Measuring VTA's Environmental Progress

SUSTAINABILITY REPORT





MAY 2015

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Executive Summary

Annual reporting was adopted as part of VTA's Sustainability Program in February 2008. This is VTA's seventh annual sustainability report. The report documents our progress toward meeting sustainability objectives and targets.

In comparison to the previous reporting year (2013), VTA reduced electricity usage by 2 percent, natural gas usage by 23 percent, and hazardous waste by 37 percent. Solid waste generation stayed consistent. Water use increased by 4 percent primarily due to higher levels of irrigation as a result of ongoing dry conditions.

2014 is marked with several achievements including:

- A recycled water connection to the bus wash facility at Chaboya Bus Division
- A new Sustainable Fleet Policy to reduce emissions and pollutants from vehicle operations and maintenance
- Utilization of a new utility management software to monitor usage and costs at our facilities
- Replacement of fluorescent and High Pressure Sodium light fixtures with LEDs at light rail station platforms and operating divisions

- Initiation of a partner project with Information Technology to manage toner and printing supplies, reduce office paper use, and remove underutilized equipment
- Participation in a Federal Transit Administration Program designed to help agencies implement an Environmental Management System, using the 14001 Standard of the International Organization for Standardization
- Electric vehicle charging station pilot program at River Oaks
- Initiation of a pilot program to replace traditional open-air trash cans with solarpowered trash and recycling compacters
- Extensive coordination to meet sustainability design and construction goals for VTA's BART Silicon Valley Berryessa Extension Project.

Future projects include conducting an inventory of greenhouse gas emissions and expanding lighting retrofit projects to additional facilities.

To learn more about VTA's Sustainability Program, visit *www.vta.org/sustainability*.





About VTA

The Santa Clara Valley Transportation Authority (VTA) is an independent special district that provides bus, light rail, and paratransit services, as well as participates as a funding partner in regional rail service. As Santa Clara County's congestion management agency, VTA is responsible for countywide transportation planning, including congestion management, design and construction of specific highway, pedestrian, and bicycle improvement projects, as well as promotion of transit-oriented development.

VTA Facts

Total Ridership FY'14 43,428,492
Service Area
Total County Population1.8 million
Bus Ridership (avg weekday FY'14)105,969
Light Rail Ridership (avg weekday FY'14)35,012
of Buses
of Light Rail Cars
Bus Routes
Bus Stops
Light Rail Lines
Light Rail Stations
Miles of Bus Routes (round trip) 1,236
Miles of Light Rail Track
Total Operating Budget \$380 million
Total Capital Program Budget\$4.5 billion
of Employees2,100 (70% are in Operations)
On Time Performance86% (Bus), 85% (Light Rail)



Report Purpose and Scope

Purpose

The purpose of this report is to measure, track, and effectively manage current and future sustainability program initiatives. Annual reporting was adopted as part of VTA's Sustainability Program in February 2008. The strategy is stated as follows: "Establish benchmarks to measure the progress and performance of VTA's Sustainability Program and report back to the VTA Board of Directors on an annual basis. Among other actions, this report will involve reassessing VTA's fuel, electrical, and water usage on a regular basis."

Scope

The scope of this report is limited to the following main facilities: Cerone Bus Division (North San Jose), Chaboya Bus Division (South San Jose), North Bus Division (Mountain View), Guadalupe Light Rail Division (Downtown San Jose), and River Oaks Administrative Division (North San Jose).

VTA's Cerone facility includes the Cerone Bus Operating Division, the Overhaul and Repair (O&R) Division, and the Distribution Center. Cerone Minor Maintenance serves as a base for operations, fueling, servicing, detailing, running repair, and preventive maintenance. The O&R facility provides a centralized major maintenance program for the entire VTA bus fleet, including paint and body repair, upholstery, farebox repair, transmission and small component rebuild, engine overhaul, and heavy repair and maintenance associated with major component removal. This facility also supports steam cleaning and a water treatment plant to treat wastewater from cleaning operations. The Distribution Center is responsible for the distribution of parts to support all bus operating divisions.

Chaboya Division is VTA's largest-capacity bus operations and maintenance facility. The facility includes a maintenance shop, fueling facility, two bus washers, transit operations, bus operator training, a maintenance training building, a facilities maintenance building, steam cleaning equipment, and a water treatment plant to treat wastewater from cleaning operations.

