SamTrans 2023 Sustainability Report

FY2021 and FY2022 Reporting Period

samTrans

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Acronym List

ACS	American Community Survey
APTA	American Public Transportation Association
BART	Bay Area Rapid Transit
BEB	battery electric bus
CAP	criteria air pollutants
CARB	California Air Resources Board
CBO	Community-based organizations
C/CAG	City/County Association of Governments of San Mateo County
CEQA	California Environmental Quality Act
CH_4	methane
CNG	compressed natural gas
CO_2	carbon dioxide
COVID-19	SARS-CoV-2, commonly referred to as COVID-19 or Coronavirus
District	San Mateo County Transit District
eGRID	emissions and grid resource integrated database
EMFAC	CARB emission factor GHG emission tool
FCEB	fuel cell electric bus
FY	fiscal year
GGE	gallons of gasoline equivalent
GHG	greenhouse gas
GREET	Argonne National Laboratory greenhouse gases, regulated emissions, and energy use in technologies model
HVAC	heating, ventilation, and air conditioning
ICT	Innovative Clean Transit
JPB	Peninsula Joint Powers Board, which operates Caltrain
kBTU	thousand British thermal units
kWh	kilowatt-hours
LCFS	Low Carbon Fuel Standard
MTC	Metropolitan Transportation Commission
$MTCO_2e$	metric tons of carbon dioxide equivalent
NEPA	National Environmental Protection Act
N_2O	nitrous oxide
NTD	National Transit Database
PCE	Peninsula Clean Energy
PG&E	Pacific Gas and Electric
PMT	passenger miles traveled
p.p.	percentage points
SLR	sea level rise
SMCEL JPA	San Mateo County Express Lanes Joint Powers Authority
TA	San Mateo County Transportation Authority
TCR	The Climate Registry
UPT	unlinked passenger trips, also called “boardings”
VM	vehicle miles
VTA	Santa Clara Valley Transportation Authority
ZEB	zero-emission bus

Message from General Manager and CEO

SamTrans is at the forefront of a zero-emission transformation. The transit district is launching a new generation of electric buses, both battery-electric and hydrogen fuel-cell, that will replace the district's diesel-powered fleet.

The first new electric buses went into revenue service on August 7, 2023, marking the start of a major shift towards a greener future. Since then, eight additional electric buses have been added into revenue service with eight more entering service by end of 2023.

The California Air Resources Board set a statewide goal for public transit agencies to achieve a 100% zero-emission bus fleets by 2040. SamTrans expects to beat this requirement by six years, retiring and replacing all our diesel buses with zero emission models by 2034.

SamTrans is proud to provide sustainable, equitable transit services that San Mateo County residents and visitors depend on. In addition to greening our fleet, we are expanding our service to best serve our diverse passengers. The Youth Unlimited Pass provides free bus fare to qualifying students, and the Clipper START pass offers reduced fares for low-income residents. Our new Ride Plus microtransit service expands mobility options in East Palo Alto, the Belle Haven neighborhood of Menlo Park, and Half Moon Bay. SamTrans is also implementing *ReImagine SamTrans*, which better tailors SamTrans' service to passengers' needs based on community feedback and data on changing travel patterns. Each of these initiatives translates into more passengers, less single occupancy vehicle usage, and reduced regional greenhouse gas emissions.

Providing excellent service to SamTrans' passengers is an integral part of creating a cleaner, greener future for all of us in San Mateo County and the region. I am pleased to share this sustainability report, which summarizes our performance between July 2020 and June 2022, discusses environmental accomplishments, and gives a preview of our sustainable journey ahead.

Sincerely,

April Chan
General Manager / CEO

INTRODUCTION

About the San Mateo County Transit District

The San Mateo County Transit District ("District") provides public transportation services within and outside of San Mateo County ("County"), California, a 455 square-mile area with a population of approximately 729,181 as of 2021. The District leads the planning, development, and management of a multi-modal public transportation system that includes buses, trains, shuttles, and paratransit services. The District is the managing agency operating three business units:

SamTrans

SamTrans provides fixed-route bus service including local and express service, paratransit, and shuttle services in San Mateo County. As of May 2023, SamTrans operates 302 fixed-route revenue buses (30,000 riders/day) and 70 paratransit vehicles and administers a shuttle program to and from Caltrain and Bay Area Rapid Transit (BART) stations.

Caltrain

Caltrain provides commuter rail service to 31 stations in three counties from San Francisco to Gilroy. Caltrain operates 104 trains per weekday (~17,200 riders/day) including express, limited, and local trains. Caltrain is owned and operated by the Peninsula Corridor Joint Powers Board (JPB), which is comprised of three member agencies: The District, the City and County of San Francisco, and the Santa Clara Valley Transportation Authority (VTA).

San Mateo County Transportation Authority

The San Mateo County Transportation Authority (TA) administers the countywide sales tax dedicated to transportation-related projects and programs in the County. In 2004, San Mateo County passed Measure A, a half-cent sales tax to support transportation and infrastructure investment. In 2018, voters passed another half-cent sales tax (Measure W). The TA administers 50% of Measure W funds and SamTrans administers the other 50%. The TA also formed the San Mateo County Express Lanes Joint Powers Authority with the City/County Association of Governments of San Mateo County (C/CAG) to manage express lanes.

About this Report

The District's sustainability program supports SamTrans' ambitious efforts to reduce the environmental impact of its operations. The sustainability program leads the development of policies that decrease waste, minimize carbon emissions, conserve water, and advance sustainable practices throughout the organization.

Sustainability is a key component of the District's vision to become a mobility leader that contributes to a climate-safe future.

Approximately 40% of California's greenhouse gas (GHG) emissions stem from surface transportation (all modes). Whether Californians choose to drive or take public transit is one of the most significant climate choices they make every day. The sustainability program supports the District's goal of helping residents reduce their carbon footprint, improve air quality, and eliminate regional traffic by reducing reliance on cars for transportation.

The District is a founding signatory of the American Public Transportation Association's (APTA's) Sustainability Commitment. This commitment provides a framework for transit agencies to achieve sustainability objectives and includes a set of key performance metrics for tracking sustainability performance. In 2011, the District received the bronze APTA Sustainability Commitment Recognition for SamTrans operations, and in April 2018, APTA recognized SamTrans with silver-level status for the agency's continued achievements in sustainability.

This is SamTrans' fourth sustainability report. This report shares SamTrans' FY2021 and FY2022 sustainability performance, including key metrics and information about sustainability achievements.

The report scope only encompasses facilities, fixed-route bus, paratransit, and shuttle services under the operational control of SamTrans. The report includes information on non-revenue vehicles, employee commuting, and centralized facility functions across all District units due to shared facilities and services. The District has prepared a separate sustainability inventory and report for Caltrain operations that does not include non-revenue vehicles nor employee commuting to avoid double-counting.

The GHG emissions discussed in the report include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). They are presented in this report as metric tons of carbon dioxide equivalent ($MTCO_2e$). Other GHGs, such as sulfur hexafluoride and refrigerants, are excluded from this inventory.

GHG emissions are divided into three different categories called "scopes." Scope 1 includes all emissions directly emitted by sources owned or controlled by SamTrans (e.g., revenue and non-revenue vehicle diesel, gasoline, and CNG fuel use and facility natural gas use); Scope 2 includes all indirect emissions from purchased electricity, heat, or steam; and Scope 3 includes all other indirect emissions (e.g., GHG emissions from water, waste, employee commuting, and displaced passenger trips).

Consistent with The Climate Registry (TCR) and APTA, SamTrans reports all Scope 1 and 2 GHG emissions. SamTrans also reports Scope 3 GHG emissions associated with waste generation and diversion, water usage, employee commuting, and avoided/displaced customer trips.

This report addresses the following sustainability indicators:

- GHG emissions
- GHG displacement
- Employee commuting emissions
- Criteria air pollutant emissions
- Energy use from revenue and non-revenue vehicles
- Energy use from facilities
- Water use
- Waste generation and diversion
- Vehicle miles
- Unlinked passenger trips (boardings)
- Displaced or avoided customer trips

Sustainability indicators are normalized by SamTrans' annual vehicle miles (VM), which includes miles traveled by fixed-route bus, paratransit, and shuttle services. VM measures miles traveled from the time a vehicle pulls out from its garage to go into revenue service to the time it pulls in from revenue service, including "deadhead" miles without passengers to the starting points of routes or returning to the garage, or for deadhead moves to layover locations. Normalizing by VM enables SamTrans to evaluate improvements in vehicle and facility efficiency.

Sustainability Performance Summary[1]

The following table provides information on SamTrans' sustainability performance since the publication of the previous sustainability report, which covered through FY2020.

