago.edu) is responsible for the design, construction, renovation, operation, and maintenance of campus and residential buildings, property, and infrastructure.

OFFICE OF SUSTAINABILITY

The University of Chicago is committed to creating a sustainable campus. With its tradition of rigorous inquiry, the University is positioned to evaluate the challenges of sustainability and create measurable results.

One such challenge is climate change, a complex and global phenomenon that requires an in-depth understanding of greenhouse gas emissions. These emissions are a reflection of natural resource consumption across several sources, so understanding the scopes and sources of emissions is a critical step in campus sustainability planning. Managing greenhouse gas emissions is one of the University's top sustainability priorities.

Raising visibility and awareness of environmental issues on campus, and engaging students, faculty, and staff to develop and implement sustainable initiatives is also important.

The University of Chicago [Sustainability Plan](#) includes goals in nine areas: Climate Change and Energy, High Performance Buildings, Multi-Modal Transportation, Waste Reduction, Food Systems, Green Space, Water Conservation, Environmentally Preferable Procurement, and Building Awareness and Partnerships.

In April 2020, the University announced a new greenhouse gas emissions reduction goal of a 50% reduction by 2030; this new goal applies to 2020 through 2030. The 2030 goal is applicable to this report.

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 emissions and is analyzed by comparing 2030 greenhouse gas emissions to the target base year greenhouse gas emissions.

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.

TEMPORAL BOUNDARY

The temporal boundary is fiscal year 2012 through the current fiscal year of reporting.

ORGANIZATIONAL BOUNDARY

The greenhouse gas emissions inventory includes the University of Chicago Hyde Park campus, excluding the medical campus. Biological Sciences Division properties are excluded except where under Facilities Services operational control. E44 Charles M. Harper Center is not within the operational control of Facilities Services but it is included in the greenhouse gas emissions inventory because it is contiguous to the rest of campus, a high profile professional school, and a campus partner. The operational control approach was used to define the organizational boundary. Operational control is defined as having the authority to introduce and implement operating policies. Under the operational control approach, emissions from each operation within the University’s operational control must be reported. Refer to the [GHG Emissions Inventory Organizational Boundary dashboard](#). The organizational

boundary varies by fiscal year and by reporting period.

OPERATIONAL BOUNDARY (SCOPES)

Emissions from scopes 1, 2, and 3, as applicable to the University of Chicago, are tracked and reported, as indicated in the [table 1.1](#).

The following greenhouse gases are tracked and reported: CO₂ (carbon dioxide), CH₄ (methane), and N₂O (nitrous oxide). Greenhouse gas emissions from refrigerants and chemicals, including HFCs (hydrofluorocarbons) and PFCs (perfluorocarbons), are omitted from this report and will be included, as appropriate, when verifiable and reliable data is available. The following greenhouse gases are also not reported as they are not present on campus: SF₆ (sulfur hexafluoride) and (NF₃)³ (nitrogen trifluoride).

SCOPE 3 EMISSIONS

Emissions from scope 3, as applicable to the University of Chicago, are tracked and reported, although they are not part of the 2030 goal. Scope 3 emissions are optional reporting.

GLOBAL WARMING POTENTIALS

The global warming potentials from the Intergovernmental Panel on Climate Change are currently the Sixth Assessment Report and were applied to the reporting period 6 (fiscal years 2012 through 2021) and reporting period 7 (fiscal years 2012 through 2022). The current global warming potentials are shown in [table 1.2](#).

EMISSIONS FACTORS LOCATION BASED METHOD

Emissions factors for electricity

are provided by the U.S. EPA regional eGRID (emissions and generation resource integrated database) for sub-region symbol RFCW, eGRID region name RFC West. [Table 1.3](#) contains a summary of global warming potentials and U.S. EPA regional eGRID emissions factors versions by reporting period and fiscal year. This table demonstrates that greenhouse gas emissions inventories are dynamic. When new data, information, emissions factors, and/or global warming potentials become available that were not available during the reporting period, they are incorporated in the next reporting period, as appropriate. When emissions factors are updated, they are applied retroactively, where applicable, making the greenhouse gas emissions inventory dynamic. To demonstrate this point, [table 1.3](#) summarizes the emissions factors used for scope 2 electricity for the most recent reporting periods.

CALCULATION TOOL

The greenhouse gas emissions were quantified using an internally developed calculation tool that connects with University systems of record and automates the calculation and visualization of greenhouse gas emissions.

UNITS OF MEASURE

Absolute greenhouse gas emissions are reported in units of metric tons equivalent carbon dioxide per fiscal year [MT eCO₂/FY]

Where:

eCO ₂	equivalent carbon dioxide
FY	fiscal year
MT	1 metric ton = 1,000 kilograms

APPROACH

The operational control approach from the *The World Resources Institute Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)* (2004) was used to define the organizational boundary.