North Division is the smallest of VTA's bus operating facilities and includes a maintenance shop, fueling facility, bus wash, transit operations, steam cleaning equipment, and a water treatment plant.

Guadalupe Division is responsible for all light rail operations and maintenance functions, including major vehicle overhaul, historic trolley maintenance, and light rail operator and maintenance training. This facility is also home to the Way, Power and Signal Department, which is responsible for preventive maintenance and repair of wayside facilities including substations and overhead contact systems, light rail signals, tracks, stations, and park & ride lots. The Operations Control Center, a communication and emergency response hub for coordinating and directing all Bus and Light Rail Transit Operations, is also located here.

River Oaks Division includes VTA's administrative offices and Office of the General Manager.

Sustainability Program Overview



Introduction

The Sustainability Program was approved by the VTA Board of Directors in February 2008. The goal of the Sustainability Program is to strengthen VTA's commitment to the environment by reducing the consumption of natural resources, the creation of greenhouse gases, and the generation of pollution in the provision of public transportation services. The strategies to achieve this goal include educational programs and outreach, transit-oriented development, increasing sustainability at existing facilities, incorporating green building practices in new facilities, developing environmental preferable procurement strategies, and establishing a means of measuring the progress of the Sustainability Program.

Sustainability Commitment

Our sustainability mission is inherently linked to providing the public with a safe and efficient countywide transportation system. Those who choose to ride public transportation reduce their carbon footprint and conserve energy by eliminating travel that would have otherwise been made in a private vehicle. The result is fewer vehicle miles of travel and reduced emissions. According to a 2010 report by the Federal Transit Administration (FTA), public transportation reduces U.S. travel by an estimated 102.2 billion in vehicle miles traveled each year. In 2009, VTA became a founding signatory of the American Public Transportation Association (APTA) Sustainability Commitment. The Commitment sets out common sustainability principles, an action plan, and a course for progress. VTA is currently at the Bronze level, but could move up to Silver, Gold or Platinum as we achieve our goals. Under Bronze, VTA is committed to reduction targets of 2 percent over the baseline within two years. These reduction targets have been met for VTA's five main operating divisions and are being explored for other facilities.

There is no dedicated source of funds for the Sustainability Program. Funding is dependent on the two-year budget process. In FY 14/15, VTA budgeted \$1.2 million for the program. Future funding would enable VTA to continue current and planned projects.

Sustainability Team

A Sustainability Team of 8-12 employees meets bimonthly to plan projects and monitor the progress of VTA's Sustainability Program. Members of the Sustainability Team represent VTA's diverse array of responsibilities and functions including Operations, Facilities Maintenance, Engineering, Construction, Fiscal Resources, and Planning and Program Development. In addition, approximately five employees allocate a portion of their time to support the program.



Graph 1: Miles per gallon (diesel fuel) from FY2008-FY2014



Fuel

Most of the bus fleet uses ultra-low sulfur diesel fuel (15 parts per million). Community buses and non-revenue vehicles use gasoline. Community buses began revenue service in 2007. In 2009, VTA introduced biodiesel and started to replace older buses with dieselelectric hybrids. The vehicle fleet breakdown by fuel type in 2014 is 91 percent diesel, 3 percent biodiesel, and 6 percent gasoline.

In 2014, VTA spent approximately \$13.9 million and used 4.3 million gallons of fuel. Graph 1 shows the change in fuel economy of the diesel bus fleet. Miles per gallon was calculated using the total service miles driven and diesel fuel consumed for each fiscal year. Fuel economy increased by 12 percent since the baseline year. In 2014, diesel-electric hybrids made up 18 percent of the total fleet.

Graph 2: Electrical Usage at



Energy

VTA's electricity and natural gas is supplied by Pacific Gas and Electric (PG&E), City of Palo Alto, Silicon Valley Power (City of Santa Clara), and Solar Star. At Cerone Division, VTA uses propane for heating.

Electricity Usage and Costs

In 2014, total electricity use for our main divisions and traction power, which operates the light rail system, was 30.1 million kilowatt hours (kWh), enough to power 2,500 homes. This is approximately 5 percent lower than the previous year and 22 percent lower than the 2007 baseline year. The reduction in usage since the baseline year is primarily a result of implementing best practices for traction power, which is the largest user of electricity. These practices include optimizing the number of cars per train and turning off auxiliary power systems for trains parked at the light rail division.