Indicator	Unit	FY2020	FY2021	FY2022	FY2021–FY2022 Percent Change
Greenhouse Gas Emissions					
Generated[i]	$MTCO_2e$	25,704	21,822	24,207	11%
Displaced/Avoided[ii]	$MTCO_2e$	-4,964	-2,439	-3,502	44%
Net Total[2]	$MTCO_2e$	20,740	19,383	20,704	7%
Criteria Air Pollutant Emissions					
Generated[iii]	tons	196	162	60	-63%
Displaced/Avoided[iv]	tons	-21	-10	-17	73%
Net Total[3]	tons	175	152	43	-72%
Facility Energy Use[v]					
Electricity	kWh	4,099,502	3,942,060	3,708,685	-6%
Natural Gas	therms	66,450	74,782	64,763	-13%
Total Facility Energy Use	kBTU	20,631,392	20,925,263	19,120,966	-9%
Vehicle Fleet Energy Use (Revenue and Non-Revenue)[vi]					
Diesel	gallons	2,163,604	1,735,394	1,925,545	11%
Gasoline	gallons	118,603	179,104	204,151	14%
CNG	GGE	0	0	0	No Activity in 2021
Biodiesel	gallons	6,442	0	0	No Activity in 2021
Electricity	kWh	30	591	2,446	314%
Non-Revenue Fleet Energy Use	kBTU	4,160,125	3,418,850	2,799,470	-18%
Total Vehicle Energy Use	kBTU	314,434,076	262,039,665	291,435,815	11%
Water[vii]					
Consumed	gallons	7,012,986	9,336,436	10,498,909	12%
Waste and Recycling[viii]					
Generated	tons	1,206	1,232	1,206	-2%
Diverted (by weight)	Percentage or Percentage Points	53%	52%	53%	1%
Employee Commute[ix]					
(Commute) Vehicle Miles Traveled	miles	3,577,760	3,292,143	3,846,027	17%

[1]Totals may not add due to rounding. A small number of past performance figures published in our 2021 report have been restated due to changes in emissions factors or more accurate information received after the publication of our 2021 report.

[2]Net GHG emissions equal SamTrans' generated emissions minus emissions displaced by SamTrans.

[3]Net CAP emissions equal SamTrans' generated CAPs minus CAPs displaced by SamTrans.

Green text represents a positive environmental impact; red text represents a negative environmental impact

The COVID-19 pandemic severely impacted SamTrans' operations. This led to a significant drop in ridership and accompanying service which resulted in reduced fuel usage but also decreased displaced emissions.

SAMTRANS RIDERSHIP AND OPERATIONS

Ridership and Operations

SamTrans' ridership was profoundly reduced by COVID-19. To keep riders, staff, and operators safe during the pandemic, SamTrans temporarily reduced and suspended service, such as its 2020 school service and summer youth pass. SamTrans also implemented social distancing on its revenue fleet, resulting in fewer passengers per vehicle.

In response to COVID-19-associated risk reductions, SamTrans gradually restored service, first in August 2020 and again in January 2021. However, boardings decreased by approximately 19% between FY2019 and FY2020 and by 49% between FY2020 and FY2021 (**Figure 1**). Passenger miles traveled (PMT) decreased by approximately 24% and 50% during these same timeframes, respectively (**Figure 2**). This loss of ridership was not only detrimental to SamTrans, but also harmed the entire Bay Area's air quality, which relies on public transit to reduce congestion, air pollutants, and GHG emissions.

Even with ridership impacts from COVID-19 in FY2020, SamTrans' ridership was more stable and resilient than other commute-focused transit providers, indicating just how many riders depend on SamTrans service for primary transportation. The pandemic showed that SamTrans' service is critical for essential workers and people without access to a vehicle.

Following the pandemic, ridership has started to recover, increasing by 21% from FY2021 to FY2022 (**Figure 1**). This trend is expected to continue in the coming years as a new normal is established.

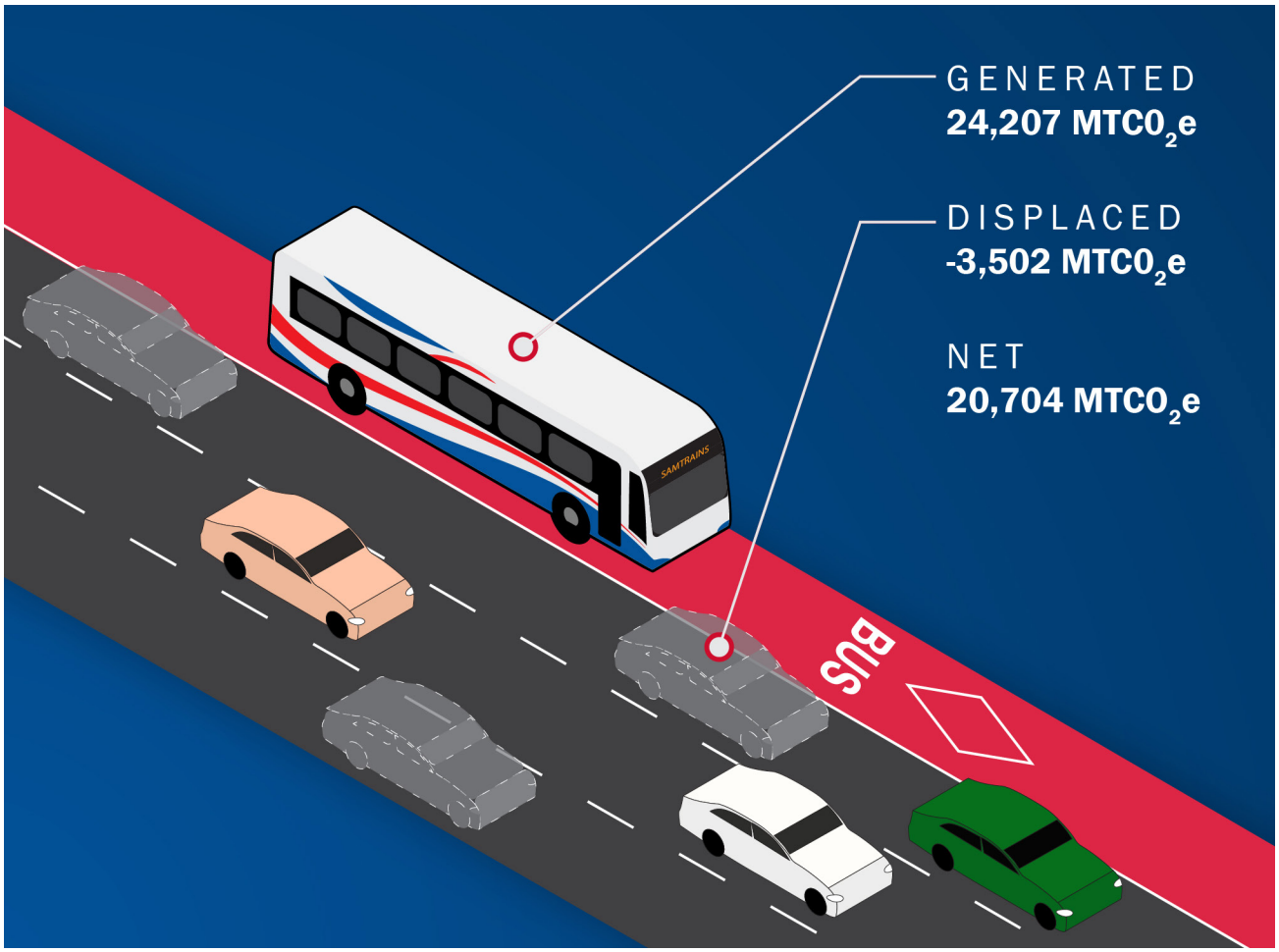


Figure 1: Total Annual Unlinked Passenger Trips (UPT)[4]

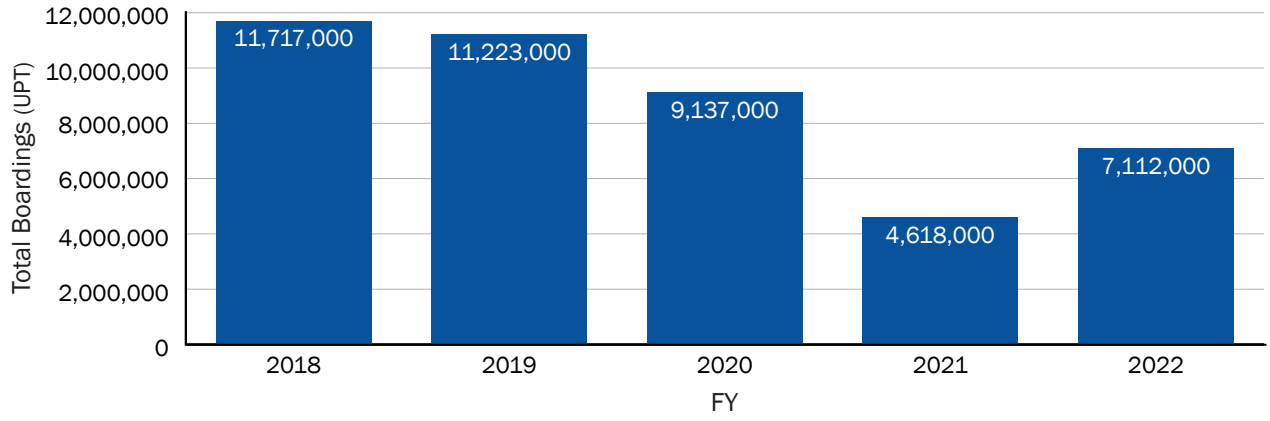


Figure 2: Total Annual Passenger Miles Traveled (PMT)[5]

