



Transportation Survey Results Report 2023

San Francisco State University

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1. Key Findings

Key findings from the 2023 transportation survey include the following:

- Schedule: Most students and staff have a hybrid schedule and only come to campus 2-4 days per week.
- Public Transportation: Public transportation use has decreased dramatically, and drive-alone rate has increased in both students and staff.
- Gator Pass: Even though public transportation use has decreased, a majority of students (64%) use Gator Pass.
- SF State Shuttle: SF State Shuttle ridership decreased dramatically.
- Electric Vehicles: Hybrid and electric vehicles are increasing in popularity, but still make up less than a quarter of all types of vehicles driven to campus.
- Greenhouse Gas Emissions: A majority of greenhouse gas emissions (69%) come from commuting to and from campus comes from single occupancy vehicles (“Drove Alone”).

2. Online Survey

San Francisco State University conducted an online survey that asked University affiliates how they travel to and from campus. A total of 2,875 University affiliates responded to the survey between May 8 and May 12, 2023. A copy of the survey can be found in Appendix A.

2.1 Survey Design

Survey respondents were asked a series of questions about their commute to and from campus and general travel behavior to and from SF State's main campus at 1600 Holloway Avenue. Answers were based on the week of May 1, 2023, to determine how many days per week a respondent came to campus and what modes of transportation they took. All respondents were asked several background questions, such as their primary affiliation with the University and their zip code. Respondents were then asked to provide travel information for their journey to and from campus. Respondents who stated that they drove or carpooled to campus were asked a series of questions related to parking and electric vehicles. In addition to questions about their journey, respondents were asked questions about the SF State Shuttle, Gator Pass, and their overall commute experiences.

Constraints and Limitations

Response rate (10%) was lower than in the previous 2018 survey (17%), though the goal to get eight percent of the population was accomplished. Respondents provided their zip code to determine how far they traveled. Estimates for mileage were on the conservative side and it is likely that actual mileage was higher. Several respondents entered data that did not make sense which suggested they did not properly fill out the survey. Any obvious outliers (e.g. they listed taking every type of transit on the same day) were deleted, but entries with false data may be included in the final analysis.

2.2 Methodology

The online survey collected rich data on trip patterns. Data clean-up and restructuring was necessary to allow for data analysis. As a first step, duplicates were removed, and data were cleaned to ensure ease of analysis. Any responses that did not make sense (e.g. they selected all modes of transportation for one day) were deleted. The last leg of the journey was adjusted for if an appropriate form of transportation was not mentioned. For example, if a respondent said they took Caltrain, BART, AC Transit, or Golden Gate Transit to campus and did not mention any other forms of transportation, it was assumed they took a Muni bus from the closest station to campus. Instead of recording just once day of community, respondents recorded how they commuted each day of one particular week. This allowed respondents to put different modes of transportation each day. Respondents were asked how they arrived to and from campus. Respondents could pick multiple modes of transportation for each day of the week. It was assumed they arrived and departed the same way on the same day. Several other questions in the style of multiple-choice were asked about the respondent's commute. Respondents did not answer every question due to the sequence of questions asked based on their responses or due to failure to complete the entire survey. All respondents who answered how they commute to and from campus were used in the analysis, even if they did not complete every other question.

2.3 Demographics

All survey respondents were asked to provide their affiliation with the University. As shown in Table 2-1, a majority of respondents were students, with 22 percent identifying as either a freshman or graduate student and 45 percent identifying as other undergraduates. Almost a third of respondents were faculty, staff, and administrators.

Table 2-1. Respondents affiliation with San Francisco State University

Affiliation	Number of Respondents	Percentage (n=2,875)
Freshman	313	11%
Other Undergraduate	1,300	45%
Graduate Student	321	11%
Faculty	332	12%
Staff or Administrator	564	20%
Other	45	1%

Based on the number of surveys that were collected from the campus's sub-groups, a weight was created to ensure that the relative shares of students and faculty/staff in the sample reflected the relative shares of those two broad segments of the campus population as a whole. Table 2-2 shows how this weight affected the survey sample. As in past years, the survey oversampled faculty and staff and under-sampled students. As such, each student response was given a weight slightly greater than one, while faculty/staff responses were given a slightly lower weight. This is consistent with the approach used in all previous years of the survey.

