SJSU SAN JOSÉ STATE UNIVERSITY

Annual Sustainability Report

FY 13/14

Prepared by: Facilities Development & Operations

SJSU SAN JOSÉ STATE UNIVERSITY

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Introduction

San Jose State University (SJSU) is dedicated to building and maintaining a sustainable environment by balancing environmental protection, academic program requirements, community leadership and financial feasibility.

World Commission on Environment and Development definition of Sustainability: Use of natural resources to meet current needs without compromising the needs of future generations.

The Talloires Declaration

In 2009, the University became a signatory to the Talloires Declaration, an international commitment to sustainability in higher education that was signed by over 360 universities in more than 40 countries. Key principles from the Declaration that have become part of our sustainability dialogue include practicing "institutional ecology," "increasing awareness of environmentally sustainable development," "creating an institutional culture of sustainability," and "educating for environmentally responsible citizenship."

Many new and emerging academic programs are responsive to students' interest in pursuing green jobs. Environmentally conscious student development, with the integration of sustainability into the campus and curriculum, will improve California as over 95,000 CSU graduates join the state's skilled workforce each year.

Facilities Development & Operations (FD&O) has the responsibility to be a wise steward of university resources through various endeavors, such as green building design, energy efficiency, water conservation, waste diversion, vehicle retrofits, and green procurement.

The CSU Sustainability Policy

The CSU Sustainability Policy was approved in May 2014 that will further incorporate sustainability into our educational curriculum, reduce our greenhouse gas emissions to 1990 levels by 2020, improve waste management, promote sustainable procurement, and provide sustainable food service. In addition, the policy revised existing guidelines to pursuing energy procurement, energy and water conservation, sustainable building practices, and physical plant management.

Campus Highlights

- Since 2009, major energy projects, such as lighting, building, and chiller plant upgrades, have saved approximately 58,000 megawatt-hours (MWh), 2.3 million therms, and $11 million dollars in utility costs. These projects over their lifetime will save almost $38.5 million dollars in utility costs, 200,000 MWh in electricity and 7.7 million therms of natural gas.

- Ongoing energy savings programs, such as monitoring-based commissioning and demand side management, save 11,000 MWh, 350,000 therms, and almost $2 million annually.

- Major water projects implemented have reduced water usage by 28%. Converting irrigation, indoor plumbing and cooling tower water to recycled water has saved 480 million gallons of water and more than $3 million. Low flow fixtures are expected to save an additional 20 million gallons of water over their lifetime.

- Ongoing recycled water usage will continue to save our campus 52 million gallons and $700,000 annually.

- Total greenhouse gas (GHG) emissions since 2010 have been reduced by a total of 726 metric tons with further reductions anticipated as more energy efficient projects and buildings are completed.

- The Student Union expansion was completed in the summer of 2014, built to LEED Gold standards and includes 125 kV solar photovoltaic panels that will generate 100,000 kWh per year.

- Spartan Shops achieved a 12% reduction in food waste. They successfully changed sourcing of all supply-stream with tableware that is recycled or compostable, meats and produce are locally grown and sustainable, and seafood is Marine Stewardship Council (MSC) certified.

Sustainability in Facilities Development & Operations

Understanding sustainability in facilities requires an understanding of the scope and complexity of our university. SJSU is very similar to a small city. We have approximately 34,000 students, 5,000 employees, over six million square feet of buildings, roadways, walkways, a building department, a utility department, a power plant, our own water system, sewer system, electrical and plumbing system, police department, etc. SJSU is one of three CSU campuses with a large cogeneration facility, the Central Plant, producing electricity, steam, and chilled water for most of the campus. The Cogeneration Unit produces 6 MW of electricity and buys 2 MW from Pacific Gas and Electric (PG&E) to fulfill the daily campus electrical demand. SJSU operates its own Public Water System that delivers 115 million gallons of potable water per year to the campus.

SJSU is the oldest CSU campus, with our oldest building, the Associated Students House built in 1904. The new Student Union, our newest expansion, was completed in 2014. SJSU is comprised of four sites totaling more than 6 million gross square feet with the main campus centrally located in one of the United States' most important urban and economic centers.

- Main Campus 88.5 Acres
- South Campus 62 Acres
- Aviation facility 5 Acres
- Moss Landing facility 21 acres

Having an appreciation of the physical and operational complexity of the university is helpful in order to understand and gauge progress in our sustainability efforts. We use key performance indicators – useful variables that are linked to sustainable practices and outcomes that can be measured by a consistent methodology over time. Over time, campus changes, such as building more on-campus housing, upgrading the utility distribution systems, lighting system conversions, and even weather and the economy can significantly impact natural resource demand. Therefore, analyzing trends in indicators and understanding the interdependency with university efforts is more meaningful than a snapshot at one point in time.

