

# Greenhouse Gas Emissions Inventory Summary

2014 (FY) - 2020 (FY)



**USC** University of  
Southern California

Updated January 2021

# Summary

- Total Emissions (Scope 1, 2, and 3)
  - Absolute emissions dropped by 19.4%
- Scope 1
  - Absolute emissions increased by 16%
- Scope 2
  - Absolute emissions dropped by 26%
    - LADWP's carbon intensity dropped by 31%
    - USC improved its building energy efficiency by 11.8%
- Scope 3
  - Absolute emissions decreased 21%
- Scope 1 + 2 Emissions
  - Absolute emissions dropped by 17.7%
  - Normalized (per square foot) emissions dropped by **35%**
    - USC's goal is 20%



# Purpose of Inventory

This inventory update is intended to provide insight into USC's greenhouse gas management to date, and to guide future energy, program, and infrastructure developments.

Current commitments\* include:

**Goal: Reduce Scope 1 and 2 combined greenhouse gas emissions per square foot by 20% from 2014 levels by 2020.**

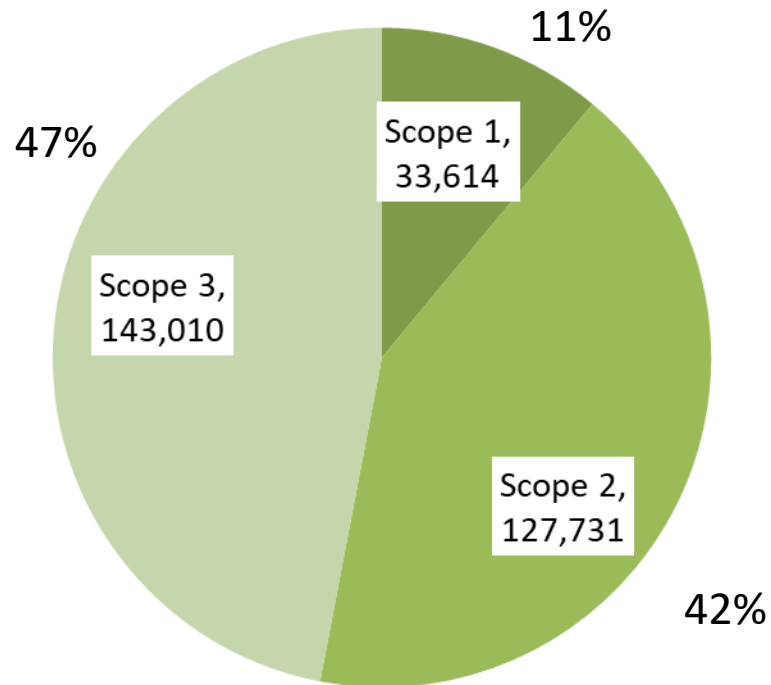
- Track and report greenhouse gas emissions
- Implement a Climate Action Plan

Definition of Scopes:

- Scope 1 Emissions: GHG resulting from burning fuel and using chemicals on campus.
- Scope 2 Emissions: GHG resulting from LADWP generating electricity used on campus.
- Scope 3 Emissions: GHG resulting from indirect sources like campus commuting, air travel, etc.

\*[https://green.usc.edu/files/2017/03/Sustainability2020\\_Single-page.pdf](https://green.usc.edu/files/2017/03/Sustainability2020_Single-page.pdf)