Table 2-2. Adjusted Faculty/Staff and Student Responses

Affiliation	Total Population	Responses	Adjusted Weight	Weighted Response
Students	25,046 (88%)	1,934 (68%)	1.29	2,500 (88%)
Faculty/Staff	3,303 (12%)	896 (32%)	0.37	330 (12%)
Total	28,349	2,830		2,830

2.4 Mode Split

Table 2-3 and Figure 2-3 show the reported mode respondents used to commute to campus compared to the 2018 survey. Drive alone was the most common at 43 percent, followed by Muni at 25 percent. The 2023 survey shows a great increase in drive alone rate to overtake Muni as the main mode of transportation to campus. Carpool and Other Buses (including SamTrans, AC Transit, and Golden Gate Transit) increased in usage.

Table 2-3. 2018 and 2023 Comparison Mode of Transportation to Campus

Mode	2023	2018	% Change
Drove Alone	43%	23%	20%
Muni	25%	31%	-6%
Walk	15%	14%	1%
Carpooled	8.4%	2.2%	6.2%
Other Bus	10%	2.2%	7.8%
Bike	3.2%	1.4%	1.8%
Taxi	2.2%	5.3%	-3.1%
Motorcycle	0.9%	0.4%	0.5%
BART	20%	17%	3%

Modes of Transportation 2018 vs 2023 Comparison

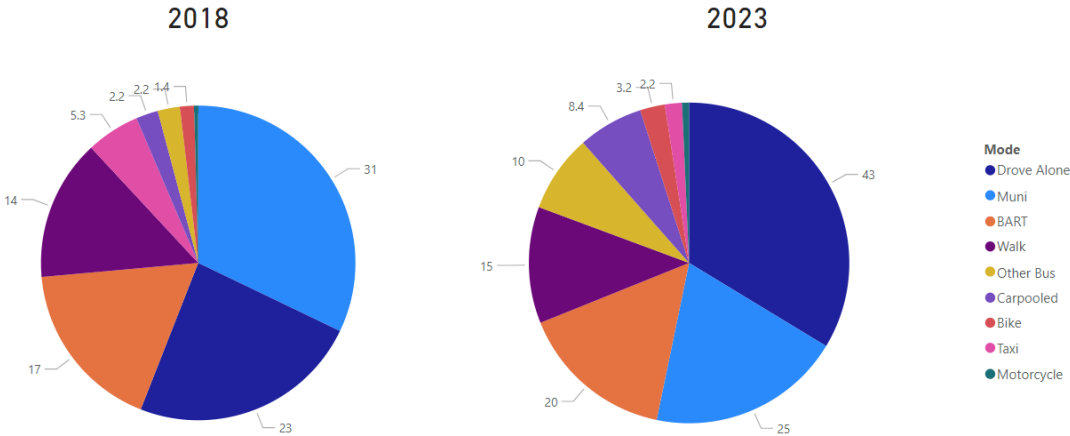


Figure 2-3. 2018 and 2023 Comparison Mode of Transportation to Campus

Table 2-4 and Figure 2-4 show the student, faculty/staff, and total percentage of respondents mode of transportation to campus. Both students and faculty/staff main mode of transportation is drive alone, at 41 percent and 63 percent respectively. Muni is the second most used mode for students and faculty/staff, at 27 percent and 13 percent respectively.

Table 2-4. Student and Faculty/Staff Mode of Transportation to Campus

Mode	Student	Faculty/Staff	Total
Drove Alone	41%	63%	43%
Muni	27%	13%	24%
AC Transit	4.2%	3.0%	4.0%
Carpooled	8.5%	8.4%	8.4%
SamTrans	5.8%	0.5%	5.1%
Taxi	2.3%	1.4%	2.2%
Motorcycle	0.9%	1.1%	0.9%
Caltrain	3.3%	0.3%	2.9%
GG Transit	0.9%	0.4%	0.9%
Ferry	0.6%	1.3%	0.7%
BART	22%	11%	20%
Walk	16%	6.8%	15%
Bike	1.9%	6.6%	2.4%
E-bike	0.8%	1.0%	0.8%

