

Stanford University Scope 3 Emissions Inventory

CY2019 Baseline Scope 3 Emissions Methodologies and Results by Category

Introduction

Over the past decade, Stanford University (excluding SLAC and the hospitals) has reduced its scope 1 and 2 greenhouse gas emissions by 80% and is on track to eliminate 100%.

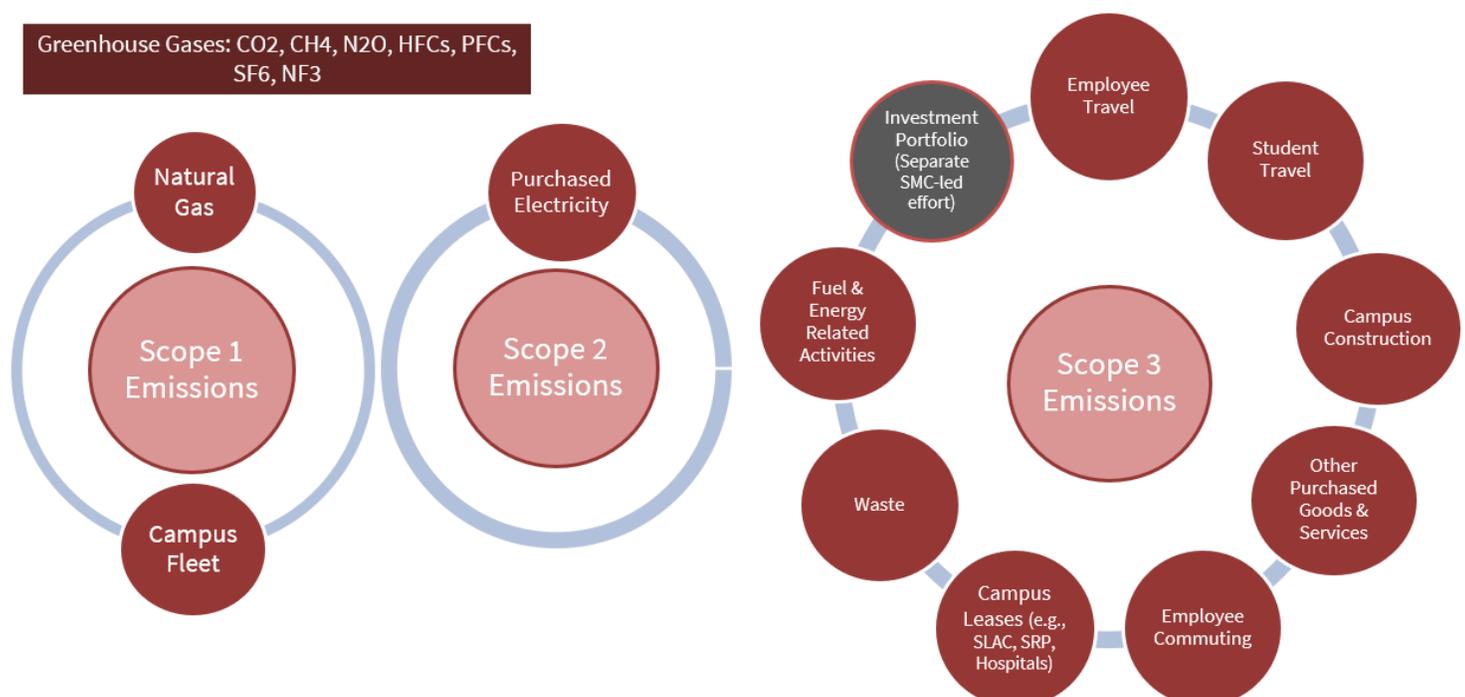
In June 2020, the Board of Trustees passed a resolution calling for the university to eliminate its scope 3 emissions by the year 2050, while acknowledging this date may move forward as we develop knowledge and experience. To that end, a new Scope 3 Emissions Program sponsored by the Vice President of Business Affairs and managed by the Scope 3 Emissions Program Manager was launched in 2021. A separate effort is being established to address the investment portfolio.

The Scope 3 Emissions Program has two principal objectives:

- Reduce, mitigate, or offset Stanford's Scope 3 emissions to the maximum extent possible.
- Establish a path that other institutions can follow in addressing their own Scope 3 emissions, through the following efforts:
 - Communications
 - Campus Engagement
 - Regional Community Engagement
 - Collaboration with other Institutions

The Scope 3 Emissions Program has defined and measured nine applicable overarching scope 3 emissions categories within a university setting, as shown in Figure 1. These categories have been adapted from the Greenhouse Gas Protocol's Scope 3 Emissions Guidance.