The location-based method of calculation outlined in *The GHG Protocol Scope 2 Guidance* was used to calculate emissions from scope 2 electricity.

Emissions from carbon dioxide, methane, and nitrous oxide are calculated by taking the amount of fuel consumed and multiplying it by the appropriate emissions factor and global warming potential.

The global warming potential is used to convert metric tons of specific greenhouse gases to metric tons of carbon dioxide equivalents [MT eCO₂]. By converting all emissions into the same unit, MT eCO₂, the contribution of emissions sources can be more easily aggregated and compared. This also enables comparison between organizations.

This conversion is based on the gas's relative impact on climate change compared to that of carbon dioxide. The global warming potential indicates the contribution each gas makes to climate change relative to carbon dioxide. For example, emitting a metric ton of methane (CH₄) has the same impact on climate change as emitting 29.8 metric tons of carbon dioxide (CO₂).

REFERENCED STANDARDS

The inventory was completed according to widely accepted referenced standards, including *The World Resources Institute Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)* (2004), *The GHG Protocol Scope 2 Guidance*, *The Climate Registry General Reporting Protocol, Version 2.0* (2013), and *The Climate Registry*

General Reporting Protocol, Version 3.0 (2019).

The World Resources Institute Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition) (2004)

The GHG Protocol Scope 2 Guidance

The Climate Registry General Reporting Protocol, Version 2.0 (2013)

The Climate Registry General Reporting Protocol, Version 3.0 (2019)

Global Warming Potentials
IPCC Sixth Assessment Report

Emissions Factors *location based method*

United States Environmental Protection Agency Emissions and Generation Resource Integrated Database (eGRID)

The eGRID sub-region symbol is RFCW.

The eGRID region name is RFC West.

Area (square footage)
Facilities Inventory and Classification Manual (FICM)

RELATED LINKS

The University of Chicago
sustainability.uchicago.edu

Facilities Services
facilities.uchicago.edu

Office of Sustainability
sustainability.uchicago.edu

Sustainability Plan
sustainability.uchicago.edu/sp

The University of Chicago
Greenhouse Gas Emissions
Reduction Plan FY2022 through
FY2030
[sustainability.uchicago.edu/
reporting/2022_2030_
greenhouse_gas_emissions_
reduction_plan](https://sustainability.uchicago.edu/reporting/2022_2030_greenhouse_gas_emissions_reduction_plan)

Greenhouse Gas Emissions
Dashboards
[sustainability.uchicago.edu/
reporting/ghg_emissions_
dashboards](https://sustainability.uchicago.edu/reporting/ghg_emissions_dashboards)

ACRONYMS AND CHEMICAL FORMULAS

Maroon text indicates UChicago-specific acronyms

BTUBritish thermal unit
CH₄methane
CBECSCommercial Buildings Energy Consumption Survey
CO₂carbon dioxide
CRThe Climate Registry
eCO₂equivalent CO₂
EFemissions factor
eGRIDemissions and generation resource integrated database
FICMFacilities Inventory and Classification Manual
FSFacilities Services
FYfiscal year
GHGgreenhouse gas
GWPglobal warming potential
HFChydrofluorocarbons
IPCCIntergovernmental Panel on Climate Change
kWhkilowatt hour
MMBtu1 MMBtu = 1x10⁶ Btu
MT1 metric ton = 1,000 kg
(NF₃)³nitrogen trifluoride
N₂Onitrous oxide
OSOffice of Sustainability
PFCperfluorocarbons
SF₆sulfur hexafluoride
SPSustainability Plan