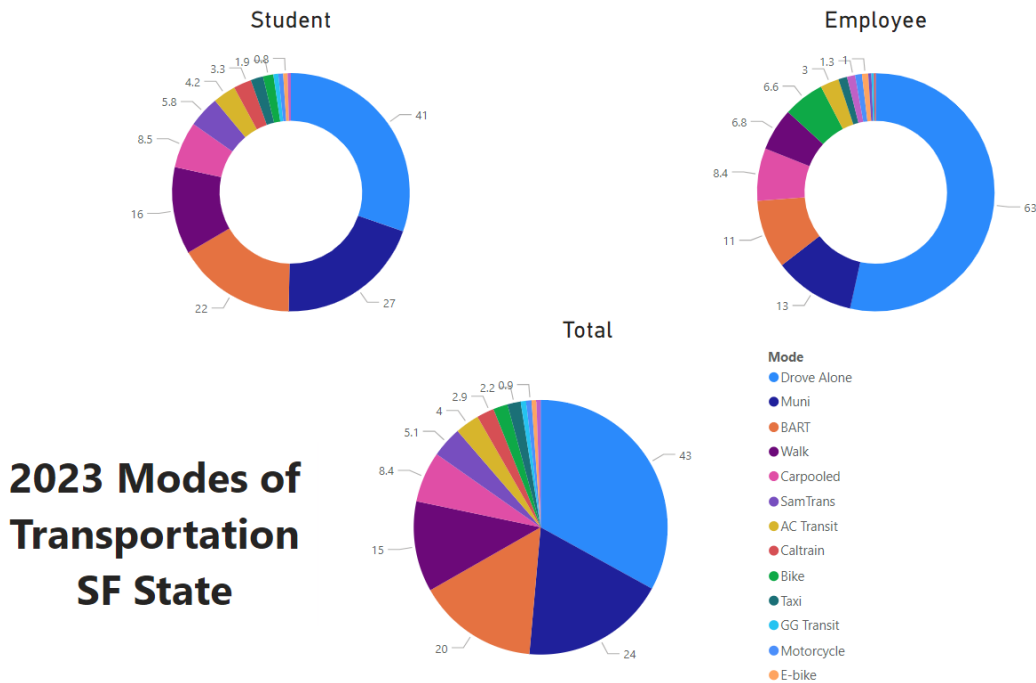


Figure 2-4. Student and Faculty/Staff Mode of Transportation to Campus

2.5 Electric vehicles

Out of the 1,752 respondents who answered to “If you drove to campus or carpoled, what type of vehicle was used,” 8 drove a diesel car, 91 drove an electric vehicle, 229 drove a hybrid vehicle, 1,387 drove a gasoline vehicle, and 36 selected “other.”

Type of Vehicle	# of Respondents	Percentage
Gasoline	1,387	79%
Hybrid	229	13%
Electric	91	5%
Other	36	2%
Diesel	8	0.4%
Total	1,752	

Out of 2,785 respondents who answered to “Do you currently own an electric vehicle,” 126 responded yes.

Out of 217 respondents who answered to “Do you use electric or plug-in hybrid vehicles to commute to campus,” 122 responded yes, 16 responded sometimes, and 79 responded no.

Out of 133 respondents who answered to “If you use your electric or plug-in hybrid vehicle to drive to campus, where do you currently park,” 73 responded “parking lot/garage,” 27 responded “on the street,” 25 responded “EV charging station,” and 8 responded “other.”

Out of 130 respondents who answered to “If you use your electric or plug-in hybrid vehicle to drive to work, would you be interested in having more charging stations available on campus,” 116 responded “Yes”.

Out of 2,756 respondents who answered to “If you currently do not own an electric vehicle, do you plan to purchase one in the next,” 209 responded “1-2 years,” 815 responded “3-5 years,” and 1,732 responded “Not Applicable.”

2.6 Parking

Out of 133 respondents who answered to “When you drive to campus, do you typically park on the street or in the campus parking lot / garage,” 71 responded “Parking lot / garage,” 51 responded “On the street,” and 11 responded “Other.”

