Sustainability Annual Report

FY 2020

Valley Transportation Authority

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Contents

Acknowledgments

Thank you to all the members of the Sustainability Team for your contributions to this report and to VTA's Board of Directors and executive management for your continued support of the Sustainability Program.

1 Introduction

The purpose of this report is to present Santa Clara Valley Transportation Authority's (VTA) progress towards meeting the objectives and targets set forth in the Sustainability Plan approved by VTA's Board of Directors in 2020. The sustainability metrics are applicable to the facilities and fleet under the operational control of VTA. The data found in this Plan are derived from utility bills, invoices, utility vendors, and fuel and mileage reports, and are as accurate and complete as these data sources allow. Sustainability metrics are used to measure VTA's performance over time. The key performance indicators (KPI) tracked by VTA include greenhouse gas (GHG) emissions, criteria air pollutants, energy use (buildings and fleet), water, and waste. These are shown in Table 1. Fiscal Year (FY) 2009 was selected as the baseline year based on available data and establishment of the Sustainability Program in February 2008. Fiscal Year 2025 was selected as a short-term target and FY 2040 was identified as a stretch target for the future. Please refer to the Sustainability Plan for a description of how these years were identified and the methodology used in the reporting process.

Table 1 **Sustainability Objectives and Targets**

Key Performance Indicator[1]	Objective[2]	Targets[3]
Greenhouse Gas Emissions	Reduce greenhouse gas (GHG) emissions generated	• Reduce GHG emissions by 60% by FY 2025 • Reduce GHG emissions by 90% by FY 2040
Criteria Air Pollutants[4]	Reduce criteria air pollutant emissions generated	• Reduce criteria air pollutant emissions by 80% by FY 2025 • Reduce by criteria air pollutant emissions by 95% by FY 2040
Building Energy	Reduce building energy consumption	• Reduce building energy consumption by 15% by FY 2025 • Reduce building energy consumption by 40% by FY 2040
Fleet Energy	Reduce revenue fleet energy consumption	• Reduce revenue fleet energy consumption by 35% by FY 2025 • Reduce revenue fleet energy consumption by 60% by FY 2040
Water	Reduce potable water use	• Reduce potable water use by 45% by FY 2025 • Reduce potable water use by 60% by FY 2040
Waste Diverted	Increase waste diversion rate	• Increase waste diversion rate to 50% by FY 2025 • Increase waste diversion rate to 80% by FY 2040

[1] As recommended by the American Public Transportation Association (APTA).
[2] Overall goal VTA seeks to achieve.
[3] Quantitative measures to track performance over time compared to Fiscal Year (FY) 2009 baseline.
[4] Emissions from Reactive Organic Gas, Nitrogen Oxide, Carbon Monoxide, and Particulate Matter.

2 Environmental Performance

The environmental performance for the current reporting year (FY 2020) is presented below along with a comparison to baseline (FY 2009) conditions and future targets for each KPI.

On March 16, 2020, a shelter-in-place order was issued by the Santa Clara County Health Officer to slow the spread of Novel Coronavirus 2019 (COVID-19). Therefore, the FY 2020 results include approximately 3.5 months of operations under these conditions. During this time, VTA reduced revenue service system-wide (bus, paratransit, and light rail) to meet lower ridership demand; completely suspended light rail service for a two-week period between March 26 and April 8; cancelled weekend light rail service and all express bus service for the months of April and May; reduced the number of cars per light rail train from three to one; and commenced a work-from-home program for employees who could do their work remotely. The reductions described in the following sections reflect these changes.

2.1 Greenhouse Gas Emissions

Status

On track, with caution

Target

Reduce GHG emissions generated by **60%** below FY 2009 levels by FY 2025.

GHGs include carbon dioxide, methane, and nitrous oxide associated with VTA's revenue and non-revenue fleet, building energy, waste, employee commute, and water[1]. Since the baseline year, annual GHG emissions generated by VTA have decreased. This decrease is primarily due to the change from diesel to hybrid and electric buses. In FY 2020, VTA generated 34,649 metric tons of carbon dioxide equivalent (MT CO_2e). This is 36% lower than the annual emissions generated in FY 2009. Table 2.1 shows the GHG emissions in MT CO_2e from each area of VTA's operations and the percent change from the baseline year (FY 2009).