The electricity use at VTA's main operating divisions, excluding light rail, is shown in Graph 2. Electricity use is lower at Chaboya North, and Cerone where solar panels are installed. Since the 2007 baseline year, VTA's electricity use has decreased by 10 percent. Usage decreased by 2 percent compared to the previous year. Despite the reduction in usage, electrical costs increased by 11 percent. In 2014, VTA spent \$1.2 million on electricity, excluding traction power.

The total cost of electricity in 2014 with traction power was \$4.57 million.

Solar Production

In 2011, solar panels were installed at Cerone, Chaboya, and North Bus Divisions. Solar electricity is procured through a Power Purchase Agreement (PPA). Under a PPA, VTA purchases 100% of the energy that is generated by solar panels operated and maintained by SunPower. By using solar energy generated onsite, VTA is able to reduce the necessity for grid-provided energy and reduce greenhouse gas emissions. Excess electricity generated during summer months is fed back into the grid through net energy metering. This allows VTA to accumulate credit with PG&E to apply towards high summer rates and offset electricity purchases at night or cloudy days.



Graph 3: Cumulative Solar PV Generation, 2012 to 2014

Graph 4: Electricity usage at VTA site by source, 2014



Graph 3 shows the annual solar energy generation in kWh from 2012, the first year of production, to 2014. Solar energy generation at Chaboya Division increased after the first year of production, but decreased at Cerone and North. Solar energy generation decreased at all locations compared to 2013, but especially at North Division, due to two periods of equipment failure.

Graph 4 shows the electricity usage by source. In 2014, the ratio of electricity usage offset by solar was approximately 60 percent at Cerone, 69 percent at Chaboya, and 67 percent at North.

Cerone and North Divisions are underperforming relative to original forecasts. Underlying causes for system underperformance are attributed to (1) production losses during the summer months due to inverter outages and soiling of the panels and (2) lower-than-expected increases in utility rates. Despite underperforming, overall the VTA solar installations saved money and reduced greenhouse gas emissions.

Natural Gas Usage and Costs

In 2014, VTA spent \$104,657 on natural gas and used 109,015 therms. Natural Gas is used primarily at Chaboya, North, and Guadalupe Divisions for heating. River Oaks Division uses a small amount of natural gas for heating water.

The natural gas use at VTA's main operating divisions, excluding Cerone Division which uses propane, is shown in Graph 5. Since the 2007 baseline year, our natural gas use decreased by 18 percent. Usage decreased by 23 percent compared to the previous year, resulting in a cost savings of \$3,800.

Water

VTA's water is supplied from Great Oaks Water Company, San Jose Water Company, and the cities of San Jose, Santa Clara, Sunnyvale, Milpitas, Morgan Hill, Mountain View, and Palo Alto.



Graph 5: Natural Gas Usage at

The water use at VTA's main operating divisions is shown in Graph 6. Since the 2007 baseline year, our water use increased by 10 percent. Overall, VTA spent \$133,104 and consumed 26.1 million gallons of water in 2014, enough to fill 39 Olympic-sized swimming pools. Usage increased by 4 percent compared to the previous year. The increase in usage is a result of the drought and vehicle washing. River Oaks Division consistently uses more water than the other divisions due to irrigation. Higher water use in 2014 is attributed to water line breaks at Cerone and River Oaks and problems with back flushing at a bus wash facility. These issues have been resolved and part of the irrigation system at River Oaks is being capped to prevent future leaks.



Graph 6: Water Usage at VTA's Main Operating Divisions

Waste

VTA's solid waste and recycling providers are Republic Services and the City of Mountain View. Graph 7 shows the annual waste and recycling generation at VTA's main operating divisions. Waste and recycling fluctuates seasonally and from year-to-year based on operations. In 2014, approximately 530 tons of materials (mixed paper, plastic, aluminum, glass, wood, and metal) were recycled and 1,193 tons of waste were collected by VTA's solid waste providers, representing a waste diversion rate of 31 percent. Overall, waste has been reduced 40 percent since 2007. Waste levels have stayed consistent compared to the previous year.