## 2014 Baseline\* Greenhouse Gas Emissions\*\*



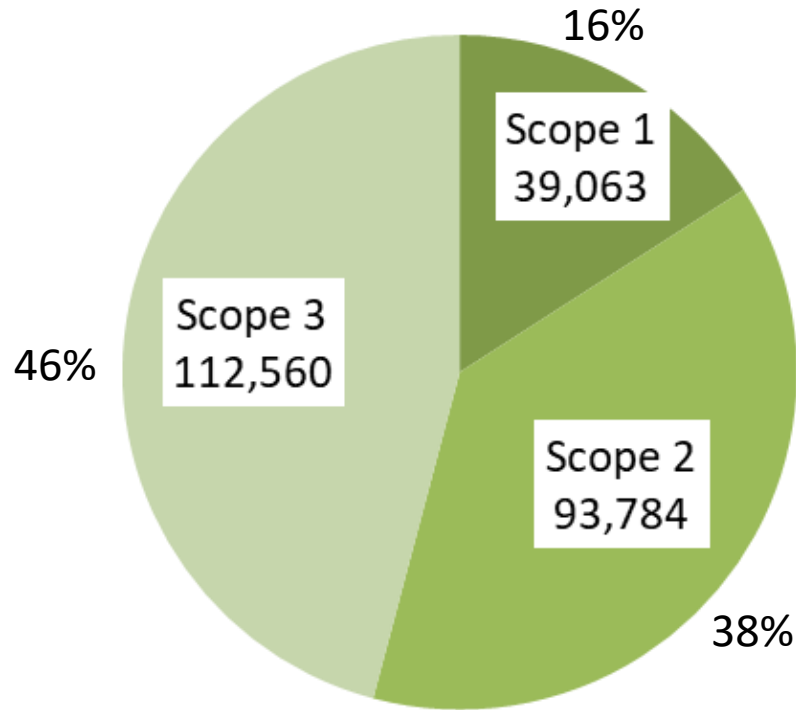
2014	Energy Consumption MMBtu	kg CO <sub>2</sub>	kg CH <sub>4</sub>	kg N <sub>2</sub> O	Metric Tons eCO <sub>2</sub>
Scope 1	604,952	32,484,585	3,044	424	33,614
Scope 2	865,459	127,730,617	0	0	127,731
Scope 3	1,328,647	137,853,767	127,695	5,966	143,010
All Scopes	2,799,057	298,068,969	130,738	6,391	304,355

**USC emitted an estimated 304,355 metric tons of carbon dioxide equivalent in adjusted\* 2014 (FY).**

- Scope 1- 11% of those emissions were “Scope 1” emissions, meaning they occur directly as a result of burning fuels or using chemicals on the USC campus.
- Scope 2- Another 42% were “Scope 2” emissions; these result from generating the electricity used on campus.
- Scope 3- The largest category of emissions—47% of the USC footprint—were the “Scope 3” emissions that are the indirect result of campus operations; for example, the emissions from student, staff, and faculty commuting, and from business travel.

\*See explanation of adjustment at end of slide deck \*\*‘Market-Based’. See Methodology for explanation

# 2020 Greenhouse Gas Emissions\*



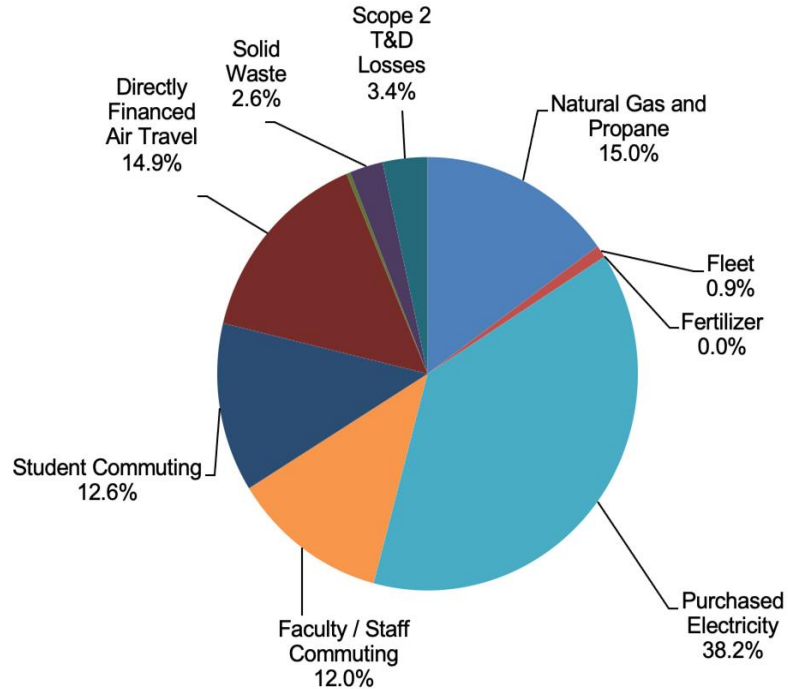
2020	Energy Consumption MMBtu	kg CO <sub>2</sub>	kg CH <sub>4</sub>	kg N <sub>2</sub> O	Metric Tons eCO <sub>2</sub>
Scope 1	724,925	38,897,055	3,661	217	39,063
Scope 2	919,092	93,783,844	0	0	93,784
Scope 3	1,116,396	104,687,585	237,705	4,593	112,560
All Scopes	2,760,413	237,368,484	241,366	4,810	245,407

**By 2020 (FY), USC's total emissions had dropped 19.4% from the 2014 (FY) baseline to 245,407 metric tons carbon dioxide equivalent.**

- Scope 1- Emissions from the first scope increased from 11% to 16% as a percentage of the footprint and increased as an absolute number.
- Scope 2- Purchased electricity was still a large source of USC's GHG footprint, though its proportion of the footprint dropped from 42% to 38% and the absolute numbers decreased.
- Scope 3- Indirect emissions from the campus decreased in absolute number but was approximately the same portion of the overall footprint.