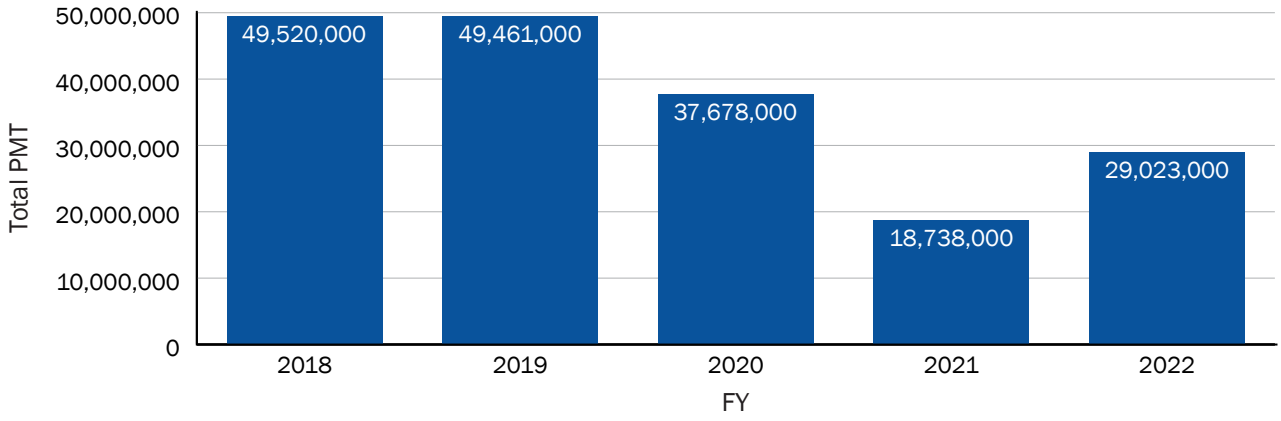
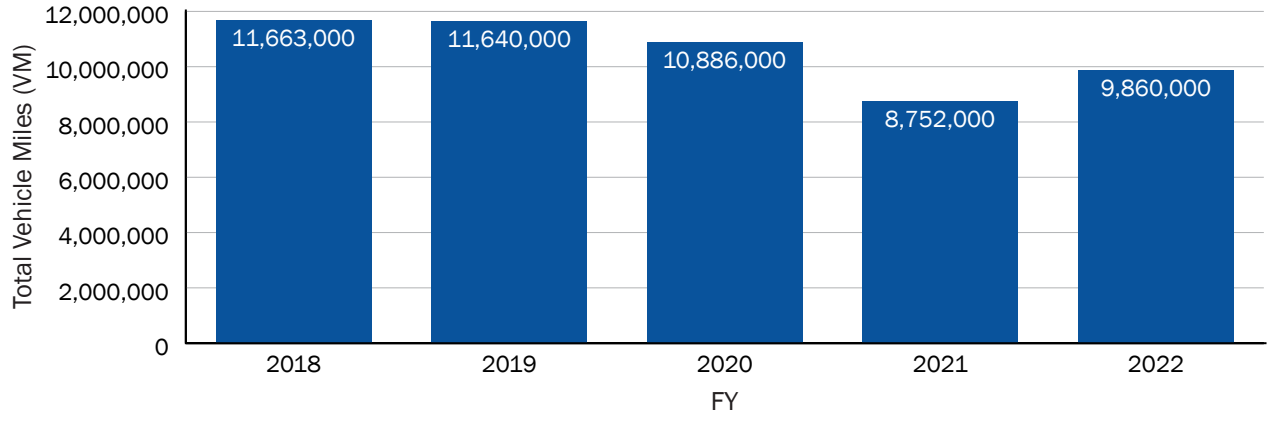


Figure 3: Total Annual SamTrans Vehicle Miles (VM)[6]



[4]Federal Transit Administration, National Transit Database, FY 2018 to FY 2022 Reporting – San Mateo County Transit District. (Activity from the DT/PT mode and Transportation Authority Shuttle operations are excluded from this inventory).

[5]Federal Transit Administration, National Transit Database, FY 2018 to FY 2022 Reporting – San Mateo County Transit District. (Activity from the DT/PT mode and Transportation Authority Shuttle operations are excluded from this inventory).

[6]Federal Transit Administration, National Transit Database, FY 2018 to FY 2022 Reporting – San Mateo County Transit District. (Activity from the DT/PT mode and Transportation Authority Shuttle operations are excluded from this inventory).

DIVERSITY AND EQUITY

Diversity and Equity

Environmental Justice refers to the need to reduce disparities in environmental protections which have historically led to underserved communities disproportionately suffering environmental harm. With this in mind, SamTrans seeks to ensure that the environmental benefits of its service are shared equally throughout the communities it serves. SamTrans' work to advance equity accomplishes this by increasing inclusion in transportation planning processes, delivering environmental benefits to underserved communities, and encouraging ridership that helps reduce GHG emissions. A few examples are summarized below.

Translation and Interpretation Services

The District follows a comprehensive Language Assistance Plan, created as part of the Caltrain and SamTrans Title VI Programs. One critical concern addressed by Title VI is the language barrier that Limited English Proficiency (LEP) persons face in accessing information about using transit services. Given the diversity of San Mateo County's population, it is critical to provide language assistance. The Language Assistance Plan provides this service for LEP persons and operates alongside the public participation process to ensure that members of limited English-speaking populations are reached.

Assessment of Equity-Related Social Sustainability Metrics

In 2022, SamTrans launched a review of equity-related social sustainability metrics to determine potential metrics that could be integrated into future sustainability reporting. Doing so can help SamTrans measure impacts to the public from transportation, transportation access, opportunity, and diverse representation in transit riders. Review of potential metrics was conducted through the lens of the *Caltrain Framework for Equity, Connectivity, Recovery, & Growth*. As SamTrans continues to embed equity throughout the organization, including equity metrics within the sustainability reporting process, it can support the agency's overall equity goals while more holistically addressing environmental justice as part of its sustainability efforts.

Transit Oriented Development

In 2022, SamTrans won an Affordable Housing & Sustainable Communities grant in partnership with the City of East Palo Alto and Caltrain. The project provides funding for 135 new affordable homes and $7.8 million in transportation investments to the City of East Palo Alto, supporting the expansion of zero-emission SamTrans service in East Palo Alto.

Youth Unlimited Program Made Permanent

The SamTrans Youth Unlimited program aims to reduce transportation costs for low-income families, attract new and more frequent riders, and understand the potential operational impacts of providing free fares to some or all youth riders. In this program, SamTrans provides free bus fares in the form of a Youth Unlimited Pass for Socioeconomically Disadvantaged (SED) students, as defined by the California Department of Education. SED students include students that are eligible for the Free and Reduced-Price Meal program, students experiencing homelessness, foster-youth, migrant students, and students whose parents did not graduate high school. The Board of Directors approved the program to become permanent in 2022, offered in partnership with the San Mateo County Office of Education.

Clipper START

SamTrans also offers 50% off one-way fares for low-income residents through the Clipper START program.[x] This is a pilot program managed by Clipper, the Bay Area transit fare card operated by the Metropolitan Transportation Commission. Clipper START provides single-ride transit fare discounts for eligible low-income individuals across the Bay Area. Interested applicants must provide age, residency, and income information and then discounts are applied whenever eligible participants use their personalized Clipper card, making cost savings easy to access.

Reimagine SamTrans Adopted

As part of the agency's comprehensive operational analysis of 2019-2022, *Reimagine SamTrans*, the SamTrans Board adopted a new Service Policy Framework in March 2022 that identified equity as one of its four guiding principles. The new framework used an analysis of Equity Priority Areas, areas with significant transportation and access disparities in San Mateo County, to understand and prioritize future route service in neighborhoods with the highest transportation needs. By including social equity as a guiding principle in service planning, SamTrans can balance its service priorities along with other traditional principles of customer experience, route effectiveness, and operator workforce. The Service Policy Framework provides SamTrans staff, leaders, stakeholders, and the public a clear vision for how SamTrans designs and evaluates its services.

Collaboration with Artists on Anti-Racism Artwork

On April 7, 2021, the SamTrans Board of Directors passed a resolution on SamTrans' commitment to Diversity, Equity, and Inclusion (DEI) (Resolution No. 2021-11). "SamTrans serves a diverse population that continues to experience bias, discrimination, and unequal outcomes and treatment," said then-SamTrans Board Chair Charles Stone. "SamTrans, as an agency, believes in tolerance and inclusivity. We condemn the increasing number of hate crimes against Asian Americans and Pacific Islanders (AAPI) including harassment, bullying, and violent acts. We believe every person should be valued and respected, and we support and stand with the AAPI communities in San Mateo County and across the nation."

Following the motion in June 2021, in a continued effort to show its commitment to DEI, SamTrans partnered with the Millbrae Anti-Racist Coalition and three Asian American artists to launch a series of artwork in support of the AAPI community. The artwork, which depicts diverse images of people spreading the message to "Love Our Communities," was showcased throughout San Mateo County in the summer of 2021.