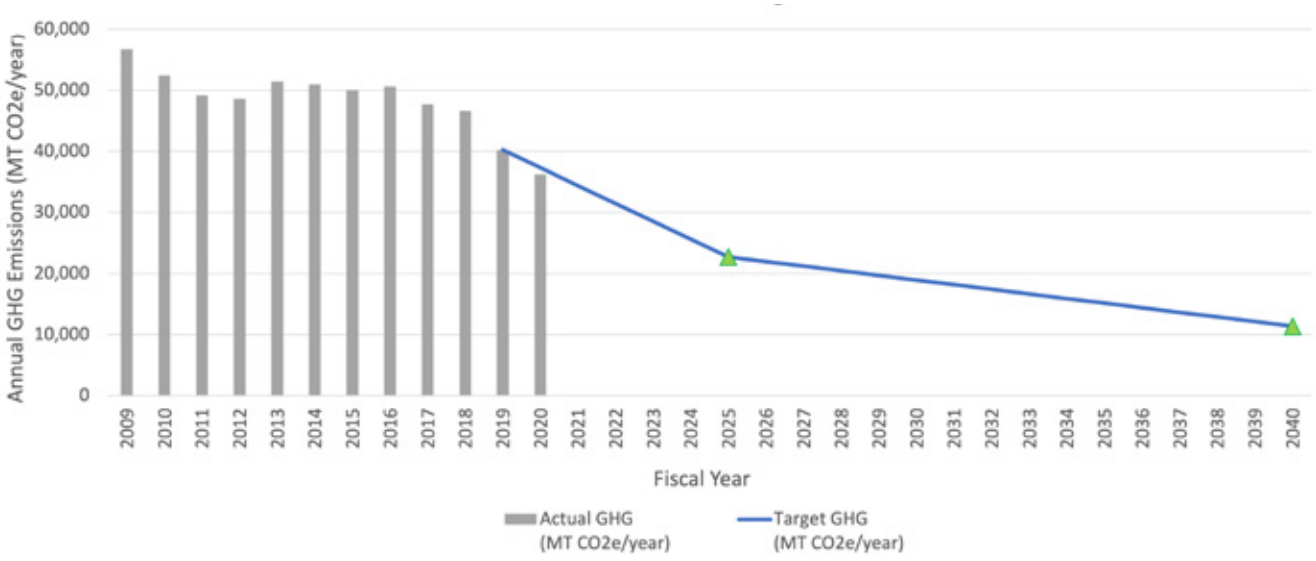
Table 2.1 **GHG Emissions (MT CO_2e)**

Fiscal Year	Fleet (MT CO_2e)	Building Energy (MT CO_2e)	Waste (MT CO_2e)	Employee Commute (MT CO_2e)	Water (MT CO_2e)	Total GHG Emissions Generated (MT CO_2e)	Change from FY 09
2009	46,699	6,777	1,803	1,471	23	56,773	
2010	43,211	6,115	1,754	1,408	15	52,502	-8%
2011	39,962	6,060	1,851	1,345	11	49,229	-13%
2012	39,244	6,219	1,817	1,330	10	48,620	-14%
2013	41,605	6,663	1,875	1,305	12	51,460	-9%
2014	42,233	5630	1,806	1,324	16	51,010	-10%
2015	42,722	4,327	1,724	1,268	15	50,057	-12%
2016	42,876	4,543	1,853	1,370	8	50,650	-11%
2017	40,197	4,172	2,048	1,321	6	47,744	-16%
2018	39,879	3,625	1,793	1,311	15	46,622	-18%
2019	34,213	3,030	1,726	1,249	17	40,235	-29%
2020	30,422	3,105	1,586	1,107	11	36,232	-36%

[1] The consumption of water results in indirect GHG emissions through the generation of electricity needed to convey, treat, and deliver water to VTA facilities.

To stay on track to meet the FY 2025 target, emissions need to be reduced by an additional 8% next year. Figure 2.1 compares the actual GHG emissions to the target GHG emissions leading up to FY 2025 and FY 2040. Assuming pre-COVID service levels are gradually restored, VTA will need to accelerate the replacement of its fleet with zero-emission buses, in compliance with the California Air Resources Board's Innovative Clean Transit regulation,[2] to meet this target. The revenue fleet, consisting of bus, paratransit, and light rail service, is the largest generator of GHG emissions, accounting for 30,422 MT CO_2e or 84% of the total emissions in FY 2020. See Section 2.4 for further discussion of fleet energy consumption.