Graph 7: Solid Waste Levels at

Hazardous waste is generated at Chaboya, North, Cerone, and Guadalupe Divisions. Waste streams include steam cleaner and bus wash sump interceptor waste and absorbent pads used to remove oil and grease and clean small spills. In comparison to the 2006 baseline year (attributed to a four year reporting cycle), hazardous waste decreased by 184 tons. In 2014, we generated 81 tons of waste, a 37 percent reduction compared to the previous year. The reduction in waste results from fluctuations in maintenance activities, improvements in waste management, and increased employee education and awareness.





Projects

Current and Ongoing Projects

This section describes current and completed projects supported by the Sustainability Program.

Recycled Water Connection

Using recycled water helps conserve drinking water supplies, provides a dependable, locally-controlled water supply, and reduces dependency on imported water and groundwater.

A project to provide recycled water to the bus wash facility at the Chaboya Bus Division was initiated in 2014 and completed in January 2015 at no cost to VTA. The project was constructed by San Jose Water Company in partnership with the City of San Jose and South Bay Water Recycling. The use of recycled water to wash buses is estimated to reduce VTA's water bill by \$4,000 per year.

In addition to Chaboya, recycled water is also used for irrigation at North Bus Division. Potential recycled water connections are being investigated at other facilities.

Vehicle Replacement

VTA continues to replace revenue and nonrevenue vehicles that have exceeded their useful lifespan with fuel efficient hybrids. In December 2014, VTA adopted a Sustainable Fleet Policy, which aims to reduce emissions and pollutants from both vehicle operations and maintenance. All revenue and non-revenue vehicles (excluding light rail vehicles) will be subject to minimum MPG requirements and maintenance guidelines, as well as goals to adopt cleaner technologies. A Green Fleet Team will be responsible for guiding implementation and keeping a vehicle inventory.

Utility Management Software

In 2014, VTA started using a utility management software to monitor utility usage and costs at our facilities. Historical data is currently being uploaded and verified. The software will enable VTA to identify opportunities for efficiency improvements, catch mistakes on invoices, and identify leaks. Once the software is fully integrated, VTA will develop a GIS program to improve monitoring and locating of utility meters.



Lighting Retrofits

Fluorescent and High Pressure Sodium light fixtures are being replaced with LED fixtures. The LED fixtures contain no hazardous material and are manufactured in the USA. The benefits of LED lighting include: lower wattage and energy use, better quality lighting, and lower maintenance costs.

In 2014, VTA retrofitted 139 light fixtures at the following light rail station platforms: Civic Center, Children's Discovery Museum, Gish, Metro, Karina, Component, Bonaventura, Orchard, River Oaks, and Tasman. The light rail station retrofits are estimated to save \$11,000 per year with a return on investment period of less than 3 years. The lighting retrofits conserve enough energy to power 5 homes for one year and reduce greenhouse gas emissions by 39.6 metric tons. Light fixtures at VTA's main operating divisions are being retrofitted on an ongoing basis. To date, over 3,200 fixtures have been replaced mostly at Cerone, Chaboya, Guadalupe, and North Divisions. There are opportunities to conserve energy at the River Oaks Division through additional lighting retrofits and converting to natural gas for heating.

Office Paper Reduction and Document Management

In 2014, VTA initiated a Managed Document Services (MDS) project with Ricoh USA, Inc. to manage toner and printing supplies, reduce office paper use, and remove underutilized equipment (e.g. printers, scanners, fax machines). The MDS team, comprised of Information Technology, Sustainability Program, and Ricoh, meets monthly to evaluate usage and implement solutions to optimize the office print environment.

A full inventory and asset tagging of networked printers and multi-functional (print, copy, scan) devices was performed and a monitoring software was installed in late 2014. January 2015 was the first full month of data collected. As shown in Graph 8, the majority of documents at VTA are printed rather than scanned. The total print volume in January 2015 is equivalent to approximately 119 reams of paper. Less than 20 percent of the total volume was printed double-sided. There are nearly 200 networked printers installed and 88 multi-functional devices. To date, 15 percent of the networked printer fleet has been reduced to encourage the use of multi-functional devices and electronic scanning.



Graph 8: Volume of Office Paper Printed v. Scanned, January 2015



Environmental Management System Institute

In 2013, VTA was accepted into the Federal Transit Administration's (FTA) fourth round of Environmental Management Systems (EMS) training and technical assistance for public transportation agencies. FTA's 18-month program is designed to help agencies develop and implement an EMS, using the 14001 Standard of the International Organization for Standardization (ISO).