SAMTRANS SUSTAINABILITY PERFORMANCE

Highlights

-72%

Net criteria air pollutant emissions decreased by 72% between FY2021 and FY2022

-6%

Facility electricity use decreased by 6% between FY2021 and FY2022

-18%

Non-revenue fleet total energy use decreased by 18% between FY2021 and FY2022

Environmental Management System (EMS) Benchmarking Study

Through the reporting period, SamTrans conducted an ISO 14001:2015 Environmental Management System (EMS) gap analysis and benchmarking study. The ISO 14001 standard serves as a framework to assist organizations in developing their own effective EMS and can also assist companies in meeting their environmental and financial goals. This internationally accepted standard accounts for legal requirements as well as other requirements to which the organization subscribes, such as the American Public Transportation Association (APTA). An ISO 14001 EMS uses the organization's existing environmental programs and procedures, business management, and accounting practices as a foundation for building an ISO 14001 program. Implementing an EMS at SamTrans could improve environmental compliance, lessen regulatory fines, enhance public image, increase employee sustainability satisfaction, and streamline environmental programs. SamTrans is moving forward with implementing an EMS at the agency. Doing so will allow the agency to develop and codify a clear, comprehensive environmental policy objective, define employees' roles for managing environmental programs, consolidate the environmental compliance program, and develop a centralized document management system.

Air Quality

GHG Emissions

SamTrans generates GHG emissions directly through the operation of its revenue fleet (i.e., fixed-route bus, paratransit, and shuttle services) which is currently powered by diesel fuel, gasoline, and a small percentage of other fuels (e.g., biodiesel, electric). A small amount of GHG emissions are generated from SamTrans' service vehicles (non-revenue fleet) as well as through natural gas used for facility heating. SamTrans purchases 100% GHG-free and renewable electricity through Peninsula Clean Energy (PCE) and therefore does not generate any emissions associated with electricity.

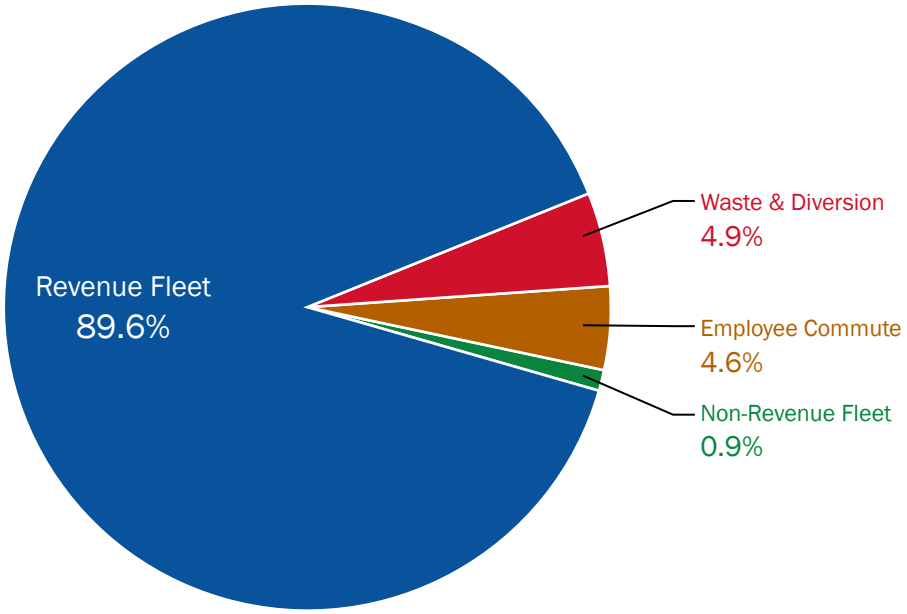
SamTrans calculates indirect GHG emissions generated from waste disposal, water consumption, and employee commuting. SamTrans also accounts for displaced emissions that would have occurred if travelers chose to travel by private automobile and calculates these as avoided emissions. **Figure 4** shows SamTrans' GHG emissions by source.

SamTrans' net GHG emissions equal its generated emissions minus the emissions displaced by SamTrans. **Figure 5** shows a line graph of SamTrans' net GHG emissions with generated and displaced emissions highlighted as bars for each fiscal year. This figure demonstrates that increased efficiency has resulted in a sustained trend of declining generated GHG emissions.

In FY2021 and FY2022, SamTrans generated approximately 21,822 and 24,207 $MTCO_2e$, respectively. Generated emissions declined by approximately 6% between FY2020 and FY2022. During this same timeframe, SamTrans displaced approximately 29% fewer GHG emissions. As SamTrans transitions to a zero-emission fleet and incorporates electric vehicles into its non-revenue fleet, its generated GHG emissions will decrease significantly, and it will displace more emissions than it generates.

Figure 6 illustrates how much CO_2e SamTrans generates per vehicle mile (VM) it operates and per passenger that boards. Between FY2020 and FY2022, GHG emissions per VM increased by approximately 4%, indicating that SamTrans is generating more GHG emissions per mile than in its last reporting period. In the same period, generated emissions per boarding increased by approximately 18%. Both are likely due to COVID-19-associated ridership impacts during this reporting period and are expected to revert as ridership returns.

Figure 4: FY2020 GHG Emissions by Source[7]



[7]No emissions from water have been generated since FY2020.

Figure 5: GHG Emissions - Generated, Displaced and Net

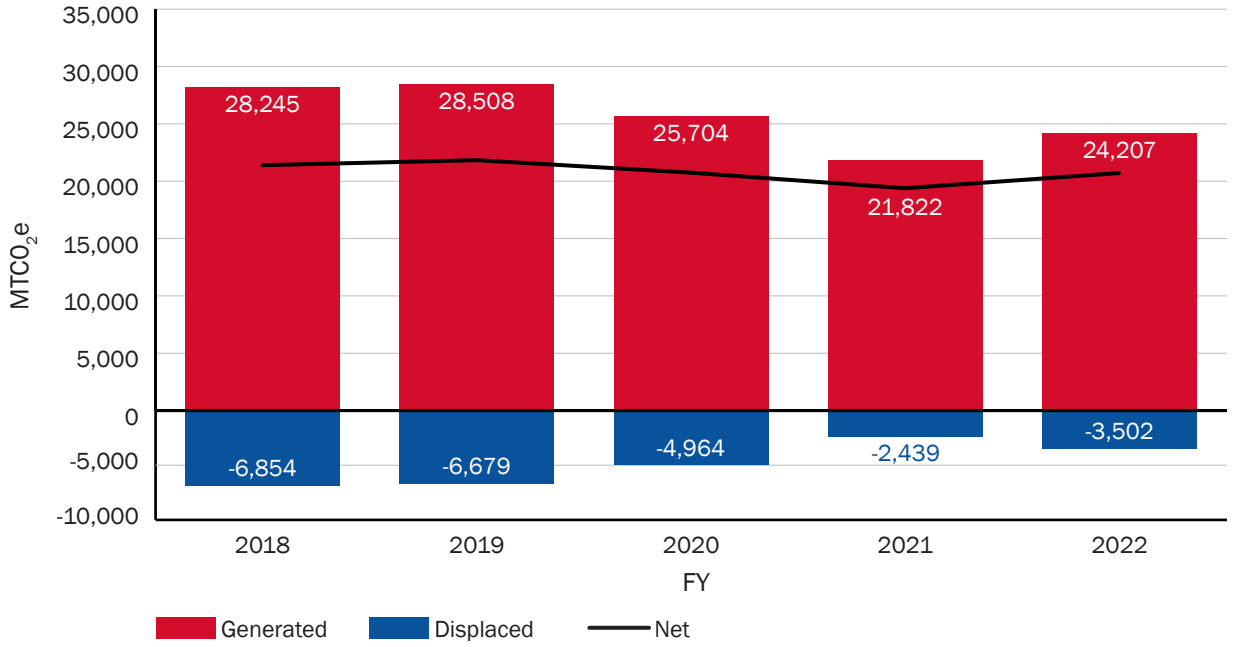
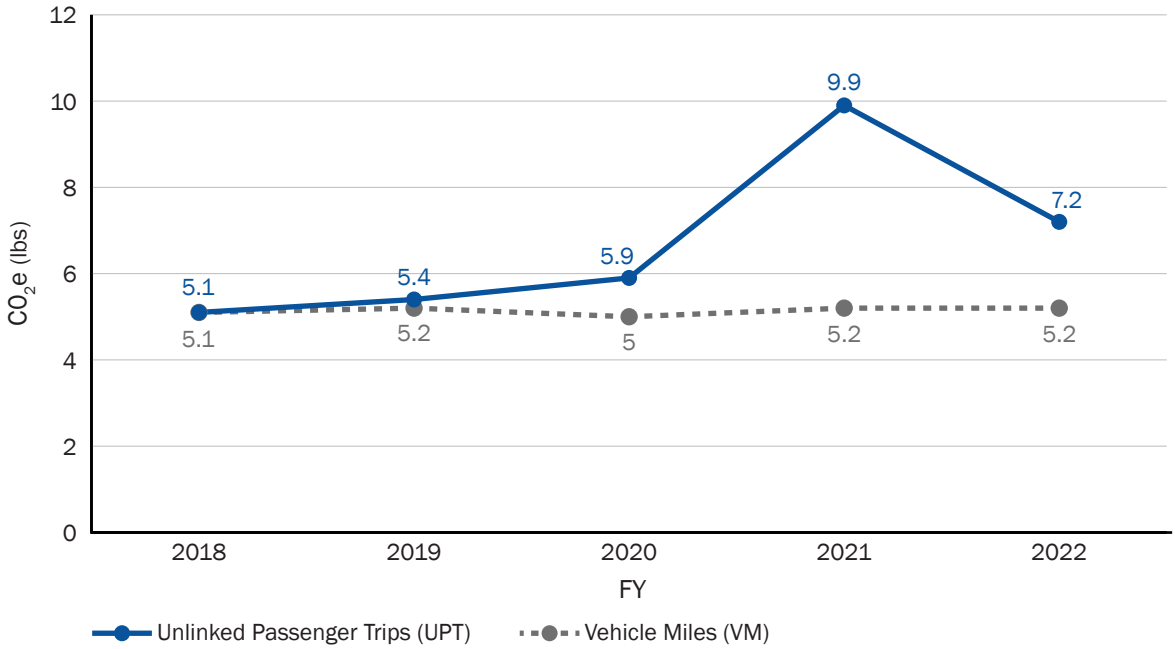