Figure 2.1 **GHG Emissions Reduction Targets**



Avoided emissions are GHG emissions associated with the mode shift from single-occupancy vehicles to transit. In FY 2020, VTA helped displace regional GHG emissions by 16,066 MT CO_2e. In FY 2020, VTA ridership increased by 3% after the New Transit Service Plan was implemented in December 2019, but immediately declined by at least 50% when the shelter-in-place orders took effect in March 2020 and continued to drop significantly as the COVID-19 pandemic continued. At the time of this writing, overall ridership (bus and light rail) was down by approximately 69%.

[2] The Innovative Clean Transit regulation, California Code of Regulations Title 13, Section 2023.1, sets a goal to transition all transit buses in the State to zero-emission by FY 2040.

2.2 Criteria Air Pollutants

Status

On track, with caution

Target

Reduce criteria air pollutant emissions generated by **80%** below FY 2009 levels by FY 2025.

Criteria air pollutants include ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, and lead generated by the operation of VTA's revenue and non-revenue fleet and employee commute. Table 2.2 shows VTA's criteria air pollutant emissions for each year and the percent change from the baseline.

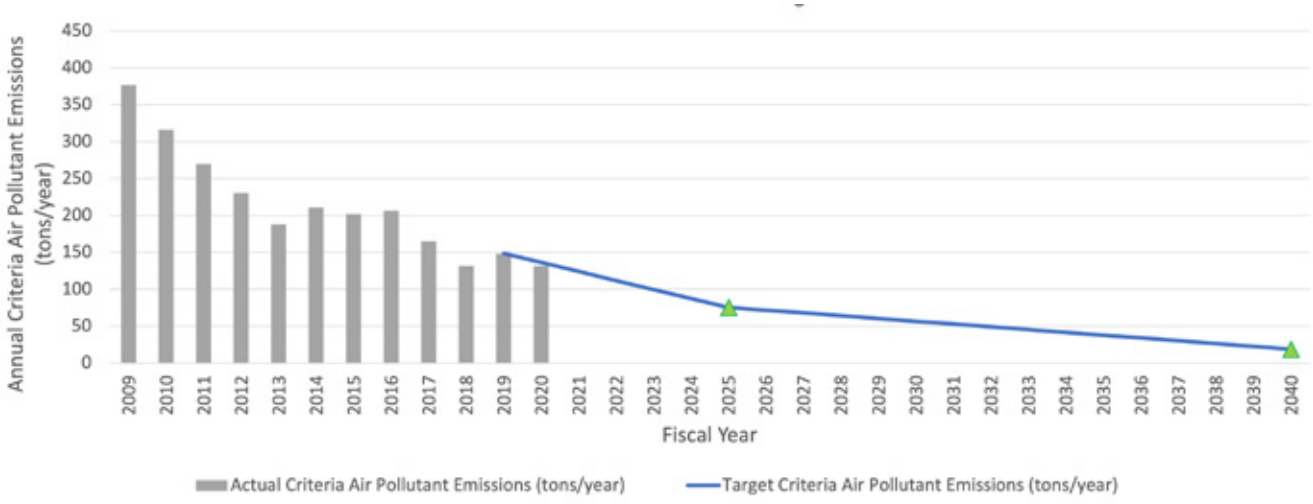
Table 2.2 **Criteria Air Pollutant Emissions (Tons)**

Fiscal Year	Criteria Air Pollutant Emissions (Tons)	Change from FY 09
2009	377	
2010	316	-16%
2011	270	-28%
2012	231	-39%
2013	188	-50%
2014	210	-44%
2015	202	-46%
2016	206	-45%
2017	165	-56%
2018	132	-65%
2019	148	-61%
2020	132	-65%

In FY 2020, VTA's criteria air pollutant emissions were 132 tons. This is a 65% reduction from the baseline year. The decrease is a result of moving towards a cleaner fleet, including the transition from diesel to hybrid and electric buses, and gasoline to hybrid and electric cars.