ASSUMPTIONS SUMMARY

- Verifiable and reliable data is used to the best of its availability during the current reporting period. Decisions are made with the best information available during the reporting period, and on the side of over reporting. Greenhouse gas emissions inventories are dynamic. When new data, information, emissions factors, and/or global warming potentials become available that were not available during the reporting period, they are incorporated in the next reporting period, as appropriate.
- Building areas are measured in gross square feet using Facilities Inventory and Classification Manual (FICM) areas.
- For new construction or demolished buildings: if a building is "online" (utility data is available for it) for six months or more (≥ 6 months) of the fiscal year, its area and utility data are included in the greenhouse gas emissions calculations.
- Utility data is from utility billing.
- Steam data is adjusted to include the portion of steam serving the buildings in the organizational boundary.
- A86 Gordon Center for Integrative Science: utilities and area [sqft] are adjusted to include the portion of the building included in the organizational boundary since the other portion of the building is occupied by the medical campus. 100% of fuel oil is included in the inventory as it is used for required testing of the emergency generators and the generators are operated by Facilities Services.
- Fuel oil for buildings on the medical campus is excluded from the inventory.
- Fuel oil usage is zero for some fiscal years.
- University-owned fleet data tracked and reported is only what is included in the IT Services database (fuel that was filled up on campus at the Fuel Depot). If fuel was filled up off campus, it is not tracked and reported.
- Data includes fuel used for all University-owned fleet such as Facilities Services, the Library, IT Services, the Press Building, the University of Chicago Booth School of Business, UCPD (starting in FY2017), etcetera. It excludes the Medical Center fleet.
- The UCPD fleet does not have any vehicles that use diesel fuel. The UCPD fleet is University owned.
- UGo Daytime and UGo Nightride shuttles: Since the lease between UChicago and the shuttle vendor is an operating lease, and the consolidation method is operational control, the gallons of fuel usage from the UGo Shuttles are included in scope 1 of the greenhouse gas emissions inventory calculations.
- This report excludes fugitive emissions from refrigerants and other chemicals.
- The air travel data is partial data as it reflects only what is booked through the University's official travel booking system. Travel not booked through the University's system is excluded.
- The rental car data is partial data as it reflects only what is booked through the University's preferred contracts.
- A portion of the faculty/staff air travel data contains student air travel. This occurs when the employee (anyone on University payroll) purchases the travel on behalf of the student.
- Conversion factors for USD (\$) to miles of international and domestic air travel were used from [Airlines for America](#). Airlines for America is no longer reporting on the passenger yield data point that is necessary to convert air travel dollars to miles. In the absence of this data, the last available year's data (FY2017) is used.
- For personal mileage reimbursement, the data is only for employees (anyone on University payroll).
- Assumed all study abroad travel originated from Chicago O'Hare International Airport per student participating in the program.
- Landfilled waste: Data includes all buildings included in the greenhouse gas emissions organizational boundary, as well as many residential properties not within the organizational boundary (which contribute a small portion of the total data). Data excludes Harper Court, Gleacher Center, or any leased space. Data excludes construction waste. New waste hauler arrived on campus in 2016.
- If a building is leased out less than 100%, it is included. If a building is leased out 100% it is included if University personnel frequently occupy it, otherwise it is excluded.

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.

CONTACT

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TABLES

Table 1.1: Data Compiled for the Greenhouse Gas Emissions Inventory	
Institutional	Unit of Measure
Student, Faculty, and Staff Population	[count/FY]
FICM Gross Area	[sqft/FY]
Scope 1: Direct Emissions (mandatory reporting)	Unit of Measure
Distillate Fuel Oil #2	[gallons/FY]
Natural Gas	[MMBtu/FY]
Unleaded Fuel (University-Owned Fleet and UGo Shuttles)	[gallons/FY]
Diesel Fuel (University-Owned Fleet and UGo Shuttles)	[gallons/FY]
Refrigerants and Chemicals, Fugitive Emissions*	[pounds/FY]
Fertilizer, Nitrogen	[pounds N/FY]
Scope 2: Indirect Emissions (mandatory reporting)	Unit of Measure
Electricity	[kWh/FY]
Scope 3: Other Indirect Emissions (optional reporting)	Unit of Measure
Business Travel (Air, Automobile)	[miles/FY]
Study Abroad Travel (Air)	[miles/FY]
Landfilled Waste	[short tons [†] /FY]
*Omitted from reporting. Expected to be a very small amount of overall University emissions. Reporting is anticipated when verifiable and reliable data is available.	
†1 short ton = 2,000 pounds	

Table 1.2: 100-Year Global Warming Potentials		
Common Name	Chemical Formula	GWP
Carbon dioxide	CO ₂	1
Methane fossil	CH ₄	29.8
Methane non-fossil	CH ₄	27.2
Nitrous oxide	N ₂ O	273

