

Greenhouse Gas Emissions Inventory Summary

2014-2021



USC University of
Southern California

Updated August 2022

Executive Summary

- **USC has a commitment to sustainability and climate leadership.** In 2016 the university set a goal to reduce greenhouse gas (GHG) emissions per gross square foot (GSF) from the most direct sources (Scopes 1 and 2) by 20% from a 2014 baseline by 2020.
- USC's academic facilities **FY21 Scope 1 and Scope 2 footprint of 4.86 Metric Tons Carbon Dioxide Equivalent (MTCDE) per 1000 GSF** represents a 54.3% reduction in carbon intensity.
- USC's new goal is to get to carbon neutrality for Scope 1 and Scope 2 emissions by 2025. Its **FY21 footprint of 80,564 MTCDE for Scopes 1 & 2** represents a 41.9% emissions reduction since 2014.
- That's due in part to a 25.6% improvement in energy efficiency, as well as 48% less carbon-intensive electricity from LADWP. The global COVID-19 pandemic has introduced new challenges and opportunities.

Boundaries and Purpose of Inventory

This greenhouse gas (GHG) inventory, representing FY14-21, documents the carbon footprint of USC's academic facilities, including the following campuses and locations:

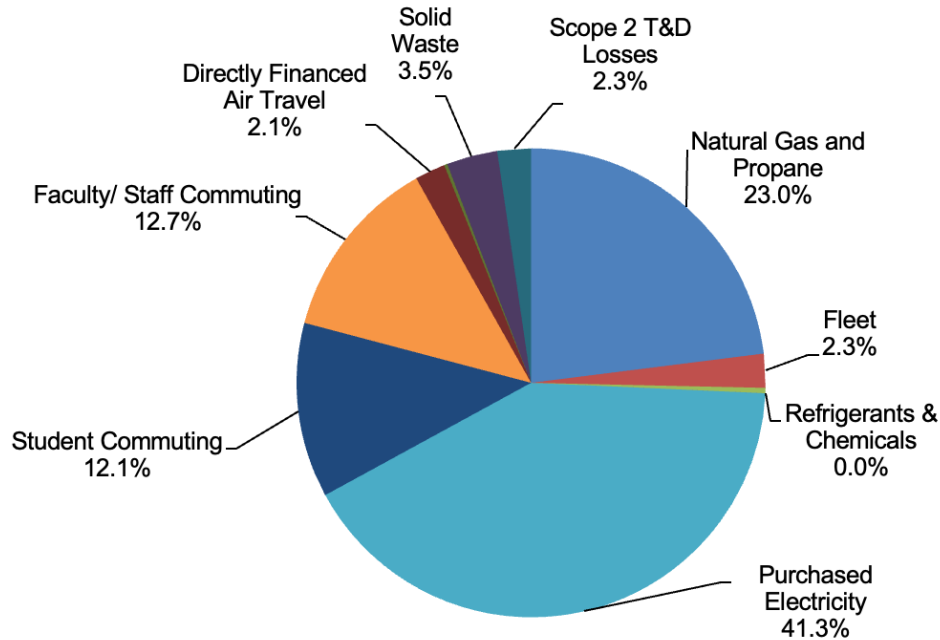
- University Park Campus
- University Park North Housing
- USC Health Sciences Campus (*excluding HC2, HC3, H4, NTT, NOR, SST*)
- USC Wrigley Institute for Environmental Studies
- USC Pacific Asian Museum
- USC Hotel

The **organizational** boundaries have shifted from those in previous years' reports, as UCS's healthcare enterprise facilities will now track their emissions separately. The **operational** boundaries have stayed the same: USC tracks its scope 1 and Scope 2 emissions (*i.e.*, power, ventilation, heating and cooling buildings; fleet fuels; refrigerant and fertilizer use.) Scope 3 emissions from select sources - namely from commuting, business travel, and waste disposal – are also reported.

This report is intended as a tool for assessing USC's progress toward its climate and sustainability goals.