Figure 1: Visualization of Scope 1, 2, and 3 Emissions at Stanford

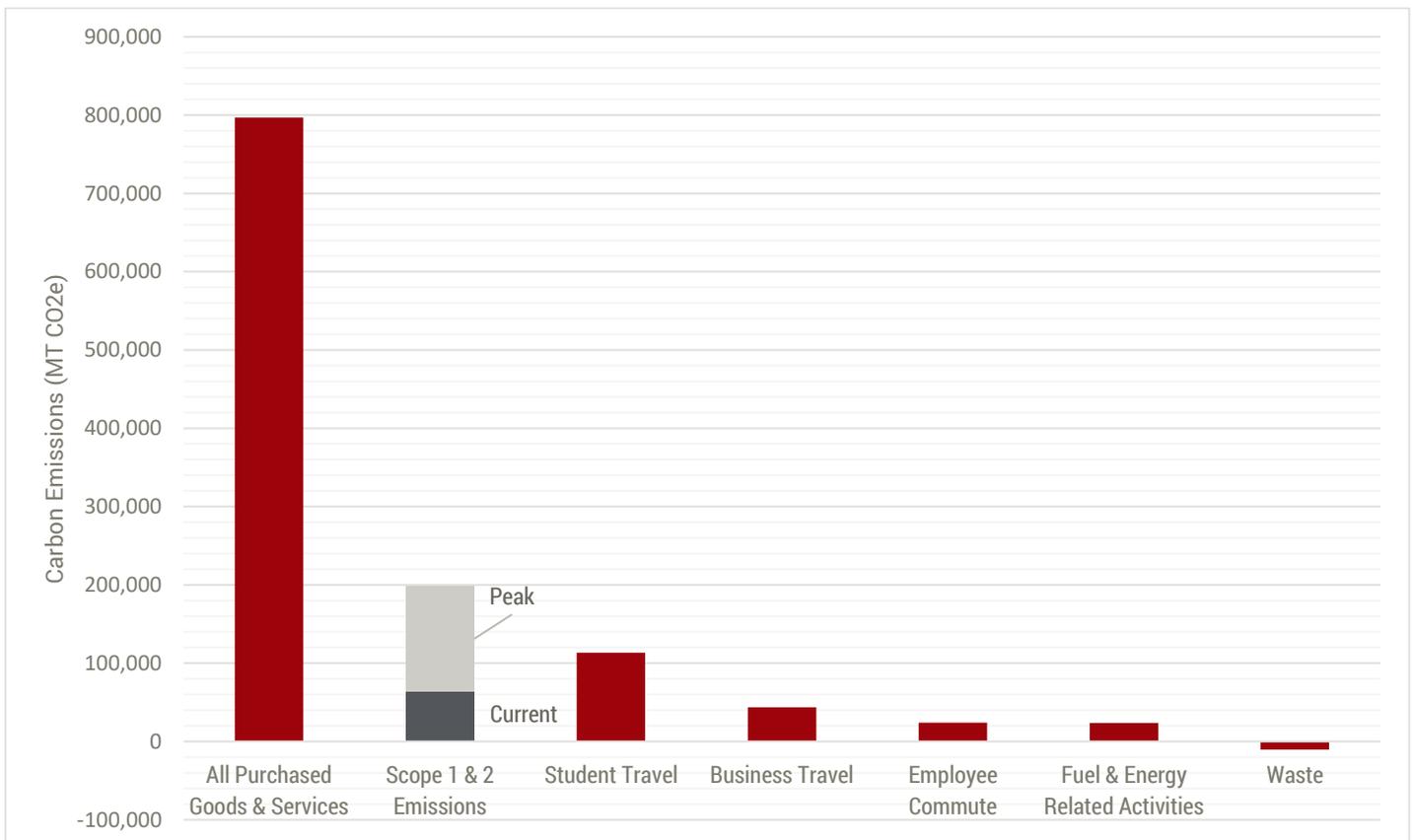


A process has been established to quantify and mitigate emissions in each category according to the following steps:

- Category definition, ideal calculation methodology, and baseline measurement established and documented in a white paper. These parameters are defined using a combination of existing tools—like SIMAP, VitalMetrics and Sievo—and custom methodologies using publicly available factors.
- Review and approval of each white paper by the Scope 3 Emissions Working Group (comprised of faculty, staff and students)
- Mitigation strategy identification and impact assessment
- Mitigation initiative approval by the Scope 3 Emissions Working Group
- Mitigation implementation
- Mitigation measurement & reporting

This report summarizes the calculation methodologies and calendar year 2019 results for six of the eight categories of scope 3 emissions shown above, with an overall summary shown in Figure 2 below. In Figure 2, the CY19 scope 3 emissions estimates are shown in blue alongside the university’s CY19 and peak scope 1 & 2 greenhouse gas emissions in grey.