To stay on track to meet the FY 2025 target, criteria air pollutant emissions need to be reduced by an additional 9% next year. Figure 2.2 depicts the actual criteria air pollutant emissions against the annual target for the agency through FY 2025 and FY 2040. It is assumed that pre-COVID service levels will be eventually restored. Therefore, to sustain the downward trend toward zero-emissions while increasing service, VTA will need to accelerate the replacement of its fleet, particularly the diesel bus fleet, with zero-emission vehicles to meet this target.

Figure 2.2 **Criteria Air Pollutant Emissions Targets**



2.3 Building Energy

Status

On track, exceeding expectations

Target

Reduce building energy consumption by **15%** below FY 2009 levels by FY 2025.

Buildings and facilities are powered by electricity[3], natural gas, and propane. Net grid[4] electricity use decreased by 38% in FY 2020 compared to baseline. Natural gas use increased by 4% in FY 2020 compared to the baseline. This temporary increase is mostly attributable to managing indoor temperature and ventilation systems and is expected to remain during the COVID-19 pandemic as described in Section 3.

[3] Purchased directly from the utility, or grid, as well as from the generation of on-site solar panels.

[4] Grid electricity is the electricity generated at power plants. Net grid electricity usage is the difference between the total electricity consumption by VTA and the solar-generated electricity from 5 on-site solar or photovoltaic (PV) systems. In addition to the installation of PV systems, VTA attributes reduction in net grid electricity usage to participating in Community Choice Aggregate programs.

Propane use decreased by 19% in FY 2020 compared to the baseline. This reduction is a result of a facility retrofit project at the Cerone Bus Operations and Maintenance Division that replaced boilers and upgraded equipment in 2019.

Table 2.3 shows the total building energy and the percent change from FY 2009. Although there were fluctuations from the baseline for the various fuel types, VTA facilities overall were able to achieve a 7% reduction from the baseline year in FY 2020 with an energy consumption of 64,276 million British Thermal Units (MMBTU).[5]

Table 2.3 Total Building Energy Usage by Fuel Type (kBTU)

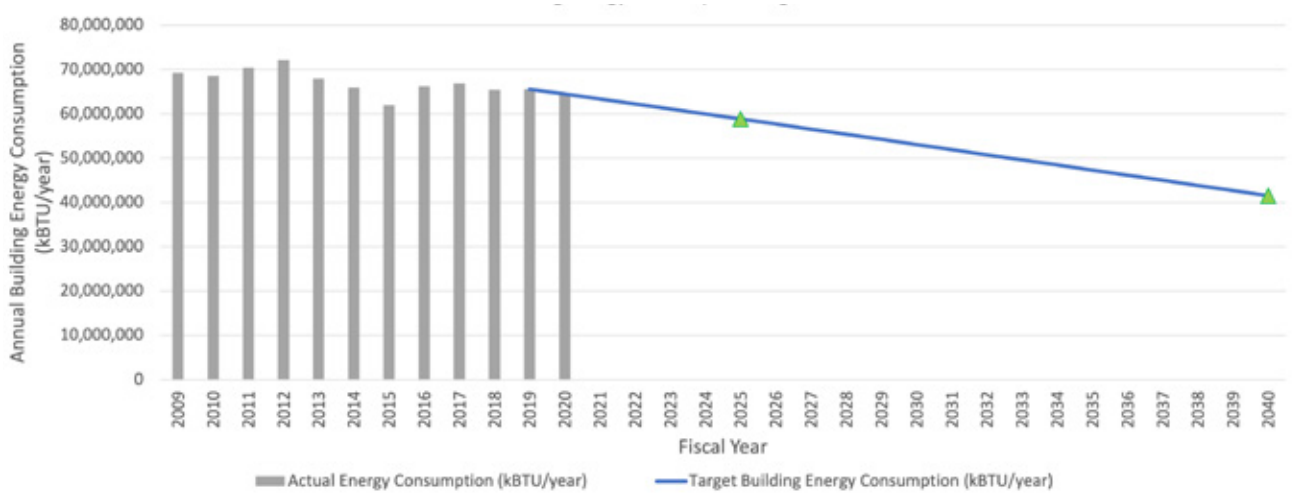
Fiscal Year	Electricity (kBTU)	Natural Gas (kBTU)	Propane (kBTU)	Total Building Energy Use[6] (kBTU)	Change of Total Building Energy Use from FY 09
2009	43,992,951	15,230,243	9,997,078	69,220,272	
2010	42,017,406	16,770,909	9,805,523	68,593,839	-1%
2011	42,224,014	16,437,199	11,725,623	70,386,837	2%
2012	46,009,987	14,987,273	11,163,334	72,160,594	4%
2013	42,168,349	13,680,796	12,144,223	67,993,368	-2%
2014	42,595,199	13,034,839	10,328,773	65,958,811	-5%
2015	42,913,526	11,145,692	7,903,175	61,962,393	-10%
2016	42,373,580	13,678,741	10,167,143	66,219,465	-4%
2017	41,793,890	14,845,263	10,217,364	66,856,518	-3%
2018	43,983,176	14,180,805	7,224,172	65,388,152	-6%
2019	44,346,273	13,910,378	7,294,651	65,551,302	-5%
2020	40,423,666	15,778,932	8,073,156	64,275,754	-7%