FY21 Greenhouse Gas Emissions

“Market-Based” Overview



2021		Energy (MM BTU)	kg CO ₂	kg CH ₄	kg N ₂ O	Metric Tons eCO ₂
Scope 1	Natural Gas and Propane	520,766	27,554,096	2,748	55	27,645.66
	Fleet	42,658	2,785,511	87	59	2,803.6
	Fertilizer	-	-	-	-	442.3
	Refrigerants & Chemicals	-	-	-	8	2.0
	SUBTOTAL		30,339,607	2,835	122	30,893.50
Scope 2	Purchased Electricity	636,339	48,943,317	338	2,707	49,670.14
Scope 3	Faculty / Staff Commuting	203,098	14,349,078	780	489	14,500.6
	Student Commuting	216,933	15,148,079	824	515	15,307.7
	Directly Financed Air Travel	14,128	2,510,287	28	29	2,518.7
	Other Directly Financed Travel	3,853	264,830	14	9	267.7
	Solid Waste	-	-	159,663	-	4,218.6
	Scope 2 T&D Losses	33,149	2,800,300	19	152	2,779.9
	SUBTOTAL		35,072,574	161,328	1,497	39,593.2

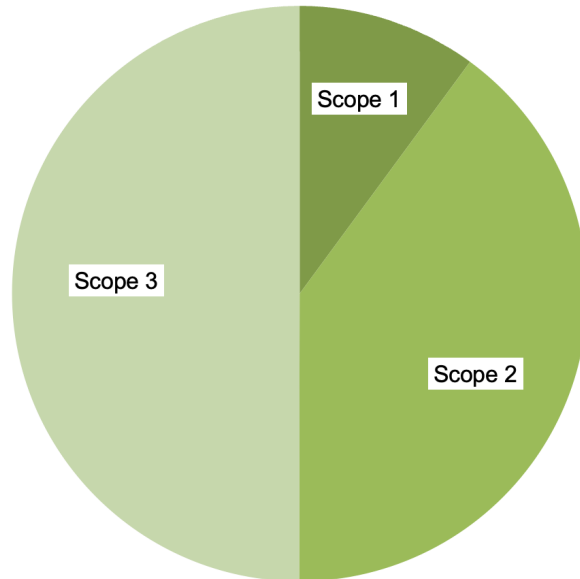
In FY21, USC emitted an estimated 120,157 metric tons carbon dioxide equivalent (MTCDE); 56.5% lower than its 2014 baseline.

Purchased electricity was still a large source of USC’s greenhouse gas footprint (41%). Indirect commuting emissions—though estimated to have dropped by half due to closures related to the global COVID- 19 pandemic—were still the next-largest contributor to USC’s footprint (25%). Emissions from natural gas and other non-transportation fuels were a significant contributor as well (23%).

Emissions from campus waste disposal, business travel, fleet vehicles and refrigerant use were relatively minor contributors. USC had an additional estimated 298 MTCDE of biogenic emissions from the use of biodiesel and ethanol as transport fuels.