\*'Market-Based'. See Methodology for explanation

# 2020 Greenhouse Gas Emissions in Detail

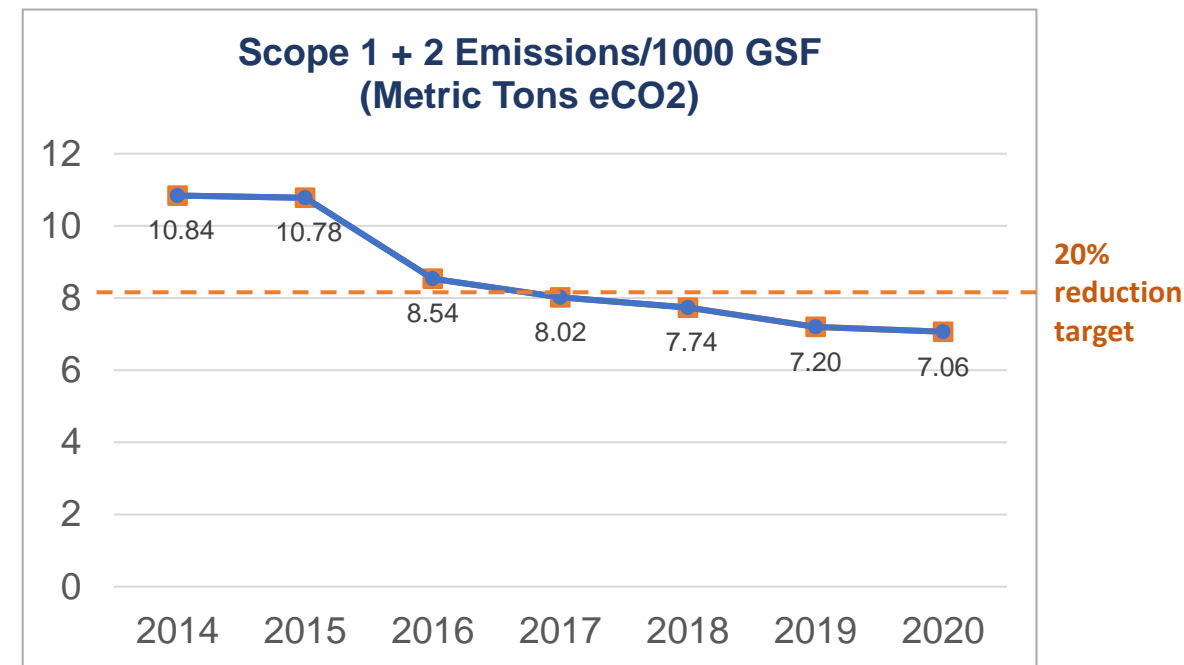
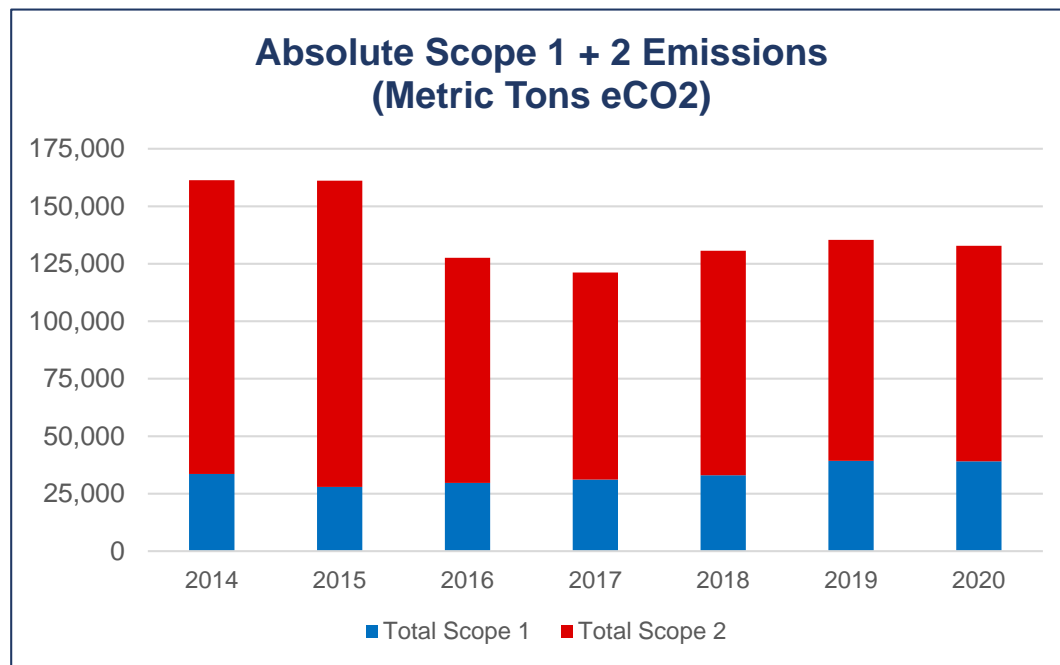