[5] Conversion factor for kBTU to MMBTU: 1 MMBTU = 1,000 kBTU

[6] Energy use is presented in British Thermal Units (BTUs) to provide an equal level of comparison across the various energy sources used (electricity, natural gas, and propane).

To stay on track to meet the FY 2025 target, total building energy needs to be reduced by an additional 2% next year. Figure 2.3 shows the actual building energy consumption alongside the annual target, especially for FY 2025 and FY 2040. It is possible that natural gas use may increase in future years as ventilation improvements are made in compliance with Centers for Disease Control and Prevention (CDC) guidelines discussed in Section 3. It is important that VTA decreases its usage for other fuel types, such an electricity and propane, to offset this potential increase and achieve the set targets.

Figure 2.3 **Building Energy Consumption Targets**



2.4 Fleet Energy

Status

On track, with caution

Target

Reduce revenue fleet energy consumption by **35%** below FY 2009 levels by FY 2025.

VTA's fleet includes non-revenue vehicles, buses, paratransit vehicles, and light rail trains. Fleet energy includes the consumption of fuel and electricity. VTA's sustainability targets focus on improving efficiency of the revenue fleet. Therefore, non-revenue vehicles are excluded from the targets, but a comparison to the baseline is included below for information. With the conversion to a more efficient fleet, fuel use has declined in all fleet types since the baseline year.

The percent change in FY 2020 compared to the baseline is as follows for the vehicle fleet:

Non-revenue fleet
- 18% reduction of diesel
- 5% reduction of gasoline

Revenue bus fleet
- 21% reduction of diesel
- 53% reduction of gasoline

Paratransit fleet
- 67% reduction of gasoline

In FY 2020, VTA's light rail system consumed 22.3 million kWh of electricity. This consumption of electricity is generally consistent from year-to-year with slight variations due to service changes. Compared to the baseline year, energy used for light rail operations declined by 16% in FY 2020. Table 2.4 shows the total revenue fleet energy consumption along with the percent change from FY 2009. Overall, the energy consumption of the revenue fleet in FY 2020 was 577,053 MMBTU. The energy consumption in MMBTU consists of the conversion from 3,335,131 gallons of diesel, 318,627 gallons of gasoline, and 22,4666,573 kWh of electricity. This is a 25% reduction from the baseline.