FY14 Greenhouse Gas Emissions

Adjusted Baseline: “Market-Based” Overview

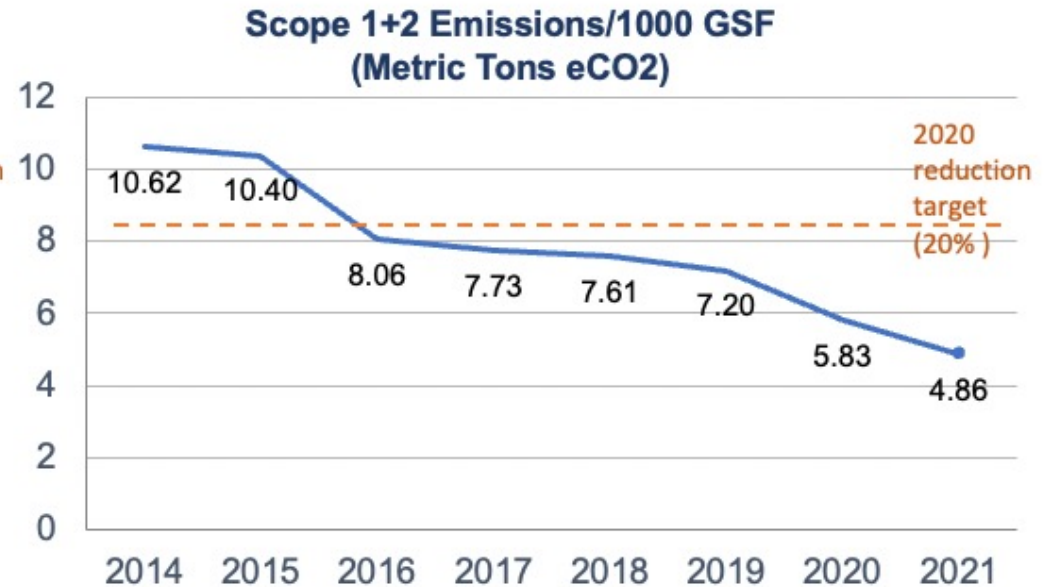
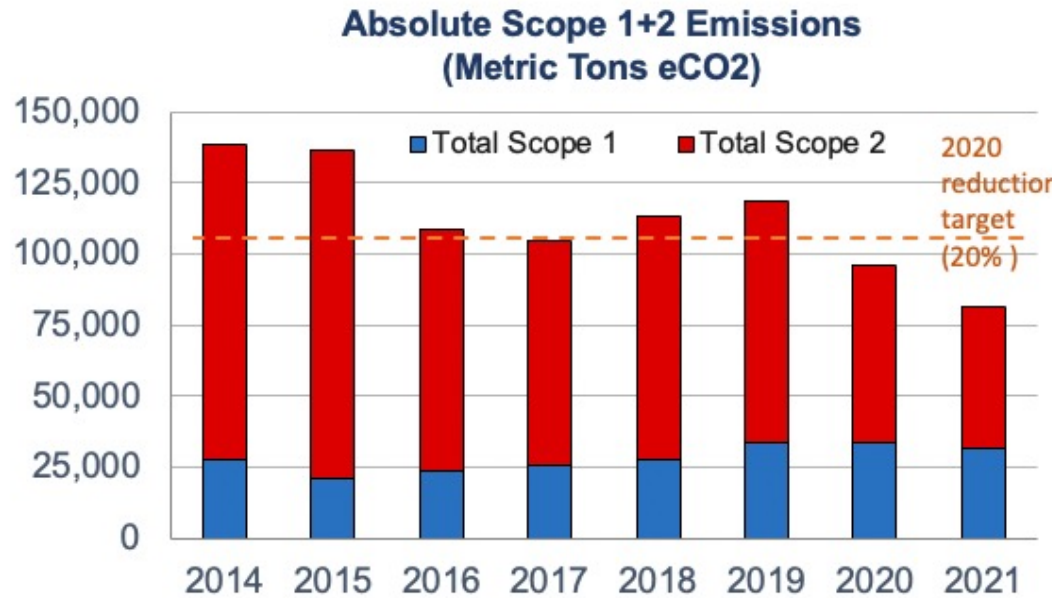


2014	MMBTU Energy	kg CO ₂	kg CH ₄	kg N ₂ O	Metric Tons eCO ₂
Scope 1	500,188	26,791,506	2,581	302	27,866
Scope 2	750,567	110,535,600	3,300	403	110,735
Scope 3	1,361,373	131,456,122	170,008	5,054	137,556
All Scopes	2,612,128	268,783,229	175,888	5,758	276,157

In FY14, its baseline year, USC’s academic facilities emitted an estimated 276,157 metric tons of carbon dioxide equivalent.

10% of those emissions were Scope 1 emissions, which means they occur directly as a result of burning fuels or using chemicals on the USC campus. Another 40% were Scope 2 emissions; these result from the purchased electricity used on campus. The largest category of emissions—50% of the USC footprint—were the “Scope 3” emissions that are the indirect result of campus operations; for example, the emissions resulting from student, staff and faculty commuting, and from business travel.