Out of 209 respondents who answered to “If you park on campus, how do you purchase your parking permit,” 59 responded “Purchase a Semester/Yearly Parking Permit,” 58 responded “Daily Parking Permit Machines,” 64 responded “Payroll Deduction,” and 28 responded “Daily Parking Permit App.”

2.7 Shuttle

Out of 2,858 respondents who answered to “Do you use the free shuttle service from Daly City BART station to campus,” 821 responded “Yes.”

2.8 Gator Pass

Out of 2,788 respondents who answered to “Do you use the Gator Pass to commute to campus,” 1,116 responded “Yes,” 1,147 responded “No,” and 525 responded “Not Applicable.” Of the “No” responses, 539 were staff or faculty which do not have Gator Pass and should have responded “Not Applicable.” Once this is calculated for, 1,116 responded “Yes” and 608 responded “No” out of 1,724 applicable responses. Overall, 65% of applicable respondents use Gator Pass.

Out of 1,116 respondents who answered to “Has the Gator Pass changed the way you travel to/from campus,” 923 responded “Yes” and 193 responded “No.”

Out of 1,100 respondents who answered to “Please rate the extent to which the Gator Pass has improved your commute,” 13 responded “Not at All (1),” 32 responded “Not Really (2),” 46 responded “Undecided (3),” 244 responded “Somewhat (4),” and 764 responded “Very Much (5).”

3. Greenhouse Gas Emissions

San Francisco State University has been committed to pursuing greenhouse gas (GHG) emissions reductions since 2007, and this commitment was reinforced in 2019 when President Lynn Mahoney signed the Presidents' Climate Leadership Commitments which aims to reduce greenhouse gas emissions 40% below 1990 levels by 2030. This chapter provides the latest in this series of analyses of GHG emissions resulting from commute trips to and from campus. GHG emissions were measured in carbon dioxide equivalents (CO₂e), which is a total of all GHGs converted into CO₂ at a rate based on the gas' impact on ozone depletion.

3.1 Methodology

The online survey was designed in part to enable the University to calculate GHG emissions related to transportation. For each leg of their commute journeys, respondents were asked to provide the mode they used and their zip code. The average distance traveled by students and faculty/staff on each mode in each direction (to and from campus) was calculated. Each resulting value was multiplied by the proportion of students and faculty/staff and adjusted to represent the total population. This estimate was used as a one week estimate of total miles traveled and greenhouse emissions produced to and from campus. This was then multiplied by weeks in the academic year (30 weeks) to achieve a year GHG emissions estimate for each mode of transportation. This length is based on the number of school days plus finals week in each semester. It does not include vacation weeks, holidays, weekends, winter session, or summer session.

Carbon intensities (pounds of emissions per vehicle mile traveled measured in metric tons of CO₂e) were then calculated for each mode (assumptions are listed in the following section). The product of distance traveled on each mode and the mode's carbon intensity provide the total emissions attributable to the SF State commute for that mode on a given day.

Miles x CO₂e/mile = CO₂e (for each mode)

The following assumptions were used in creating the emissions inventory for SF State:

- Zero emissions were produced for the modes Walked, Bicycled, and E-scooter/E-bike.
- Drove Alone:
 - Standard fuel economy: 0.743 pounds per passenger mile for gasoline and diesel¹.
 - Zero emissions were given for electric cars.
 - Hybrid vehicles were assigned the same standard fuel economy as gasoline vehicles since we do not know how many gasoline vs electric miles they used.
- Carpooled
 - Since we do not know how many people were in each carpool, it was assumed two people were in the car. The calculated emissions were the standard fuel economy used for Drove Alone divided in half.
 - Standard fuel economy: 0.3715 pounds per passenger mile.
 - Zero emissions were given for electric cars.
- Muni
 - Standard fuel economy: 0.30 pounds of CO₂e per passenger mile².