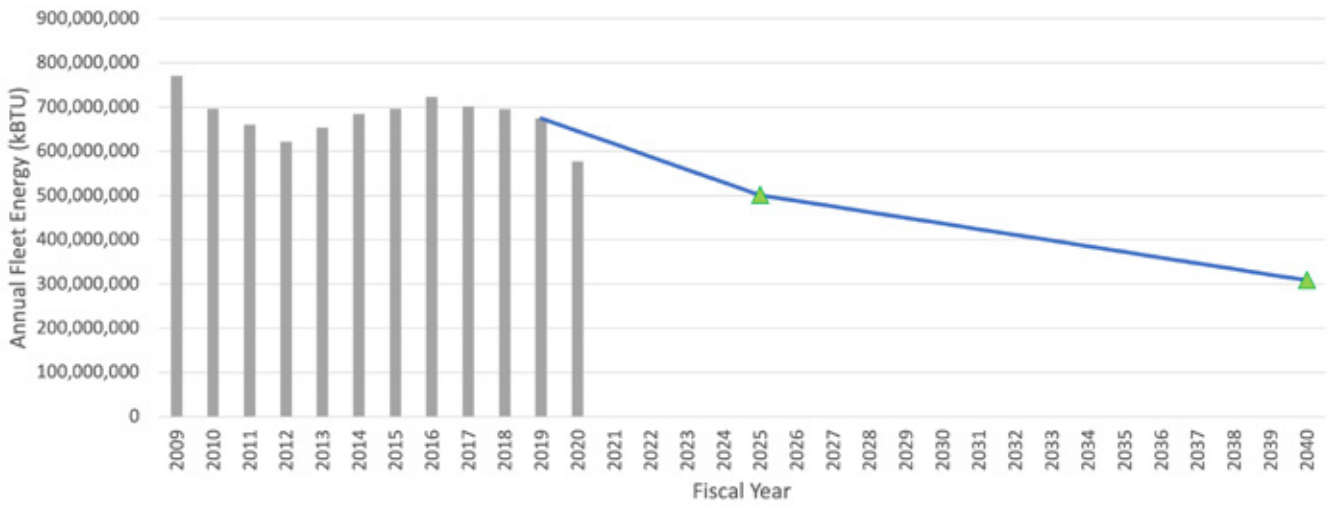
Table 2.4 **Revenue Fleet Energy Consumption (MMBTU)**

Fiscal Year	Revenue Fleet Energy Consumption (MMBTU/year)[7]	Change in Energy Consumption from FY 09
2009	770,669	
2010	696,383	-10%
2011	659,768	-14%
2012	621,802	-19%
2013	653,264	-15%
2014	684,828	-11%
2015	696,395	-10%
2016	722,996	-6%
2017	701,465	-9%
2018	695,684	-10%
2019	674,570	-12%
2020	577,053	-25%

[7] The revenue fleet consists of bus, paratransit, and light rail service. Energy use is presented in BTUs to provide an equal comparison of energy across the different sources of energy used (e.g., gallons of fuel and kWh).

VTA targeted a revenue fleet energy consumption reduction of 16% from the baseline year in FY 2020 but exceeded expectations by achieving a 25% reduction. Figure 2.4 compares the actual revenue fleet energy usage with the target. However, this decline is abnormal and attributed to reduced service levels during the pandemic. Therefore, while VTA is currently on-track to meeting the FY 2025 target (and exceeding expectations), this statement is made with caution because it assumes any increases in service post-COVID-19 will be offset by the operation of a more efficient revenue fleet, such as by transitioning to a zero-emission fleet.

Figure 2.4 **Revenue Fleet Energy Consumption Targets**



2.5 Water

Status

On track, exceeding expectations

Target

Reduce potable water use by **45%** below FY 2009 levels by FY 2025.

VTA used 31 million gallons of potable water[8] for landscaping, washing vehicles, and operating facilities in FY 2020, representing a decrease of 43% in potable water usage from the baseline year. The use of non-potable, or recycled water, increased dramatically, by 303% from the baseline year, following construction of the Milpitas and Berryessa BART stations.

[8] Potable water is defined as water that is treated to levels that meet state and federal standards for human consumption.

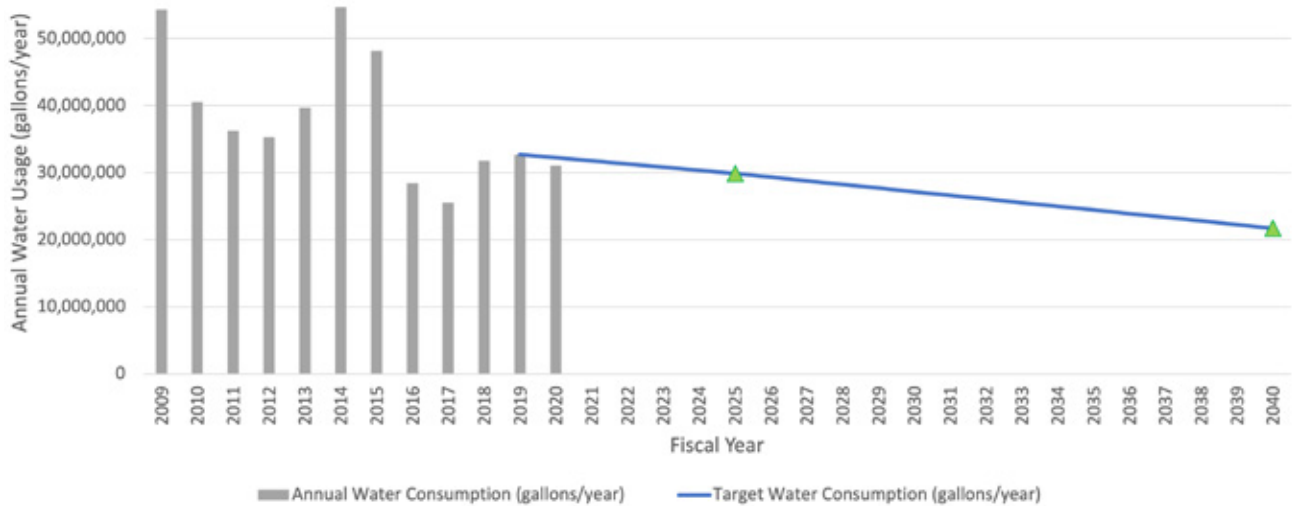
Potable and non-potable water consumption along with the percent change from FY 2009 is presented in Table 2.5.