Scope 1+ 2 Emissions Trends: FY14-FY21

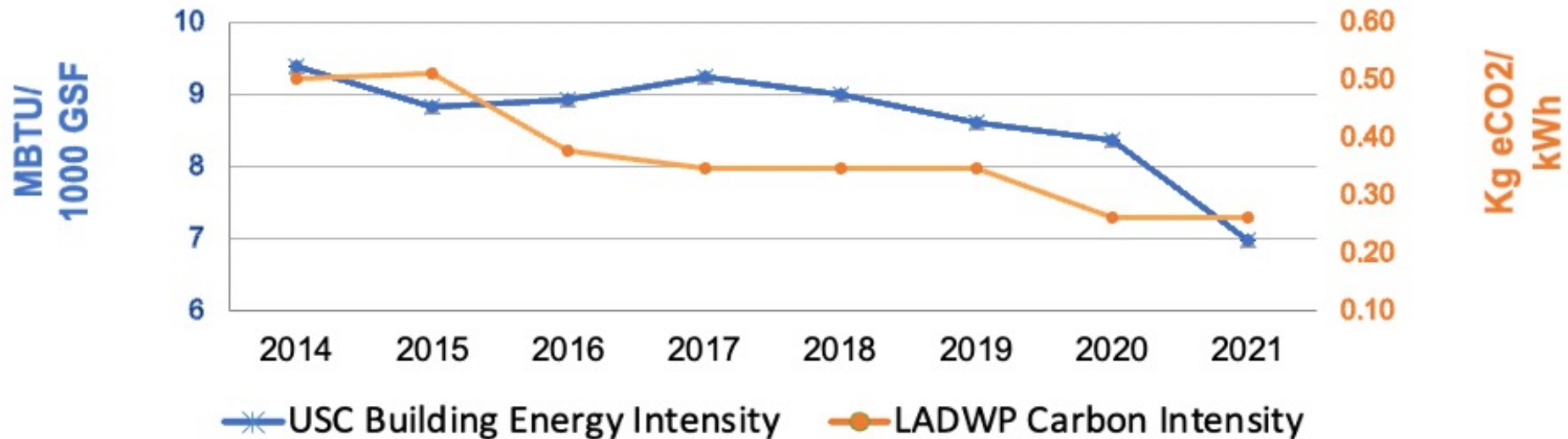


In FY21, absolute Scope 1 and 2 emissions were 41.9% lower than the FY14 baseline levels.

Scope 1 emissions have increased 11%, as natural gas consumption has risen to support a 27% increase in campus square footage. This increase was offset by a 55% decrease in Scope 2 emissions, due in part to the “greening” of USC’s power supply and in part to decreased electric consumption.

When normalized to account for campus growth, the Scope 1 and 2 emissions reduction is even greater: **USC FY21 S1+2 emissions-per-square-foot (i.e., emissions intensity) levels were 54% lower than FY14.**