Year -->	2020	Energy Consumption MMBtu	kg CO <sub>2</sub>	kg CH <sub>4</sub>	kg N <sub>2</sub> O	Metric Tons eCO <sub>2</sub>
Scope 1	Natural Gas and Propane	692,978	36,665,899	3,284	66	36,775
	Fleet	31,948	2,231,156	377	131	2,276
	Fertilizer			-	20	5
	Refrigerants & Chemicals	-	-	-	-	6
Scope 2	Purchased Electricity	919,092	93,783,844	-	-	93,784
Scope 3	Faculty / Staff Commuting	406,196	28,792,410	5,705	1,925	29,462
	Student Commuting	433,866	30,207,217	6,453	2,160	30,960
	Directly Financed Air Travel	205,689	36,546,101	398	457	36,678
	Other Directly Financed Travel	10,103	701,309	152	51	719
	Solid Waste	-	-	224,998	-	6,300
	Scope 2 T&D Losses	60,541	8,440,546	-	-	8,441

**USC's 2020 (FY) total emissions 19.4% drop from the 2014 baseline in detail.**

- Scope 1- Emissions from the first scope increased. A majority of the GHG in this scope is due to on-campus natural gas usage. Fleet vehicles and refrigerants emissions have been negligible.
- Scope 2- The single largest contributor to GHG is from electricity used on-campus. This scope did see a dramatic decrease in carbon emissions, which was due to a combination of LA Department of Power and Water (LADWP) fuel mix improvements and energy efficiency at the building level.
- Scope 3- Overall there was a significant drop in emissions due to closures related to the global COVID 19 pandemic. Commuting emissions were a significant driver of GHG pollution, and directly financed air travel also played a large role. Emissions from on-campus energy use were relatively small (transmission + distribution), as was emissions from campus waste.

# Scope 1 + 2 Emissions Trends: 2014-2020



## Absolute

**Scope 1 and 2 emissions have dropped 17.7% in absolute terms from 2014 (FY) to 2020 (FY).**

- Scope 1 emissions have increased nearly 16%, as natural gas consumption has risen to support a 26% increase in campus added square footage.
- This increase has been offset, however, by 26% decrease in Scope 2 emissions due to a drop in the carbon intensity of LADPW's fuel mixed used for generating electricity and energy efficiency efforts.