- Muni was unable to provide an accurate estimate of standard fuel economy for its multiple modes of transportation, so the previous standard fuel economy from the 2018 TDM survey was used. Muni is likely more efficient than it was in 2018 and so the emissions for this mode could have calculated as greater than they were.
- Since Muni only runs in SF, it is unlikely that a participant rode Muni for more than 15 miles (if they lived/got on at the opposite side of the city and the bus routes was not direct). Those who traveled from counties outside of SF were calculated as riding 15 miles on Muni since they most likely took other forms of transportation and input those into the survey. Even with this correction, participants may have had multiple modes of transportation counted twice (e.g. they took Muni and AC Transit for both 15 miles when they rode much less).
- SamTrans
 - Standard fuel economy: 0.39 pounds of CO₂ per passenger mile¹. SamTrans was unable to provide an accurate estimate of standard fuel economy for its buses so a generic bus standard fuel economy was used.
- BART + Shuttle | BART + Muni
 - BART standard fuel economy: 0.027 pounds of CO₂ per passenger mile³.
 - Shuttle/Muni standard fuel economy: 0.39 pounds of CO₂ per passenger-mile¹.
 - It takes 1.5 miles to get from Daly City BART to SF State. Zip code distance was multiplied by 0.027 pounds of CO₂ per passenger mile. Then 1.17 pounds of CO₂e was added for round trip on Shuttle/Muni ride.
- Caltrain
 - Standard fuel economy: 0.07 pounds of CO₂-e per passenger mile².
 - Caltrain was unable to provide an accurate estimate of standard fuel economy for its trips, so the previous standard fuel economy from the 2018 TDM survey was used. Caltrain is not likely to be more efficient than it was in 2018.
- Motorcycle/Moped
 - Assumed standard fuel economy was the same as gasoline cars: 0.47 pounds per passenger mile¹.
- Taxi/Rideshare
 - Assumed standard fuel economy was the same as gasoline cars: 0.47 pounds per passenger mile¹.
- AC Transit
 - Standard fuel economy: 0.39 pounds of CO₂ per passenger mile¹.
 - Emissions were calculated as if passenger had taken this transit the whole way from their provided zip code until the closest this transit gets to SF State. If a respondent lives 30 miles away, then it was calculated that they traveled 30 miles minus 7 miles on this transit (assuming they got off AC Transit in Mison District). Most participants added additional forms of transport (e.g. Golden Gate Transit and Muni) and the last six miles of their journey was calculated as the additional form of transportation.
- Golden Gate Transit
 - Standard fuel economy: 0.39 pounds of CO₂ per passenger mile¹.

- Emissions were calculated as if passenger had taken this transit the whole way from their provided zip code until the closest this transit gets to SF State. If a respondent lives 30 miles away, then it was calculated that they traveled 30 miles minus 6 miles on this transit (assuming they got off Golden Gate Transit at Civic Center). Most participants added additional forms of transport (e.g. AC Transit and Muni), and the last six miles of their journey was calculated as the additional form of transportation.
- Other - Ferry
 - Standard fuel economy: 0.07 pounds of CO₂ per passenger mile⁴.
 - Distance was adjusted to be 10 miles less than distance from provided zip code to account for (most likely Muni) transport from port to campus. The distance they traveled to get to the ferry is unknown and so is included in the ferry distance.
- Any mode designated as “Other” that was not a ferry was not counted.

3.2 Results

On a typical week in 2023, University affiliates traveled approximately 640,000 miles commuting to and from SF State. Due to the decline in population and the introduction of hybrid classes and work schedules, this number is greatly reduced from the 2018 TDM survey. The percentage of passenger miles in single-occupancy vehicles has increased greatly while Muni percentage of passenger miles has dropped significantly since 2018. Calculated emissions for the 2023 academic year were 17,544 metric tons of CO₂e with 19,169,630 miles traveled to and from campus (see Table 3-1). Drove Alone accounted for 43% of miles traveled but 76% of emissions produced. Drove Alone produced 319 times more emissions than the next most traveled transit, BART. BART accounted for 24% of miles traveled but only 0.2% of emissions. The next most traveled transit was Muni, which accounted for 6% of miles traveled and % of emissions (see Figure 3-1).