Figure 6: Generated GHG Emissions per Boarding and Vehicle Mile



Employee Commuting

Emissions associated with employee commuting were calculated as part of SamTrans' indirect GHG emissions. As shown in **Figure 4**, employee commuting contributes slightly less than 5% of total SamTrans GHG emissions.

Annual employee vehicle miles traveled were estimated based on anonymized employee zip code information, workplace location, and the conservative assumptions that all employees are full-time and commute to work five days a week by passenger vehicle. The estimate is not typically adjusted to account for employees who telecommute. However, an adjustment was made for FY2020 to include an estimate that two-thirds of Central employees worked remotely between March and June 2020. Nearly all of the employees based out of North and South bases were assumed to continue commuting and working on-site during this period. Vehicle miles traveled from third-party contractors are not included. With these assumptions, employee commute related emissions decreased approximately 2% between FY2020 and FY2022 due to COVID-19.

Emissions associated with commuting via car were calculated based on Bay Area carpooling trends from the American Community Survey (ACS) and vehicle emissions from the California Air Resources Board Emission Factor Database (EMFAC 2014).

Criteria Air Pollutants

Criteria air pollutants (CAPs) include pollutants that cause smog and acid rain and have been linked to negative health effects. SamTrans' vehicles emit CAPs when they burn fossil fuels like diesel and gasoline, but they also displace CAPs that otherwise would have been emitted if passengers had chosen to drive alone instead of taking public transit. Approximately 98% of the CAPs emitted by SamTrans are from the diesel revenue fleet. Nitrogen oxides (NOx) represent most of the CAPs generated by SamTrans.

In 2018, SamTrans purchased 55 heavy-duty clean-diesel articulated buses, which replaced articulated bus models from 2002 that exceeded their useful life. These newer vehicles are more environmentally friendly, produce 87% less NOx than the older models, and decreased CAPs by approximately 18%. In **Figure 7**, the net reduction in CAPs is shown in a line graph with the generated and displaced CAPs shown in bars above and below the line. SamTrans' transition to cleaner vehicles and to zero-emission buses is expected to continue to reduce CAP generation.

Figure 8 shows SamTrans' generated CAPs normalized by SamTrans VM and boardings. SamTrans' CAPs per VM have been steadily declining over the past several years.

Figure 7: Criteria Air Pollutants - Generated, Displaced and Net

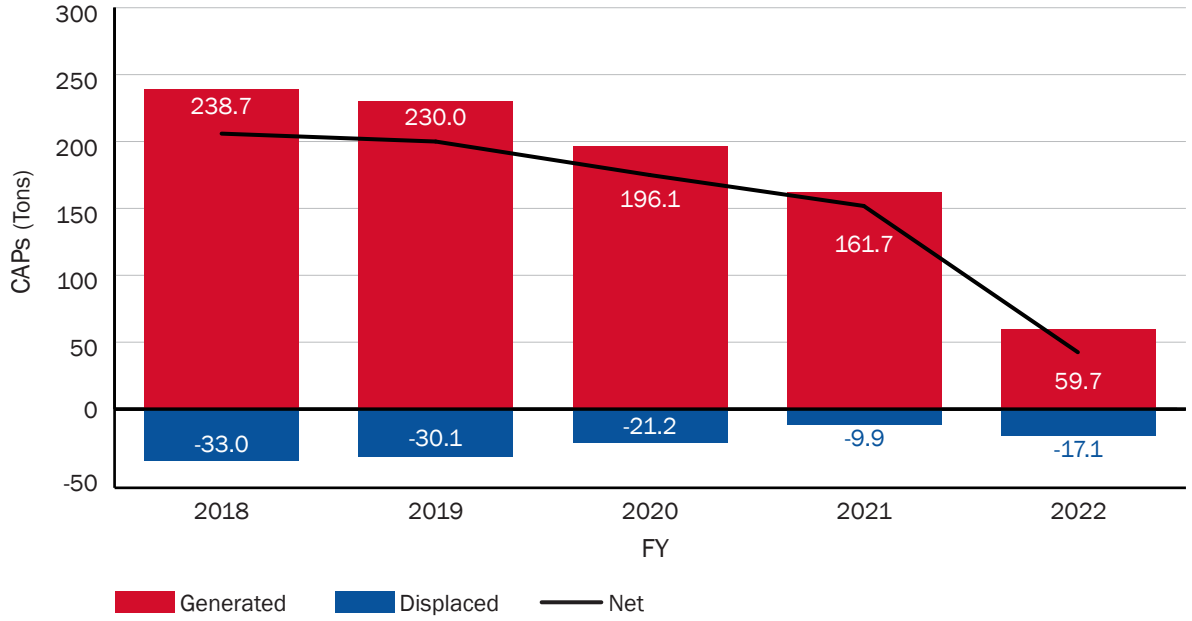
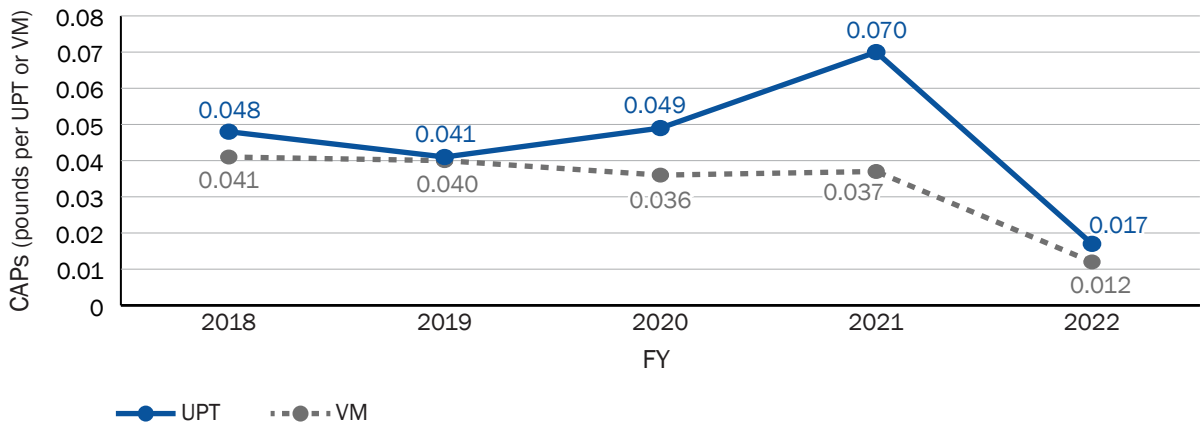


Figure 8: Criteria Air Pollutants Generated per Vehicle Mile and Boarding



Energy Use

SamTrans' fleet is made up of vehicles that operate on diesel, gasoline, biodiesel, and electricity. Between FY2020-22, SamTrans-operated bus routes (SamTrans fixed route) only used diesel fuel. SamTrans has purchased ten electric buses and contracts fixed-route buses and shuttles that use diesel, gasoline, and biodiesel. SamTrans' paratransit service, which includes Redi-Wheels and RediCoast, uses diesel and gasoline.

SamTrans' non-revenue fleet includes electric vehicles and gasoline-electric hybrid employee pool cars as well as supervisor vehicles, maintenance trucks, and specialty vehicles (like money-collection and ticket vending machine trucks) that use gasoline. Diesel vehicles have been phased out of SamTrans' non-revenue fleet entirely and SamTrans has added several battery-electric vehicles to its non-revenue fleet that will soon enter service.

The revenue fleet made up 94% of SamTrans' total energy use (fleet and facilities) in FY2022. This energy usage primarily resulted from the fixed-route bus service diesel fuel consumption as noted in **Figure 9**, which shows gallons of fuel by type. While SamTrans consumed nearly 2 million gallons of diesel in FY2022, overall diesel use decreased by 11% from FY2020 to FY2022. The transition from diesel-fueled to gasoline-fueled paratransit vehicles resulted in an approximately 72% increase in gasoline usage between FY2020 and FY2022.