In 2014, a pilot EMS was implemented at Cerone Bus Division. The primary benefits include improved employee awareness of potential environmental impacts of work activities and improved record keeping of corrective actions. VTA's EMS Core Team meets monthly and engages management in its progress towards continual improvement and pollution prevention.



Waste Reduction and Recycling

Continual improvements have been made to VTA's recycling programs and services to reduce waste. In 2008, battery recycling was expanded to administrative offices. In 2009, compost containers were added to the employee cafeteria to collect food scraps. Between 2010 and 2013, recycling posters and containers were updated to reflect changes in our waste contract.

In 2014, we began a pilot program to replace traditional open-air trash cans with solar-powered trash and recycling compacters. The high-tech trash eaters, called Big Belly trash cans, hold 5 times the amount of waste thanks to the on-site



Electric Vehicle Charging Stations

In 2013. VTA received a free electric vehicle (EV) charging station from ChargePoint and purchased a second charging station, which were installed at River Oaks Division under an initial pilot program. The pair of stations provide the ability to charge four EVs simultaneously and are open to the public and employees for a cost of \$1.25

per hour. Graph 9 shows the usage from 2013 to date. The average number of sessions was 120 per month, at an average length of 2.5 hours per session. Given the high demand, we are evaluating the feasibility of installing charging stations at other facilities.



compaction. The compactor, sensors, and wireless card are powered by a solar panel on the roof of the unit. When the trash reaches the height level of the sensor, the compactor activates. Those sensors also track the unit's fullness level and identify mechanical problems—sending status updates wirelessly to our Bus Stop Maintenance Department. The extra capacity has the potential to reduce pickups from 7 to 2 times per week, thus saving VTA money in labor and fuel. The pilot program is currently in place at Great Mall Transit Center with estimated cost savings of \$3,000 per month.

Silicon Valley Berryessa Extension

Sustainability is a key component for VTA's 10-mile BART Silicon Valley Berryessa Extension Project. Aggressive waste diversion goals, potable water reduction, recycled content in concrete, and a project-wide "carbon footprint" analysis are required during construction. Sustainable design features include using LED lighting, skylights, photovoltaics in parking structures, native and/or drought-tolerant plants, reclaimed water for landscaping, and low-flow fixtures, when possible.

Stations are designed with amenities such as pedestrian walkways, bike paths, bicycle storage rooms, bus-only lanes, bus transfer centers, private shuttle areas, and a direct connection to the existing Montague Light Rail Station in Milpitas to encourage station access by modes other than single-occupant vehicles. Projected daily BART ridership for the Project will reduce regional traffic congestion and greenhouse gas emissions by



over 3,400 tons per year. This is equivalent to over 1,100 full-grown elephants weighing an average of 3 tons each, or 1,700 households' annual municipal garbage.

Outreach and Education

One of VTA's ongoing goals is to increase environmental awareness and promote environmental stewardship in the workplace and in the local community. Ongoing outreach and education to employees include introduction of the Sustainability Program at each New Employee Orientation, Bike to Work Day competitions, Spare the Air Alert messages when a Bay Area Spare the Air Day is issued, and annual Earth Day events.

In addition, VTA's Sustainability Program works collaboratively with Sustainable Silicon Valley, Joint Venture Silicon Valley, and local agencies to combat climate change and promote environmental stewardship. For example, VTA is a task force member for the Silicon Valley 2.0 Project, a regional effort, managed by the Santa Clara County Office of Sustainability and funded by the Strategic Growth Council, to minimize the anticipated impacts of climate change and reduce the generation of local greenhouse gas emissions.





Completed Projects

Prior to the implementation of a formal sustainability program, VTA made ongoing improvements to improve operations and reduce costs. Examples include: Energy Management System upgrades (2004); replacing HVAC equipment with more efficient models (1997 to 2006); and installing cool roofing materials (2005).

In 2008, when the Sustainability Program was adopted, audits were completed to analyze operations and identify improvements, including formal audits by PG&E and the Santa Clara Valley Water District. The Sustainability Team focused on "low-hanging fruit" items first and was able to accomplish over \$800,000 in annual savings. Past accomplishments since the adoption of VTA's Sustainability Program are described below.