Table 3-1. Emissions and miles traveled for 2023 academic year for total SF State population

Transportation Mode	CO ₂ e Emissions (Metric Ton)	Miles Traveled
Drove Alone	13,398	8,288,839
Muni	1,113	1,359,814
Carpooled	991	1,276,497
AC Transit	674	834,031
SamTrans	435	392,703
Taxi	212	221,233
Motorcycle	83	81,043
Caltrain	74	449,859
GG Transit	61	63,413
Ferry	42	231,470
BART	42	4,609,492
Bike & E-Bike	0	393,556
Walk	0	967,680
Total	17,544	19,169,630

CO2e Emissions by Transportation Mode

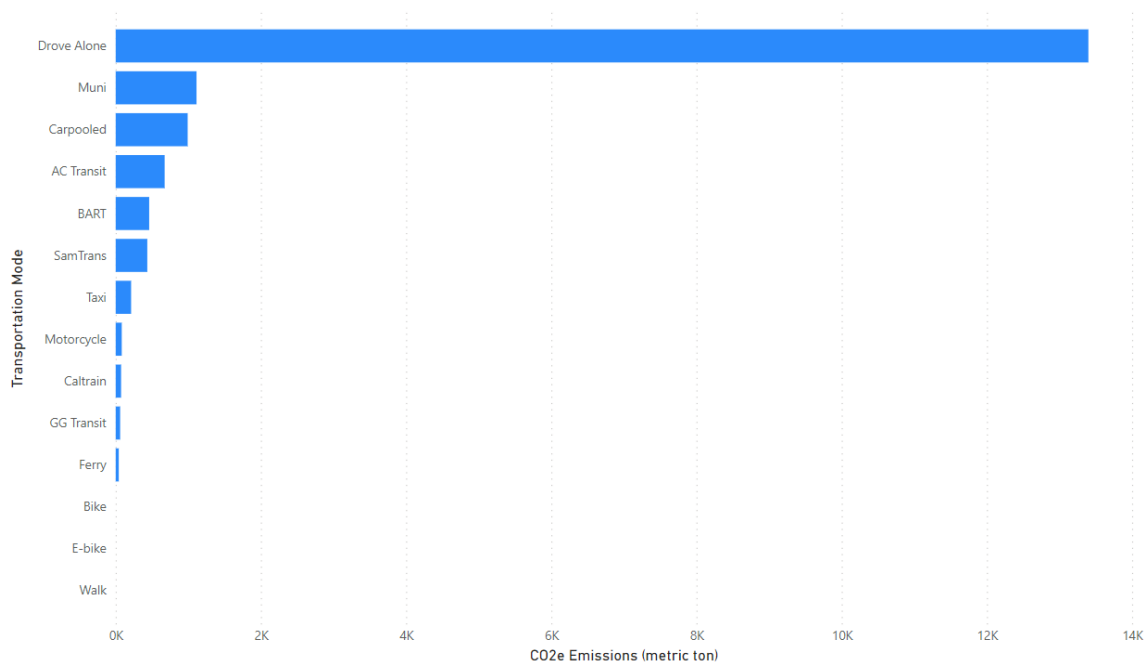


Figure 3-1. Emissions for 2023 academic year for total SF State population

The 2023 GHG inventory clearly shows the University's reliance on single-occupancy vehicles (Drove Alone) and how they make up the majority of both miles traveled and emissions produced. While Muni has seen a decrease in usage, BART is still well traveled and greatly contributes to lowering the University's emissions due to its low emissions.

Citations

1. EPA Automotive Trends Report 2023. December 2023. United States Environmental Protection Agency. <https://www.epa.gov/automotive-trends/download-automotive-trends-report>.
2. 2018 Transportation Survey Results. July 2018. San Francisco State University. https://sustain.sfsu.edu/sites/default/files/documents/2018_TransportationMonitoring_Final_with_appendix_0.pdf.
3. Final Report Earth Day 2022: This is how much carbon you save by taking BART versus driving. April 22, 2022. Bay Area Rapid Transit. <https://www.bart.gov/news/articles/2022/news20220422>.
4. Greenhouse gas reporting: conversion factors 2019. June 4, 2019. Government of the United Kingdom. <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2019>.

Appendix A

Qualtrics Survey Questions May 2023



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