In 2020, the revenue fleet used only a small amount of biodiesel (only 6,442 gallons) and no CNG, and no biodiesel or CNG in 2021 and 2022. In November 2021, the SamTrans Board of Directors approved a contract that supplies the District with renewable diesel. Staff launched a pilot fuel program to test renewable diesel at the bases and SamTrans plans to begin using renewable diesel for the entire rolling stock fleet within the upcoming year.

SamTrans is taking progressive steps to transition its revenue fleet to zero-emission vehicles. The fleet already includes 25 diesel-electric hybrid buses. In 2020, the SamTrans Board of Directors approved a plan to convert the fleet to 100% zero-emission. Since then, the board has approved the purchase of 37 battery electric buses (BEBs) and 10 hydrogen fuel cell buses (FCEBs) for the SamTrans fleet. Deploying zero-emission buses will dramatically reduce the agency's GHG emissions, advance state and regional air quality goals, and improve local air quality in alignment with the California Air Resource Board's (CARB's) statewide goal of transforming all public fleets to zero-emission bus technology by 2040.

Figure 10 shows the revenue fleet energy intensity over time by unlinked passenger trips (UPT) and and vehicle miles (VM). The energy intensity per UPT, or energy per boarding, increased in FY2021 due to COVID-19 ridership decline and decreased in FY2022 as ridership began to recover. Energy intensity by VM increased slightly from FY2019 to FY2020 and then decreased in FY2022. With fewer riders, SamTrans' service is less efficient.

Figure 9: Vehicle Energy Use by Type

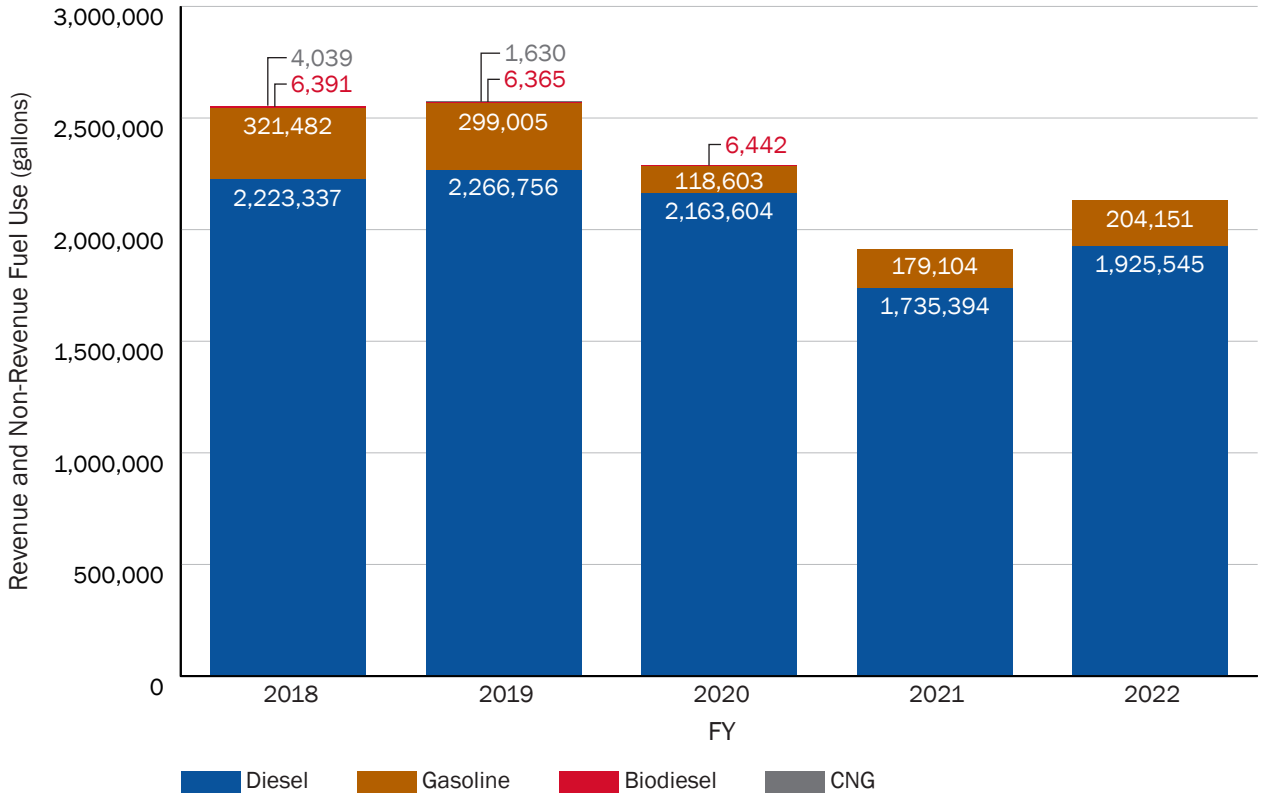
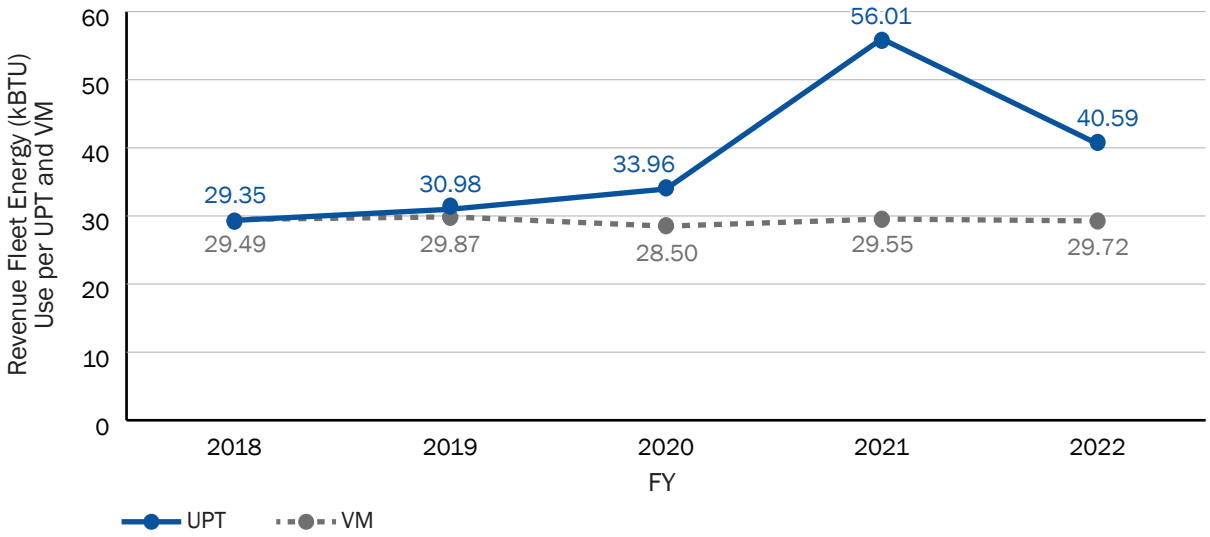