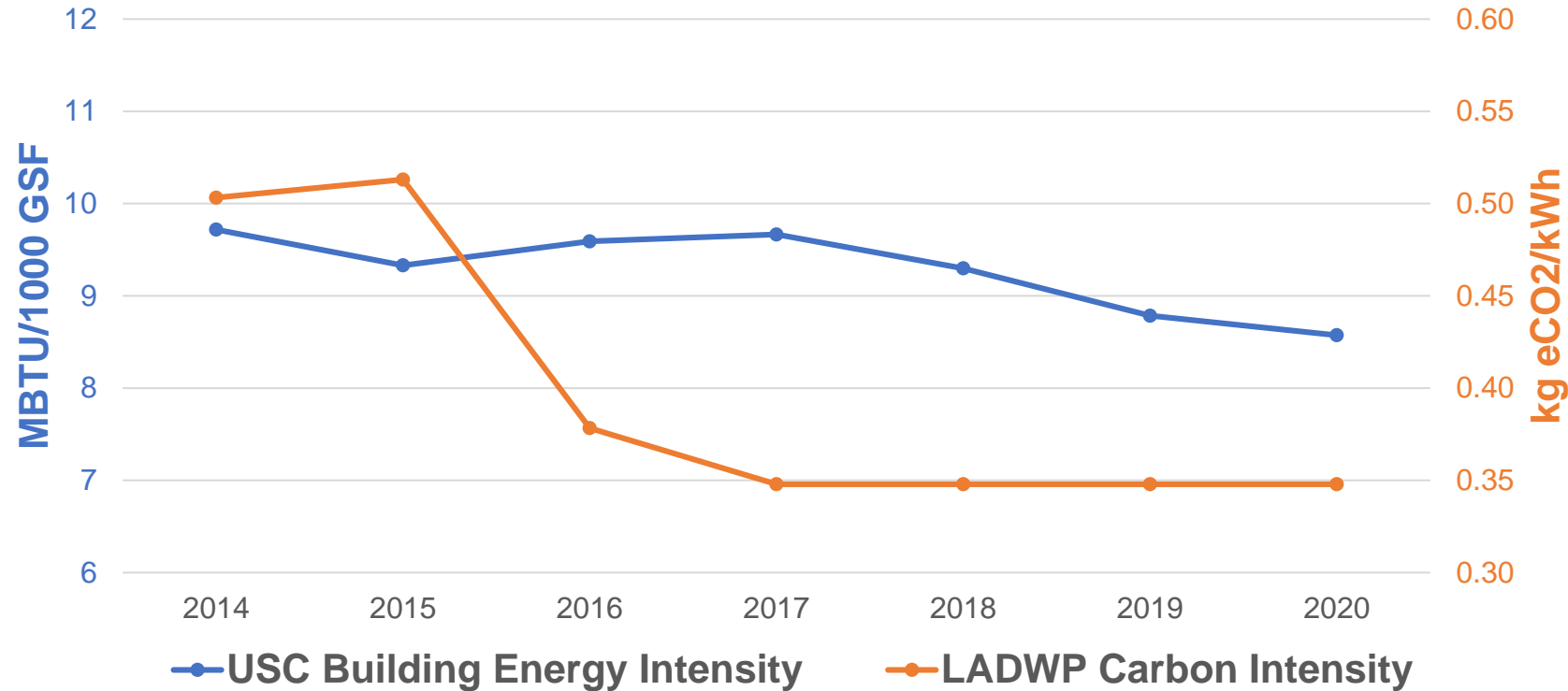
## Normalized

**USC has seen a drop of 35% in emissions-per-square-foot (i.e., emissions intensity) over six years.**

- When normalized to account for campus growth, the Scope 1 and 2 emissions reduction was significant.