Table 2.5 Water Use (Gallons)

Fiscal Year	Non-Potable Use (Gallons)	Change in Non-Potable Use from FY 09	Potable Use (Gallons)	Change of Total Building Energy Use from FY 09
2009	2,883,910		54,321,484	
2010	1,838,160	-36%	40,534,621	-25%
2011	2,337,373	-19%	36,246,886	-33%
2012	2,519,545	-13%	35,320,853	-35%
2013	3,401,841	18%	39,695,829	-27%
2014	2,078,491	-28%	54,660,071	1%
2015	4,737,427	64%	48,139,825	-11%
2016	6,347,731	120%	28,416,053	-48%
2017	7,836,806	172%	25,534,268	-53%
2018	9,010,187	212%	31,772,297	-42%
2019	15,691,916	444%	32,691,249	-40%
2020	11,629,105	303%	31,064,707	-43%

VTA targeted a potable water usage reduction of 41% from the baseline year in FY 2020 but exceeded expectations by achieving a 43% reduction. Figure 2.5 displays the actual potable water usage with the target water consumption for upcoming years to reach the short-term target in FY 2025 and stretch target in FY 2040. To stay on track, VTA must reduce potable water usage by the same percentage next year and decrease consumption by at least 1% in subsequent years.

Figure 2.5 Potable Water Usage Targets



2.6 Waste Diverted

Status

On track, exceeding expectations

Target

Increase waste diversion rate to **50%** by FY 2025.

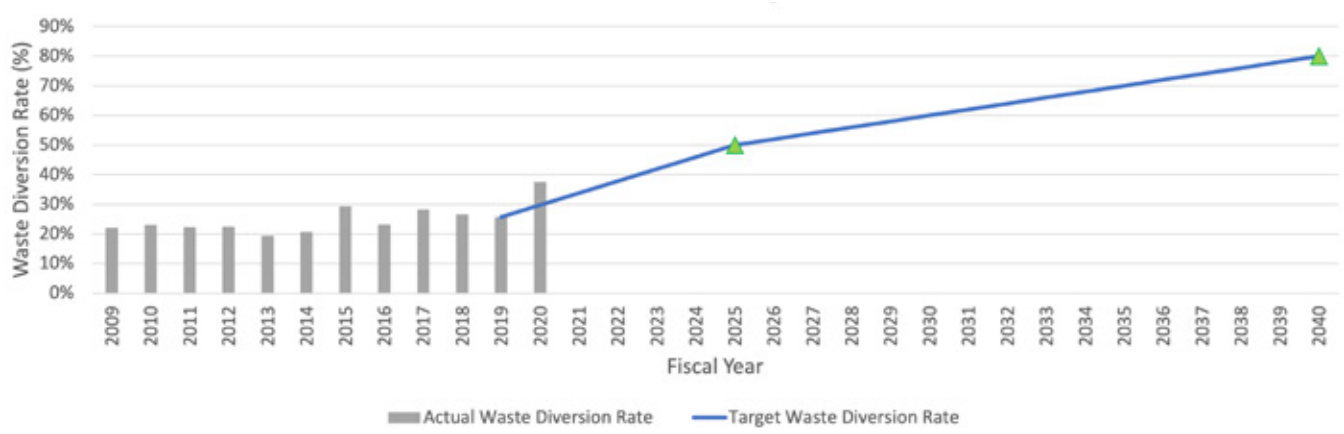
The waste diversion rate represents the percentage of waste generated at VTA facilities that was diverted away from landfills through either recycling or composting. VTA had a diversion rate of 38% in FY 2020 representing a 70% increase in waste diversion compared to the baseline year, which had a diversion rate of 22%. Table 2.6 presents the waste in tons for each category along with the diversion rate for that year.