Source: IPCC Sixth Assessment Report

TABLES

Table 1.3: U.S. EPA Regional eGRID Emissions Factor Versions for Scope 2 Electricity and Global Warming Potentials by Reporting Period and by Fiscal Year <i>Location-Based Method</i>							
Fiscal Year	Reporting Period 7	Reporting Period 6	Reporting Period 5	Reporting Period 4	Reporting Period 3	Reporting Period 2	Reporting Period 1*
	FY2012-FY2022 Inventory Report December 2022	FY2012-FY2021 Inventory Report December 2021	FY2012-FY2020 Inventory Report July 2021	FY2012-FY2019 Inventory Report January 2021	FY2012-FY2018 Inventory Report October 2019	FY2012-FY2017 Inventory Report May 2018	FY2012-FY2015 Sustainability Plan November 2016
	GWP AR6	GWP AR6	GWP AR5	GWP AR5	GWP AR4	GWP AR4	GWP AR4
	Scopes 1 and 2 [MT eCO ₂]	Scopes 1 and 2 [MT eCO ₂]	Scopes 1 and 2 [MT eCO ₂]	Scopes 1 and 2 [MT eCO ₂]	Scopes 1 and 2 [MT eCO ₂]	Scopes 1 and 2 [MT eCO ₂]	Scopes 1, 2, and 3 [MT eCO ₂]
2012	rel. 2015, eGRID2012, 10th ed.	rel. 2015, eGRID2012, 10th ed.	rel. 2015, eGRID2012, 10th ed.	rel. 2015, eGRID2012, 10th ed.	rel. 2015, eGRID2012, 10th ed.	rel. 2015, eGRID2012, 10th ed.	rel. 2015, eGRID2012, 10th ed.
2013	rel. 2015, eGRID2012, 10th ed.	rel. 2015, eGRID2012, 10th ed.	rel. 2015, eGRID2012, 10th ed.	rel. 2015, eGRID2012, 10th ed.	rel. 2015, eGRID2012, 10th ed.	rel. 2015, eGRID2012, 10th ed.	rel. 2015, eGRID2012, 10th ed.
2014	rel. 2017, eGRID2014, 11th ed.	rel. 2017, eGRID2014, 11th ed.	rel. 2017, eGRID2014, 11th ed.	rel. 2017, eGRID2014, 11th ed.	rel. 2017, eGRID2014, 11th ed.	rel. 2017, eGRID2014, 11th ed.	eGRID2014
2015	rel. 2017, eGRID2014, 11th ed.	rel. 2017, eGRID2014, 11th ed.	rel. 2017, eGRID2014, 11th ed.	rel. 2017, eGRID2014, 11th ed.	rel. 2017, eGRID2014, 11th ed.	rel. 2017, eGRID2014, 11th ed.	eGRID2014
2016	rel. 2018, eGRID2016, 12th ed.	rel. 2018, eGRID2016, 12th ed.	rel. 2018, eGRID2016, 12th ed.	rel. 2018, eGRID2016, 12th ed.	rel. 2018, eGRID2016, 12th ed.	rel. 2017, eGRID2014, 11th ed.	NA
2017	rel. 2018, eGRID2016, 12th ed.	rel. 2018, eGRID2016, 12th ed.	rel. 2018, eGRID2016, 12th ed.	rel. 2018, eGRID2016, 12th ed.	rel. 2018, eGRID2016, 12th ed.	rel. 2017, eGRID2014, 11th ed.	NA
2018	rel. 2020, eGRID2018, 13th ed.	rel. 2020, eGRID2018, 13th ed.	rel. 2020, eGRID2018, 13th ed.	rel. 2020, eGRID2018, 13th ed.	rel. 2018, eGRID2016, 12th ed.	NA	NA
2019	rel. 2021, eGRID2019, 14thed.§	rel. 2021, eGRID2019, 14thed.	rel. 2021, eGRID2019, 14thed.§	rel. 2020, eGRID2018, 13th ed.	NA	NA	NA
2020	rel. 2022, eGRID2020, 15thed.§	rel. 2021, eGRID2019, 14thed.	rel. 2021, eGRID2019, 14thed.§	NA	NA	NA	NA
2021	rel. 2022, eGRID2020, 15thed.§	rel. 2021, eGRID2019, 14thed.	NA	NA	NA	NA	NA
2022	rel. 2022, eGRID2020, 15thed.§	NA	NA	NA	NA	NA	NA

Global Warming Potential source:
[IPCC Fourth Assessment Report](#)
[IPCC Fifth Assessment Report](#)
IPCC Sixth Assessment Report

Emissions Factor source:
[United States Environmental Protection Agency Emissions and Generation Resource Integrated Database \(eGRID\)](#)

§The latest version of the United States Environmental Protection Agency regional eGRID emissions factors were released on 27 January 2022, are called eGRID2020, are from 2020 data, and are the 15th edition.

The eGRID sub-region symbol is RFCW.
The eGRID region name is RFC West.

U.S. EPA emissions factors can change for two reasons:

- Lag time in data sets being released. It usually takes one to two years for data sets to be released. For example, for electricity, eGRID2019, which includes 2019 data, was released on February 23, 2021. Regional emissions and generation resource integrated database (eGRID) release dates are available in the [U.S. EPA eGRID Questions and Answers/ What years are available for eGRID?](#) For a summary of what is new in eGRID2019, refer to the [United States Environmental Protection Agency](#). The [U.S. EPA eGRID Technical Guide](#) contains more detailed information.
- Updates to methodology. U.S. EPA factors can and do change due to methodology updates. For example, emissions factors for solid landfilled waste declined significantly from the 2019 reporting period to present. This is due to the availability of new and updated information. Refer to the [U.S. EPA Versions of the Waste Reduction Model \(WARM\)](#) for additional information. Version 15 is used in the current reporting period.