# Energy vs Carbon Intensity: 2014-2020



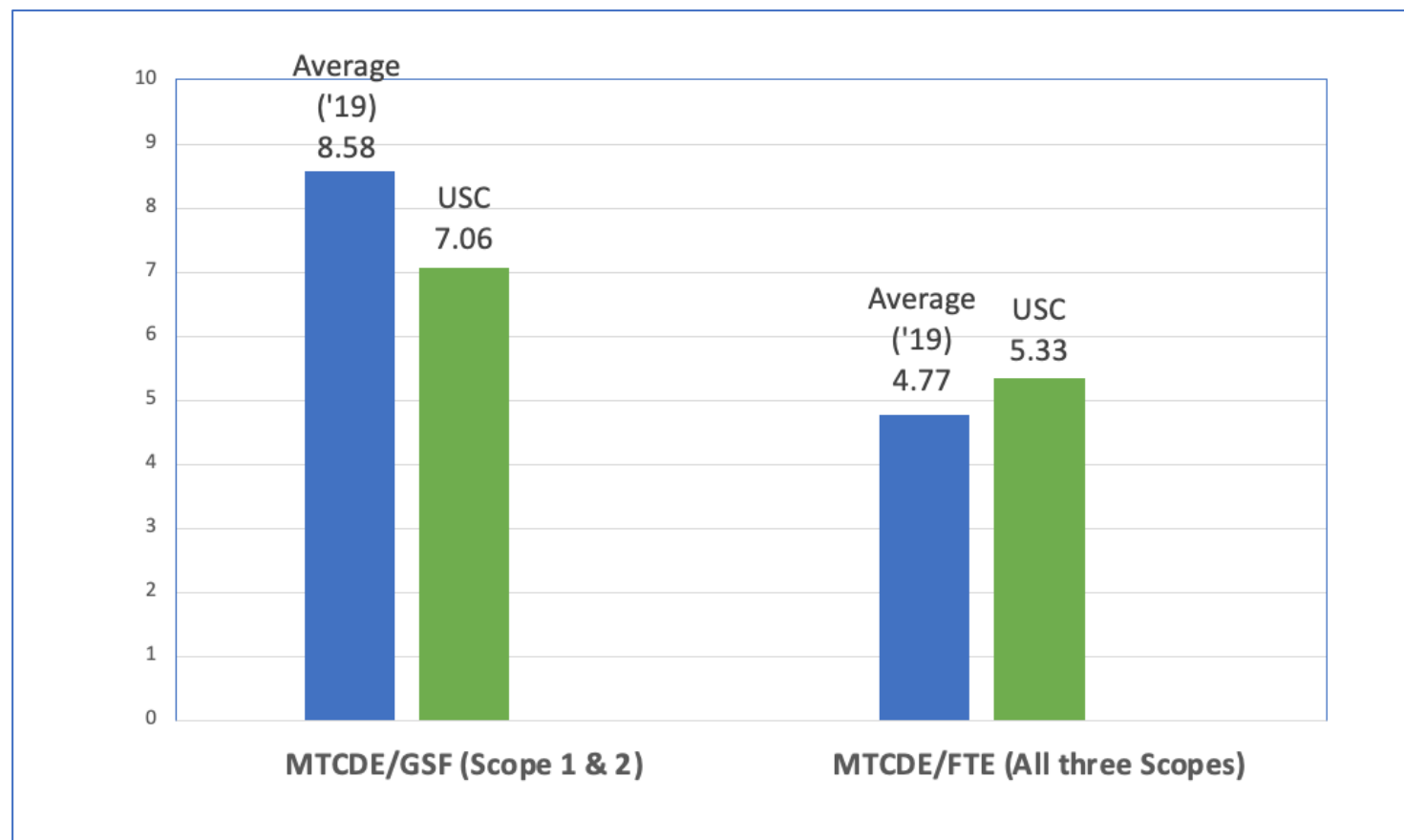
- Carbon Decrease- The decrease in USC's carbon emissions is good news—it was accomplished through the university's energy efficiency efforts combined with the reduction in carbon intensity of LADWP's fuel mix.