Energy vs Carbon Intensity: FY14-FY21

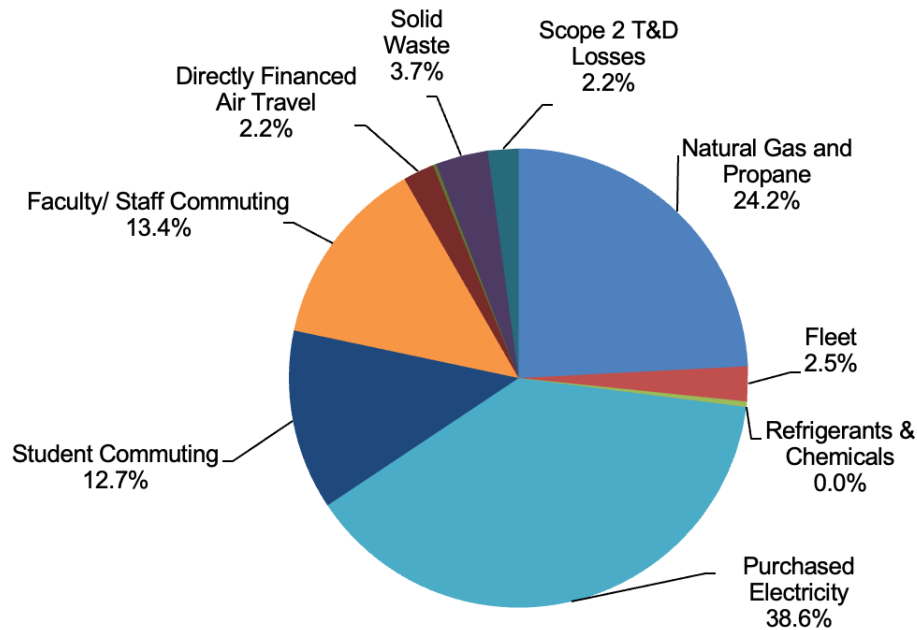


USC's building energy intensity (the amount of natural gas, propane and electricity used per square foot) for buildings was 26% lower in FY21 than FY14. Given that the COVID-19 pandemic caused significant disruptions and shutdowns, this is not unexpected. However, the level of decreased energy demand was not commensurate with the decrease in campus utilization, due to the unpredictable nature of the pandemic, the increased demand for ventilation that it spurred, and its detrimental impact on staff capacity to plan and execute changes.

USC's carbon reductions are also significantly due to the "greening of the grid." The University gets most of its power from LADWP, which has cut its carbon intensity (the amount of eCO₂ pollution emitted per kWh of electricity it produces) by 48% between 2014 and 2021.

2021 Greenhouse Gas Emissions

“Location-Based” Overview



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	Solid Waste	-	-	159,663	-	4,218.6
	Scope 2 T&D Losses	33,149	4,391,511	34	274	2,471
SUBTOTAL		36,663,785	161,343	1,316	39,340	

There are two ways to estimate Scope 2 emissions from electricity: a “Market Based” method that uses supplier-specific emissions factors, and a “Location Based” method that uses emissions factors for one’s entire grid region. Institutions are expected to report both sets of emissions calculations. USC’s Location Based emissions overview for 2021 presents a slightly different picture than the Market Based overview—because the overall grid region of which USC is a part has a less-carbon intensive electricity generation portfolio than USC’s primary supplier, LADWP, does.

As a result, absolute Scope 2 emissions are very slightly lower using the Location Based method: 11% lower for FY21. As LADWP brought its generation portfolio more in line with that of the broader California grid, the difference between Scope 2 totals using the two calculation methods has been reduced.

Methodology

The data for this inventory was provided from utility bills (LADWP for electricity, SoCalGas for Natural Gas), data from other Facilities staff outside of the Energy office (for propane, fertilizer applied on campus, and municipal solid waste), and reports run on square footage during late fall and winter of 2021.

Emissions for commuting were estimated/projected for the years 2015, 2016, 2017 and 2018 based on the rate of change in (Full-Time Equivalent) student enrollment from the 2014 baseline year (for student commuting). For 2020, a 30% across-the-board reduction from 2019 commuting vehicle miles traveled was assumed, due to changes induced by the COVID-19 pandemic. For 2021, a further 50% across the board reduction was applied.

For air travel, a portion of miles traveled was provided directly by the travel agencies that service campus travel needs; in addition, the dollars spent on airfare were converted to air passenger miles using conversion factors from the Bureau of Transportation Statistics (BTS).

All calculations were done using the [Sustainability Indicator Management and Analysis Platform \(SIMAP\)](#), EF version 2021. Global Warming Potential (GWP) values are from the [IPCC Fifth Assessment Report \(AR5\)](#). The selected radiative forcing factor was 2.7 and the air travel cost version was “BTS.”

For Market Based Scope 2 emissions calculations, an LADWP supplier-specific emission factor was applied to the UPC, UPC North, HSC campus and the USC Hotel. These supplier specific emissions factors were published by LADWP (for which the last available update was October 2020) was used and reflects the municipal utility’s generation mix; for properties that use LADPW. The other facilities in Catalina and Pasadena used the residual mix for E-Grid region CAMX.

For Location Based calculations, E-Grid emissions factors from the EPA were used (the CALI E-Grid region in 2009, and the CAMX E-Grid region for 2014-2020) to ensure more standardized comparisons. This includes E-Grid 2012, 2014, 2016, 2018, 2019 and 2020 data.

FTE figures used for benchmarking were drawn from IPEDS data, accessed from the USC Institutional Research site (<http://oir.usc.edu/ipeds/>); specifically, the “12-Month Enrollment” and “Human Resources” reports. Gross Square Footage is tracked by USC Facilities.