Figure 10: Revenue Fleet Energy Use per Boarding and Vehicle Mile



Facilities

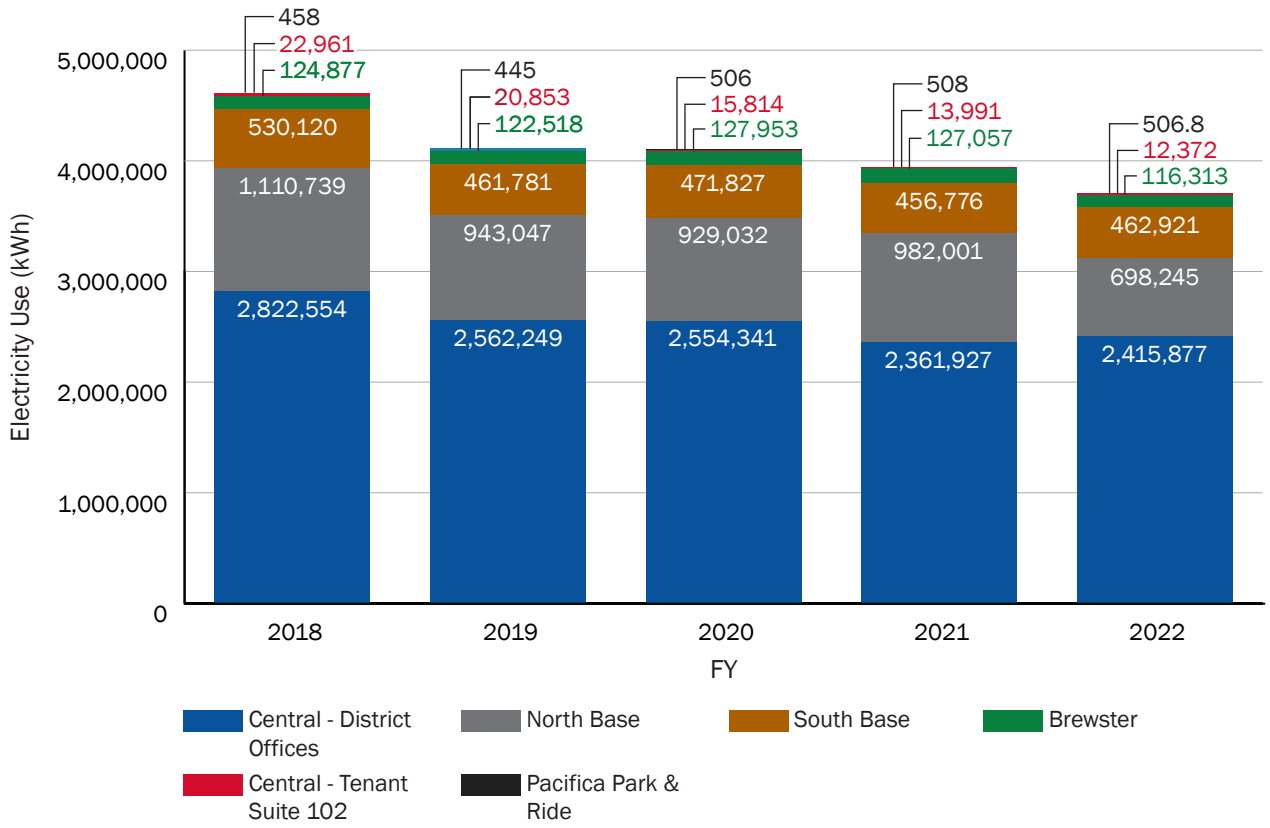
The District's four primary facilities include the Central Administrative Offices (Central), North Base Maintenance and Operations Facility (North Base), South Base Maintenance and Operations Facility (South Base), and Brewster Depot, which is currently used by contracted bus and paratransit services. Many administrative functions for SamTrans, Caltrain, the San Mateo County Transportation Authority, and the San Mateo County Express Lanes Joint Powers Authority are shared and based out of the Central Administrative Offices located in San Carlos. However, the energy use and emissions associated with the San Carlos building, which is owned and managed by the San Mateo County Transit District, are only included in the SamTrans inventory. These four facilities use electricity for lighting, office equipment, maintenance equipment, and HVAC. Central, North Base, and South Base also use natural gas for heating. Additionally, the District operates the Linda Mar and Colma Park & Rides which use electricity for lighting.

Figure 11 shows electricity use by facility in kilowatt-hours (kWh). Overall electricity usage has steadily declined with energy efficiency improvements. Total electricity consumption decreased by approximately 10% between FY2020 and FY2022. As of December 2022, SamTrans has replaced over 90% of the "T8" lights in North and South Bases with LEDs.

SamTrans procures 100% GHG-free and renewable energy through Peninsula Clean Energy. Therefore, SamTrans has zero GHG emissions associated with electricity consumption.

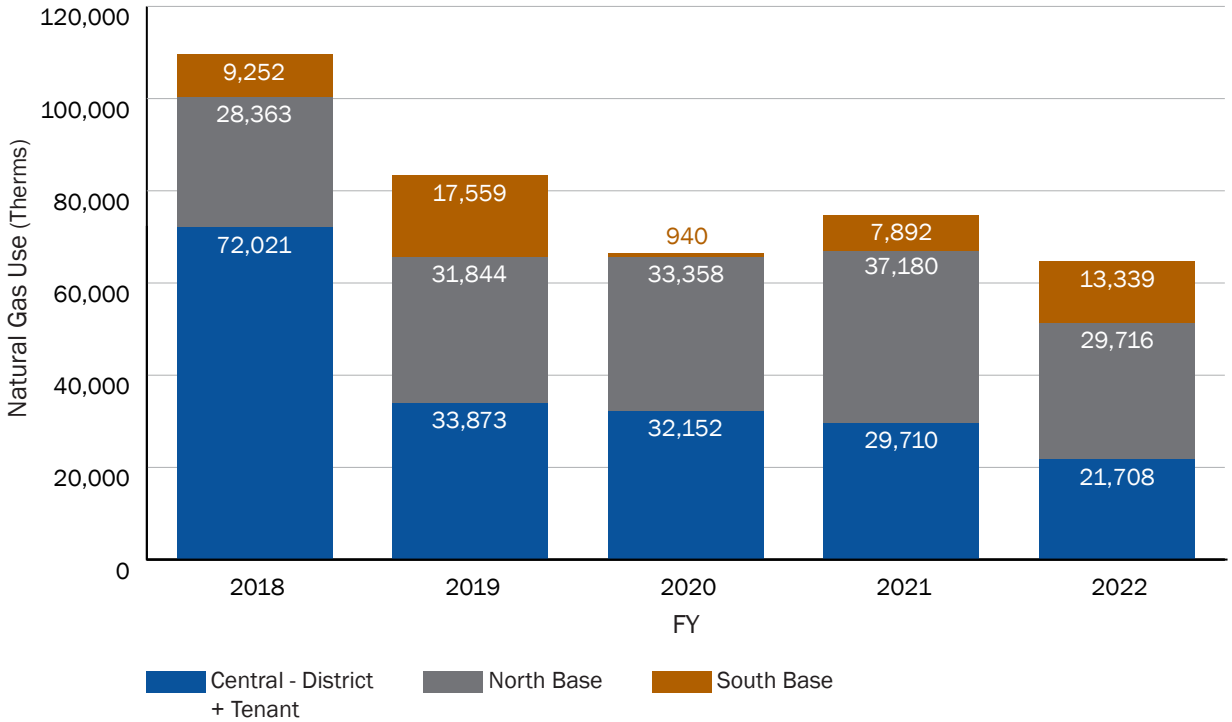
Figure 12 shows natural gas use for North Base, South Base, and the Central Administrative Offices. Natural gas usage decreased by approximately 3% between FY2020 and 2022.

Figure 11: Electricity Use per Facility*



Note: As of FY2020, SamTrans is no longer renting the tenant space in the Central office.
*Colma's electricity use is de minimus and not displayed in the above figure.

Figure 12: Natural Gas Use per Facility



Water Use

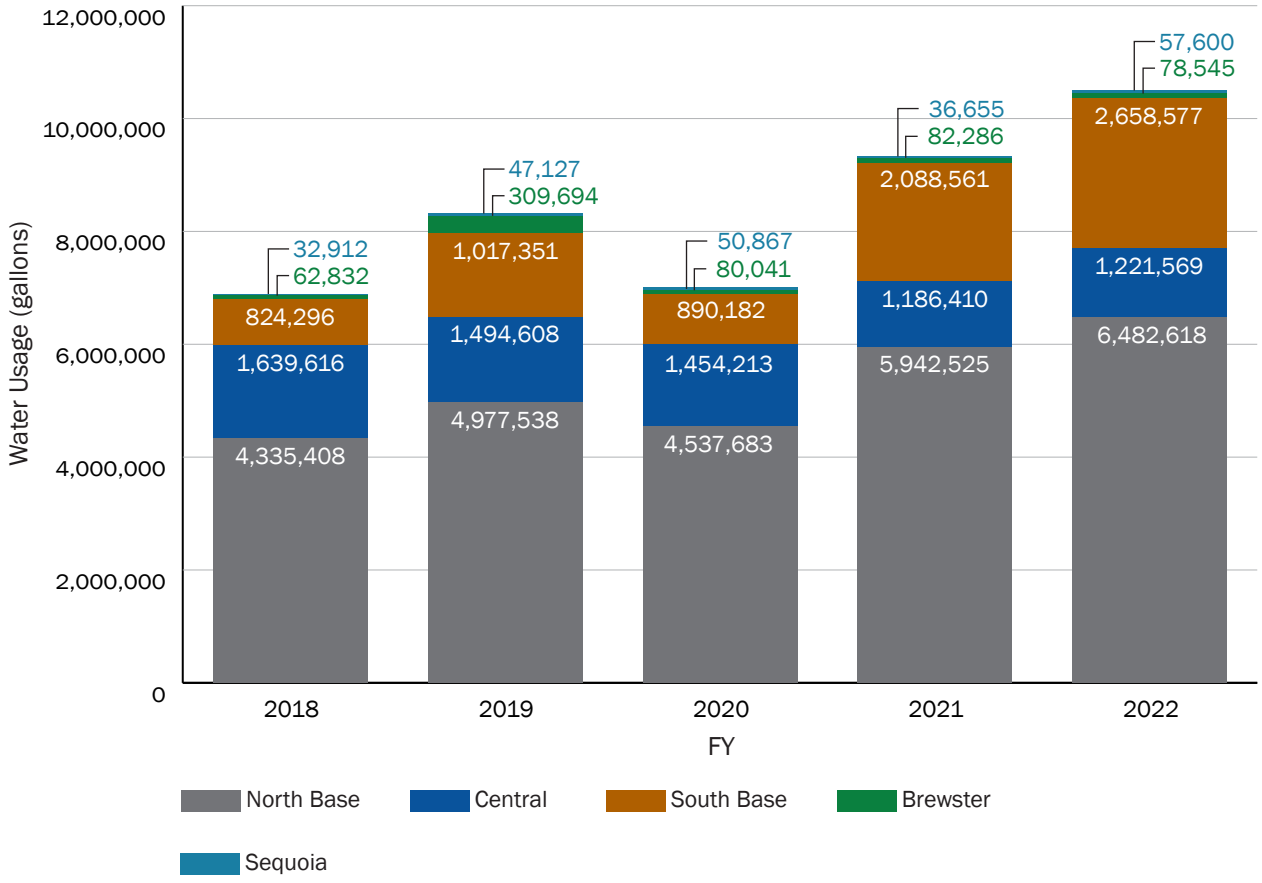
SamTrans uses water for potable consumption, bus washing, and typical commercial water uses such as restrooms and showers. SamTrans minimizes water use wherever possible and no longer uses water for irrigation. Bus washing at each facility is conducted using a closed loop system to minimize water use. At the South Base facility, about 70% of water is recovered by the new bus washing system.