# Energy vs Carbon Intensity: The Data

- LADWP- USC gets a vast majority of its power from LADWP, which has significantly decreased the proportion of fossil fuel it uses for generating electricity and increased renewable energy over the past several years, cutting LADWP's carbon intensity by 31%.
- Energy Efficiency- Overall, there has been a decrease of 11.8% in energy intensity at USC. Absolute campus electricity consumption actually *increased* during this time period—though the rate of increase was lower than the rate of growth in square footage.
  - 6% increase electricity consumption (absolute)
  - 19% increase natural gas consumption (absolute)
  - Compared to 26% campus growth
- Breakdown of the total 35% drop in Scope 1 and Scope 2 emissions (MTCDE) normalized based on campus size (1000 GSF):
  - 1% is attributable to more efficient use of natural gas
  - 12.5% is attributable to more efficient use of electricity
  - 20.5% is attributable to cleaner power from LADWP
  - <1% attributable to absolute reductions in fertilizer and refrigerant use.

# Normalized Emissions USC v Other Institutions



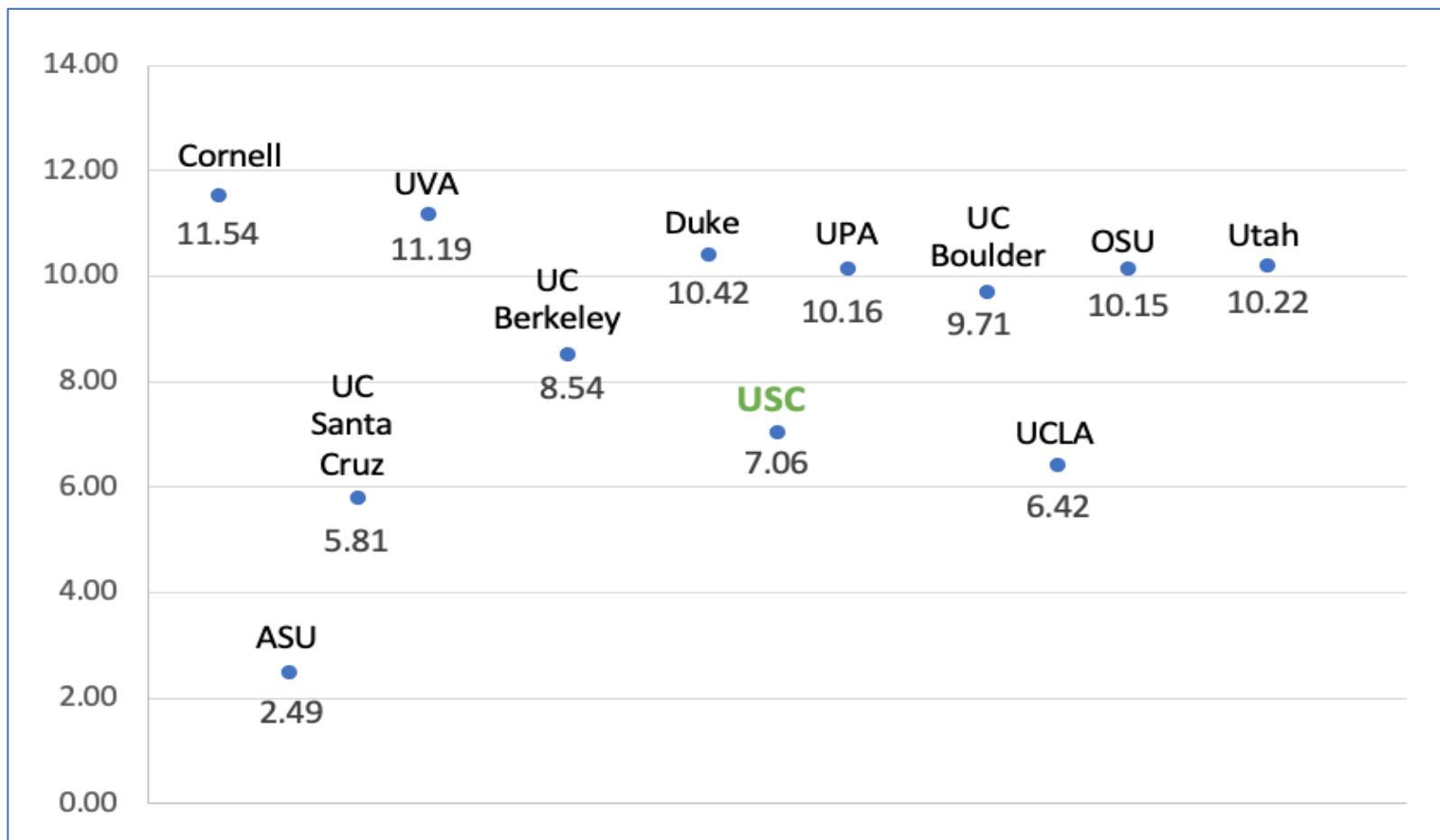
FTE = Full Time  
Equivalent

GSF = Gross Square  
Footage

*USC FY20 compared to average emission rates\**

\* "Average based on values shared in session "Are Campuses Making Progress on their Climate Goals" at AASHE 2020 conference. Includes institutions in the SIMAP database with data from 2010-2019 (the latest year for which a complete data set is available).