Figure 2: Stanford University CY19 Scope 3 Emissions compared to Scope 1 & 2 Emissions: 6 of 8 Total Relevant Scope 3 Categories



Please note that the methodologies for calculating emissions in most of these categories are still being refined and these numbers are subject to change in future reporting as more guidance, data, calculation tools, and customization become available.

A summary of the methodology and data sources used for calculations in each category is included in the subsequent sections.

Business Travel

At Stanford, the Business Travel category encompasses all student, staff and faculty travel that is paid for by the university and encompasses air travel, lodging and ground transportation. For air travel, which comprises 93% of emissions in this category, procurement data is used to generate reports with destination and arrival airports for each trip, which in turn is used to calculate mileage for each trip. EPA emissions factors are then applied by length of trip (short-haul, medium-haul and long-haul). For lodging, which comprises 7% of emissions in this category, procurement data on hotel nights is used to calculate emissions using DEFRA emissions factors. Finally, a complex system was developed to estimate emissions from ground transportation, which comprise less than 1% of emissions in this category. In total, emissions in this category equaled 44,203 MTCO_{2e} in 2019.

Student Travel

At Stanford, the Student Travel category encompasses all personal and study abroad student travel by students. Personal travel data was collected using a survey distributed to 2,000 students, which allowed for estimation of emissions associated with personal air travel and ground transportation to and from the airport. Study abroad data was collected from 36 campus groups associated with any Stanford-affiliated student travel. Several assumptions were applied to this data to estimate air travel emissions. In total, emissions in this category equaled 116,180 MTCO_{2e} in 2019.

Fuel and Energy Activities

At Stanford, the Fuel and Energy Related Activities category includes upstream emissions from fuel, upstream emissions from electricity, and emissions from electricity transmission & distribution losses, as defined by the GHG Protocol's Scope 3 Guidance. In execution, this includes natural gas used at Stanford's Central Energy Facility, natural gas used in distributed buildings across campus and at our satellite campuses, electricity used throughout our main campus and at our satellite campuses, and fuel used in our mobile fleet and for other end uses. While Stanford partners with VitalMetrics to estimate these emissions, it has also introduced a custom methodology to incorporate life cycle emissions from the solar panels at its two offsite solar facilities, which generate the equivalent of 100% of Stanford's electricity, rather than including upstream emissions from grid electricity. Using this methodology, total scope 3 emissions from fuel and energy activities equaled 23,723 MTCO_{2e} in 2019.

Waste

At Stanford, the Waste category is based on the tonnage of all goods reduced, reused, composted, recycled, and landfilled. Using emissions factors from the EPA WARM model, which incorporate carbon sinks for any reused, composted or recycled goods, and custom transportation calculations that include precise truck and shipping routes, Stanford found its emissions in this category amounted to -10,519 MTCO_{2e} in 2019.

Employee Commuting

At Stanford, the Employee Commuting category is based on emissions from employees commuting to campus by car or using alternative forms of transit. These emissions are determined using a combination of Stanford parking permit data and data from the annual employee and student commute survey. Then, vehicle emissions factors published by the EPA are applied. In total, employee commuting emissions equaled 24,049 MTCO_{2e} in 2019.

Purchased Goods & Services & Capital Goods

At Stanford, the Purchased Goods and Services and Capital Goods categories comprise all university purchases, except for travel, which is captured in the Business Travel category. To date, Stanford has used a carbon footprint module from Sievo to

quantify emissions per dollar purchased in 1,065 Stanford-defined categories. Using this method, emissions equaled 796,709 MTCO₂e in 2019, with a breakdown of 394,556 MTCO₂e for Capital Goods and 402,153 MTCO₂e for Purchased Goods & Services. Stanford is working on improving its methodology in applicable sub-categories, such as construction, food, and IT hardware, and may report those emissions separately in the future.