Figure 13 shows water usage per facility. SamTrans consumed over 9.3 million gallons of water in FY2021 and 10.5 million gallons in FY2022.

As shown in **Figure 13**, the North Base facility uses the most water, followed by the South Base and Central facilities. The Sequoia facility, which is the Redwood City Transit Center, used a small amount of water, and water use was nearly eliminated at the park and ride locations. Brewster experienced a water leak during 2019 on both sides of the meter which resulted in a notable increase in water use in FY2019.

Emissions from water are generated indirectly through the combustion of fossil fuels in electricity generation for water delivery, conveyance, and treatment. Though SamTrans does not directly control these emissions, they are included in this inventory because the emissions are a consequence of SamTrans' use of the water.

Figure 13: Water Use per Facility*



*Colma's water use is de minimus and not displayed in the above figure.

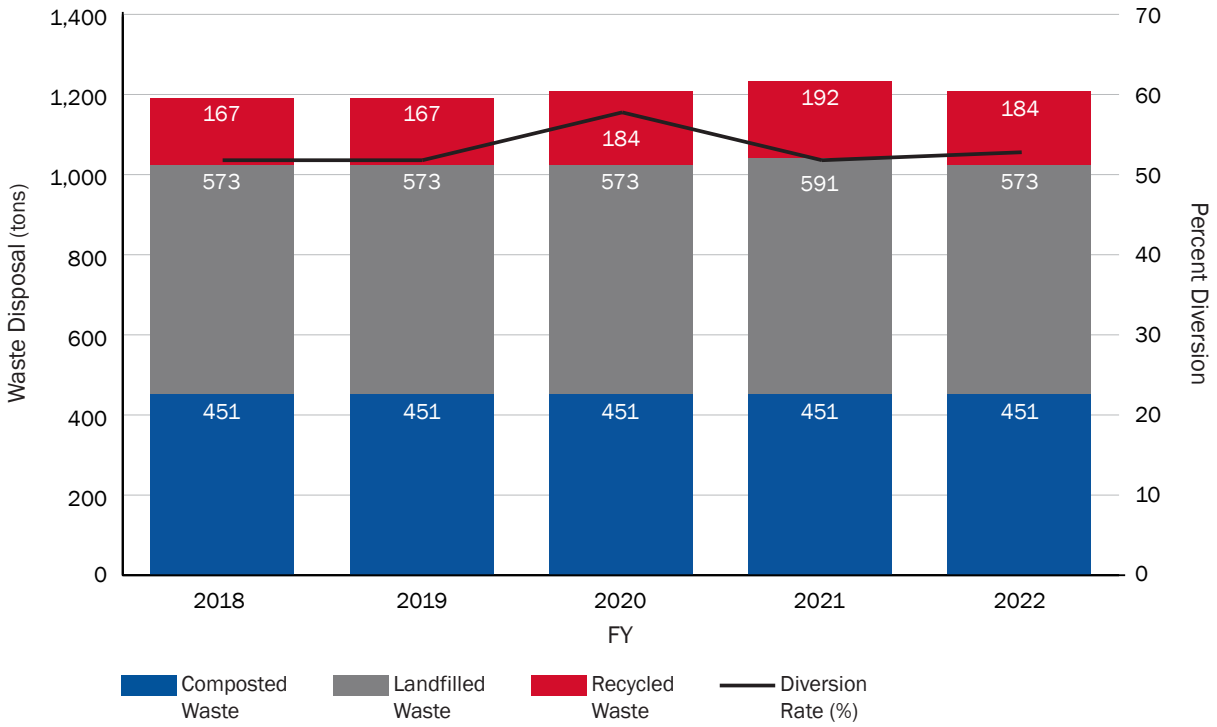
Waste and Diversion

SamTrans-generated waste consists of municipal waste from passengers (paper, food scraps, bottles, cans, and other common recyclables) and employees (from typical office activities and low-impact maintenance activities). Emissions from waste sent to landfill are included in this inventory but industrial waste (such as hazardous waste and large metal scrap recycling), construction, and demolition waste are accounted for by the construction company performing the work, and hence are not included in the graph below.

Waste and diversion (recycling and composting) rates are estimated through invoices from SamTrans' waste service provider. For the purposes of this inventory, SamTrans assumes that all landfill, recycling, and organics collection containers are 80% full when collected each week. This assumption may overstate the actual amount of waste generated and diverted, but it is the best estimate available at this time as SamTrans' waste hauler does not report customer waste by actual weight, only volume of container capacity and scheduled pickup frequency.

Figure 14 shows total landfilled, recycled, and composted waste as bars per fiscal year. The total diversion rate, measured as the percentage of total waste diverted as recycling or compost, is shown as a black line. SamTrans' total diversion rate increased by one percentage point, increasing from 52% to 53% between FY2021 and FY2022.

Figure 14: Waste Disposal by Type



LOOKING AHEAD

Looking Ahead

In December 2020, SamTrans approved an Innovative Clean Transit (ICT) Plan outlining its vision for transitioning from a diesel fleet to a zero-emission bus fleet. In May 2022, staff presented proposed changes to the ICT Plan. Highlights of the proposed changes include:

- Consideration of hydrogen fuel cell electric buses (FCEBs) as an alternative technology
- Elimination of the procurement of 72 diesel buses
- Revision of the June 2022 procurement from 15 BEBs and 15 diesel buses to 20 BEBs and 10 FCEBs
- Shifting the fleet procurement scheduled for 2023, 2024, and 2025 to allow further evaluation of BEB and FCEB technologies to inform future fleet procurement

These proposed changes to the ICT Plan accelerate the fleet conversion to 100% zero-emission by 2034 instead of 2038. These changes also allow for the continuation of zero-emission bus (ZEB) technology evaluations while allowing more time for construction of supporting ZEB infrastructure.

In 2022, SamTrans partnered with the Center for Transportation and the Environment (CTE) to evaluate hydrogen FCEB performance and fuel consumption, fueling infrastructure solutions, and facility and maintenance needs. The evaluation included a test run of a FCEB on SamTrans routes, a site walk, and a market survey of potential fueling solutions and fuel supply sources for the fleet. Next steps include demonstrations of 10 FCEBs beginning in 2024, issuance of an RFP for hydrogen and fueling equipment, and issuance of a design contract for facility modifications.

This transition away from fossil fuels will improve the health and well-being of SamTrans riders and community members across the Bay Area by reducing the impacts of transportation on air quality and climate change.

Data Sources and Methodology

See the SamTrans Sustainability Inventory Technical Report (internal document) for more information on data sources and methodologies applied.

[i]GHG emissions generated calculated using CARB EMFAC 2014, GREET 2016 for CNG and biodiesel, PG&E and PCE power content labels, the EPA eGRID, California Energy Commission's California's Water-Energy Relationship (2005) and the U.S. Community Protocol for Accounting and Reporting of GHG Emissions Appendix E: Solid Waste Emission Activities and Sources (2012).

[ii]GHG emission displacement calculations based on the APTA mode shift calculation [displaced/avoided trips (VM) = PMT (miles) x 0.42] and EMFAC 2014 emissions factors.

[iii]CAPS generated calculated using CARB EMFAC 2014.

[iv]CAPS displaced based on APTA mode shift calculation [displaced/avoided trips (VM) = PMT (miles) x 0.42] and EMFAC 2014 emissions factors.

[v]Facility energy consumption data provided by PG&E. Standard conversion factors used to convert kWh and therms to kBTU.

[vi]Data obtained from FTA NTD form A-30 (revenue fleet); SamTrans non-revenue vehicle fleet tracking spreadsheet (non-revenue fleet). Standard conversion factors used to convert all fuels to kBTU.

[vii]Water consumption data provided by California Water Service (CalWater) and the City of Redwood.

[viii]Waste and diversion data obtained through Recology invoices. Cubic yards converted to tons using California Department of Resources Recovery and Recycling facility information (FacIT) conversion factors.

[ix]Employee commuting VMT calculated based on anonymous SamTrans employee zip code information, work locations and average commute mode data from the American Community Survey (ACS).

[x]https://www.clipperstartcard.com/

samTrans