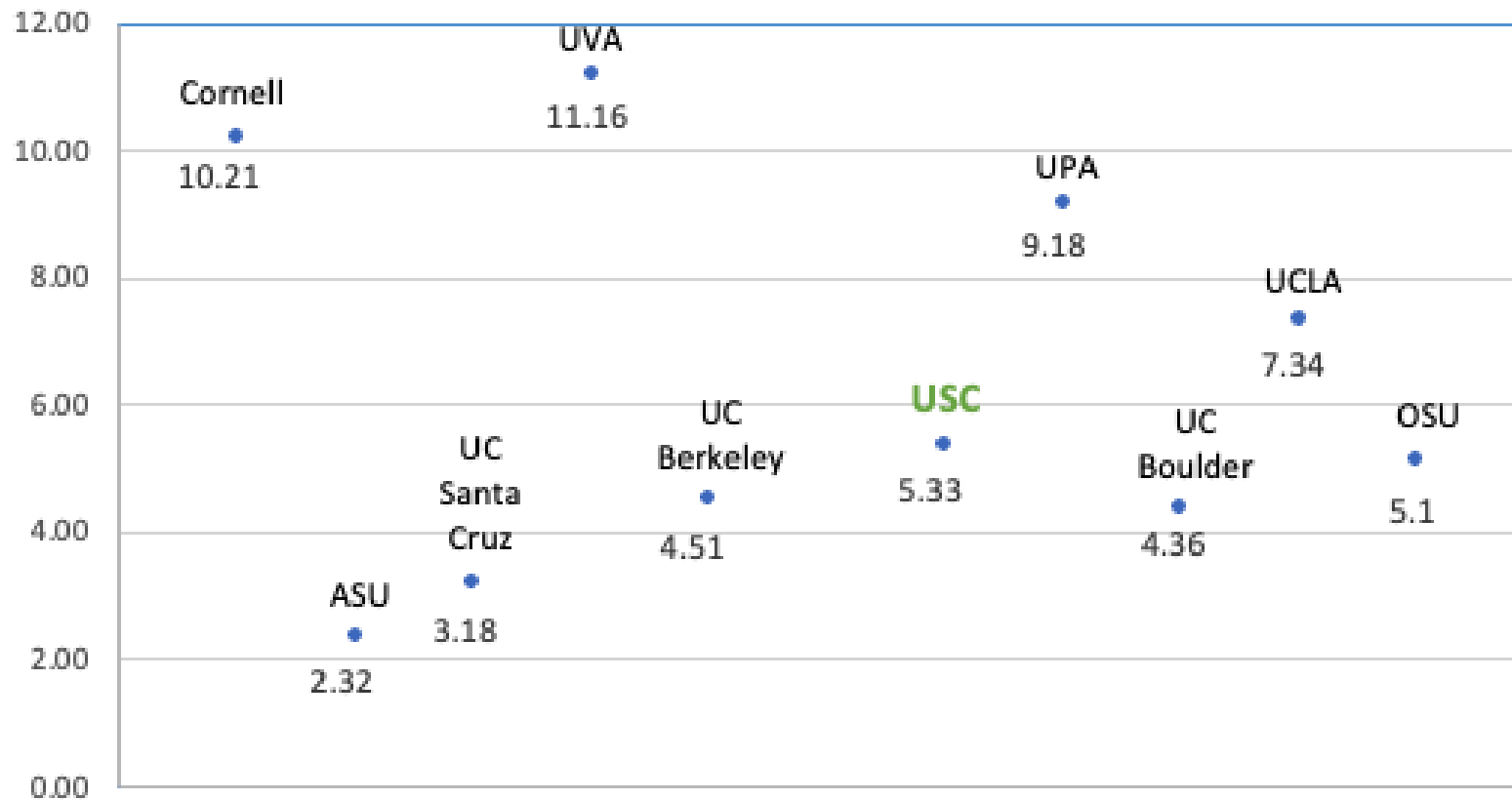
# Comparisons of Universities' Emissions Per Square Foot (Scope 1+2)



Scope 1 & 2 Emissions (MTCDE) per 1000 Gross Square Foot

*Based on data published in Second Nature Reporting Platform, STARS, or on campus websites. Most recent available (generally FY19).*

# Comparisons of Universities' Emissions Per FTE (Scope 1+2+3)



Scope 1,2&3 Emissions per FTE (MTCDE)

*Based on data published in Second Nature Reporting Platform, STARS, or on campus websites. Most recent available (generally FY19).*

# Methodology

The University of Southern California operates two main campuses: the University Park Campus (UPC) and the Health Sciences Campus (HSC). The greenhouse gas emissions sources that have been included in this report include emissions sources from these campuses as well as other properties owned by the University. The approach to organizational boundaries, therefore, is an ownership or “equity share” approach. This, as noted previously, is a slight change from previous years’ reports.

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 2020.

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 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 scope 1 and scope 3 emissions factors were updated using the 2020 version of emissions published by the [Sustainability Indicator Management and Analysis Platform \(SIMAP\)](#). Global Warming Potential (GWP) values are from the [IPCC Fifth Assessment Report](#) (AR5).

Two different versions of emissions factors for electricity were used - Market Based and Location Based. For Market Based, the customized emissions factor provided by LADWP (for which the last available update was 2019) was used and reflects the municipal utility’s generation mix. 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 and 2018 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 data was supplied from USC.

The inventory results were calculated using a modified v9 of the University of New Hampshire’s Campus Carbon Calculator (formerly the Clean Air Cool Planet Calculator) - <https://sustainableunh.unh.edu/calculator> - a widely used tool for college and university greenhouse gas inventories in the U.S.

# Boundary/Baseline Adjustment

Previous inventories were completed in 2001 and 2009. In 2014, a new greenhouse gas inventory was completed using expanded reporting categories, establishing it as the new “baseline” for the university’s carbon emissions.

These previous baseline calculations included the AT&T Center—which is leased—along with all properties owned by USC, in its organizational boundaries; it did not, however, include USC’s numerous other leased properties which it operates.

To be more consistent, the 2018 GHG inventory made a change to these organizational boundaries, shifting to an “ownership” approach which excluded the AT&T Center. In 2019, new fleet data that had not been previously available was collected and included as well; and in 2020 air travel miles and rental car miles were included for the first time, and back-casted to 2014 based on campus growth.

The result of this continued organizational evolution and methodological refinement is that the 2014 baseline figures reported in previous years once again required adjustment; the updated 2014 data, as well as those for intervening years, are included in this report.