Table 2.6 **Weight by Waste Type (Tons) and Diversion Rate**

Fiscal Year	Landfill Waste (tons)	Recycled Waste (tons)	Composted Waste (tons)	Diversion Rate (Recycled + Composted)/Total Generated Waste
2009	1,202	176	164	22%
2010	1,169	184	167	23%
2011	1,234	168	187	22%
2012	1,211	166	185	22%
2013	1,250	136	165	19%
2014	1,204	141	175	21%
2015	1,150	160	316	29%
2016	1,235	160	214	23%
2017	1,365	279	259	28%
2018	1,195	210	224	27%
2019	1,151	186	212	26%
2020	1,058	298	337	38%

VTA targeted a waste diversion rate of 30% in FY 2020 but exceeded expectations by achieving a 38% diversion rate as demonstrated in Figure 2.6.[9] To stay on track towards achieving the FY 2025 target, VTA will need to maintain the same rate of waste diversion next year and increase the rate by at least 10% in subsequent years.

Figure 2.6 **Waste Diversion Rate Targets**



3 Conclusions and Recommendations

VTA is on-track towards meeting short-term targets identified for FY 2025 in all KPI areas. However, the FY 2020 data only accounts for a short period of time, between March and June 2020 and when VTA was operating under the County's shelter-in-place order. Although, the statewide shelter-in-place order was lifted in January 2021, Santa Clara County continued to stay in the purple tier until March 2021. The data for FY 2021 will show a complete year of operations under COVID-19 restrictions. While the COVID-19 implications to VTA's environmental performance in FY 2021 and beyond are unknown, some predictions are provided below.

VTA operated service up to 80% of pre-COVID levels in FY 2021. Instead of taking transit to work, school, and special events, travel was limited to essential trips. Transit service increased slightly in July 2020 to accommodate new BART service in Milpitas and San Jose; in August 2020 to restore suspended routes to respond to demand; and in February 2021 to help alleviate passenger pass-ups on the network's busiest routes due to social distancing requirements. However, for most of the fiscal year, VTA reduced peak-period service,

[9] Potable water is defined as water that is treated to levels that meet state and federal standards for human consumption.

express bus service, and school service, and provided less frequent light rail service. As a result, VTA expects GHG emissions, criteria air pollutants, and fleet energy use to remain low in FY 2021.

Natural gas use is anticipated to increase in FY 2021, and potentially beyond, as outside air flow is increased to improve ventilation in compliance with CDC guidelines. Regulating indoor temperatures during the summer and winter months will require many changes to cooling and heating systems at facilities. However, overall building energy consumption is expected to decline in future years as facility retrofits are made. For example, a project to replace outdoor light fixtures with LEDs is currently underway and expected to be complete at the end of 2021.

Potable water use is predicted to remain low in FY 2021 and future years. Potential increases in water use associated with more frequent cleaning of facilities during COVID-19 may be offset by decreased indoor water use from employees working from home.

There is a potential that more trash will be sent to the landfill in FY 2021 than recycled because of the rise in personal protective equipment (PPE), single-use plastics, and other disposables used to disinfect vehicles and facilities. Additional PPE, including face masks, face shields, gloves, and full coveralls, was issued to VTA operators and front-line workers in FY 2021. These items cannot be recycled. There was also an increase in single-use plastics and other disposable items used by staff and customers when in-person dining was closed. However, this increase is expected to be temporary and waste diversion rates will improve when recycling and composting programs can be expanded.

To reach the long-term targets set for FY 2040, VTA will need to focus on accelerating the transition to zero-emission vehicles and upgrading to 100 percent renewable sources of energy.

Santa Clara Valley Transportation Authority

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3331 N. First Street, San Jose, CA 95134
Administration (408) 321-5555
Customer Service (408) 321-2300

www.vta.org