Energy Conservation

In 2011, 5,070 SunPower high-efficiency solar panels, totaling 2.1 megawatts, were installed over parking areas at the Cerone, Chaboya, and North Divisions. The solar panels will save \$2.7 million in electricity costs over the next 20 years and reduce carbon dioxide levels by an estimated 2,000 metric tons each year, which is equivalent to removing more than 9,000 cars from California's roads over the next 20 years.

In 2009, VTA implemented several initiatives to conserve energy and reduce costs. First, we optimized the peak and non-peak hour number of cars per light rail train and began turning off auxiliary power systems for parked light rail trains. PG&E estimates these measures achieved an annual electricity savings of approximately six million kilowatt hours, avoided three million pounds of greenhouse gases, and resulted in annual cost savings of approximately \$723,000. Second, a submeter was installed at the Guadalupe Light Rail Division, which helped identify \$107,000 in overcharges in PG&E's billing. Third, modifications were completed at the River Oaks Division to enable participation in PG&E's Automated Demand Response Program to reduce electricity usage during periods of high demand. VTA received \$35,000 to help fund the modifications. Finally, VTA partnered with a local technology company to install a pilot 27-kilowatt High Gain Solar Plant at the Cerone Division at no cost.

In 2008, VTA partnered with PG&E to complete Integrated Energy Audits of our main operating divisions. The audits recommended retrofitting existing fluorescent and metal halide lighting fixtures with energy efficient models. To date, VTA has replaced over 3,000 lighting fixtures. Occupancy sensors have also been installed in conference and break rooms per audit recommendations.

Water Conservation

In 2010, VTA replaced most of the bottled water coolers (some retained for emergency supply) at our main operating divisions and administrative offices with new filtration units. The switch results in 75 percent cost savings and reduced environmental impacts associated with transport, delivery, and bottling of water.



In 2008, Water Use Surveys were conducted in partnership with the Santa Clara Valley Water District to identify indoor and outdoor water use savings. As a result, VTA installed over 90 bathroom fixtures with low-flow equipment, including High Efficiency Toilets that use one third less water per flush. The following improvements were also made to irrigation systems:

- Installed automatic shut off-flow sensors on backflow preventers at five park-and-ride lots (Great Mall, Penitencia, I-880 Milpitas, Evelyn and Hostetter) to monitor abnormally high or low flows and automatically shut off flow to avoid unnecessary water usage.
- Installed weather-based irrigation controllers at 21 facilities to manage irrigation and configure watering schedules remotely, which results in potential savings of 12 million gallons of water and \$37,000 per year.
- Replaced sprinkler nozzles with more efficient MP Rotators at 4 park-and-ride lots (Penitencia Creek, Hostetter, Great Mall, and River Oaks).

Other Completed Projects

In 2009, VTA's Sustainability Program funded projects to update bike lockers and purchase fuel efficient non-revenue vehicles. The funding assisted with the conversion of 110 bike lockers across 12 transit centers, to utilize BikeLink smart cards. The BikeLink smart cards enable on-demand bike parking to facilitate a greater number of users. In addition, 15 fuel-efficient hybrids were purchased to retire older vehicles in the non-revenue fleet. Cerone Division was grazed by a herd of goats and sheep between 2009 and 2012. The animals were managed by Living Systems Land Management and offered a natural and costeffective solution to weed and grass mowing. However, the grazing was discontinued due to potential impact to burrowing owls.

Future Projects and Goals

In 2015, VTA will continue to make progress on current projects including implementing a utility management software, installing additional EV charging stations, reducing waste, and others as described above. Since water use has increased over the past year, particular attention will be focused on reducing irrigation use, enforcing our existing Sustainable Landscaping Policy, and studying opportunities for recycled water connections.

Future projects include conducting an inventory of greenhouse gas emissions and expanding lighting retrofit projects to additional facilities. Conducting a greenhouse gas (GHG) inventory is important to VTA because public transportation is part of the solution to the growing problem of climate change. Transportation is the single largest consumer of energy in the United States, accounting for nearly one-third of total U.S. GHG emissions. For VTA, GHG emissions produced by buses, light rail trains, and the operation of facilities is offset by the displacement of GHG emissions by taking cars off the road, reducing congestion, and supporting transit-oriented development. VTA seeks to quantify its emissions using APTA methodology. Finally, VTA will explore opportunities to retrofit existing light fixtures at little or no cost. While we have already made significant progress in reducing our energy use, additional retrofits are needed to completely convert our lighting to LED technology.





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