In 2013, SJSU adopted several indicators that we monitor in order to assess the effectiveness of our sustainability efforts. Green building efforts are assessed by percentage of campus square footage in LEED-certifiable buildings. Because the demands of the university increase as we build more capacity for students and classes, energy efficiency is best measured by energy intensity (BTUs per square foot) and monitoring greenhouse gas emissions. The number of commuters taking alternative transportation as well as multiple and single passenger vehicles are examined. Water use is measured by potable and recycled water usage. Solid waste and recycling efforts are defined by the percentage of solid waste that is diverted from landfills.

Energy Efficiency

The University of California (UC), California State University (CSU), and California's four large investor-owned utilities (PG&E, SDG&E, SCE and SoCalGas) established an Energy Efficiency Partnership (CSU/IOU) in 2004 in order to provide a sustainable and comprehensive energy management program for the 33 UC and CSU campuses. SJSU has utilized this program for funding energy conservation projects such as building systems and central plant retrofits, lighting retrofits, and MBCx projects. To date SJSU has received $4.5 million in incentive funding towards these projects.

Campus Energy Efficiency Achievements

Monitoring Based Commissioning (MBCx) is a process that involves installing meters and other monitors to see where energy is being used, to make systems work as efficiently as possible, and to provide tools and training on building systems to increase energy efficiency and savings.

MBCx was completed for: Martin Luther King Library; Chiller Plant; Business Complex; Moss Landing Marine Lab; Duncan Hall; Engineering; Central Classroom Building; MacQuarrie Hall; Sweeney Hall; Art; Music; and Dwight Bentel Hall. These commissioning projects are projected to save over 2,000,000 kWh of electricity and 185,000 therms of natural gas per year. These projects cost $1.3 million, but were offset with a $630,000 PG&E incentive. Annual utility savings are estimated to be approximately $500,000. MBCx has saved the university almost 13,000 MWh of electricity, 1 million therms of natural gas and a total savings of $3 million since implementation.

Lighting upgrades to install LED lighting were completed to Martin Luther King Library, all four of the garages, Hugh Gillis Hall, Science, Moss Landing Marine Lab, Washington Square Hall, Spartan Complex and the Computer Center. Projected electricity savings are estimated to be approximately 6,000 MWh per year. The upgrades cost $4 million with an offset of $2 million from PG&E. Over an average 15 year lifetime of Energy Star LED lighting fixtures, we are projected to save over 91,000 MWh and $13 million in electricity costs.

The chiller plant was replaced and the chilled water distribution system underwent a retrofit in 2012 for a total project cost of $6.6 million and a PG&E incentive of $1.3 million. Over a 20 year life expectancy, the chiller plant and distribution system will save 85,000 MWh of electricity, 5.8 million therms of natural gas, and reduce utility costs by $19 million dollars.

Building retrofits to the Business Tower, Duncan Hall and the Computer Center in 2012 have yielded annual savings of 1,100 MWh, 61,000 therms, and $230,000. Over the lifetime of most of these retrofits a total savings of $3.5 million is expected.

Upcoming Energy Efficiency Projects

The campus exterior lighting project is underway to replace all of the exterior lighting on campus with energy efficient LED lighting. The estimated CSU/IOU incentive payment is $200,000 based on an estimated annual energy savings of $70,000. Over a 15 year lifespan, this lighting project will save over $1 million.

The Joe West building will undergo a boiler and domestic hot water retrofit. The estimated annual energy savings total 82,000 kWh and 64,000 therms saving almost $2 million over its lifetime.

MBCx projects scheduled for next year include Central Plant Chiller and Clark Hall.

Ongoing Programs

Demand Side Management has been implemented at the Central Plant since 2003 when the Central Plant installed a thermal energy storage tank that generates ice at night when electrical rates are lower and ambient temperatures cooler. The ice is then used to produce chilled water for pumping into buildings during the day when cooling is needed. The system has saved more than 88,000 MWh of electricity and 1.65 million therms of natural gas since the project was implemented for a total of $15 million in utility costs and 44,000 Metric Tons of CO2 emissions per year.

As part of a statewide Demand Response System, SJSU voluntarily reduces energy use during periods of hot weather and high electrical load. For the 13/14 academic year, SJSU reduced our electrical load on average of 240 kW.

Utility System Upgrades

Continuous improvement in energy management and energy efficiency projects have maintained a steady decrease in our energy intensity (Figure 1) and greenhouse gas (GHG) emissions (Figure 3) despite an increase in square footage at the end of FY 13-14. During FY 10-11, SJSU mandated a furlough for its employees and building operations, which resulted in a temporary decrease in energy usage and GHG emissions for the year. As a result of this one time decrease, it made it appear as though there was an increase in utilities from FY10-11 to FY 11-12, which really was only the result of the temporary furloughs. Figure 2 below shows that the cost to produce our utilities, our overall amount of GHG emissions, and our overall energy intensity have decreased significantly due to energy efficiency projects.

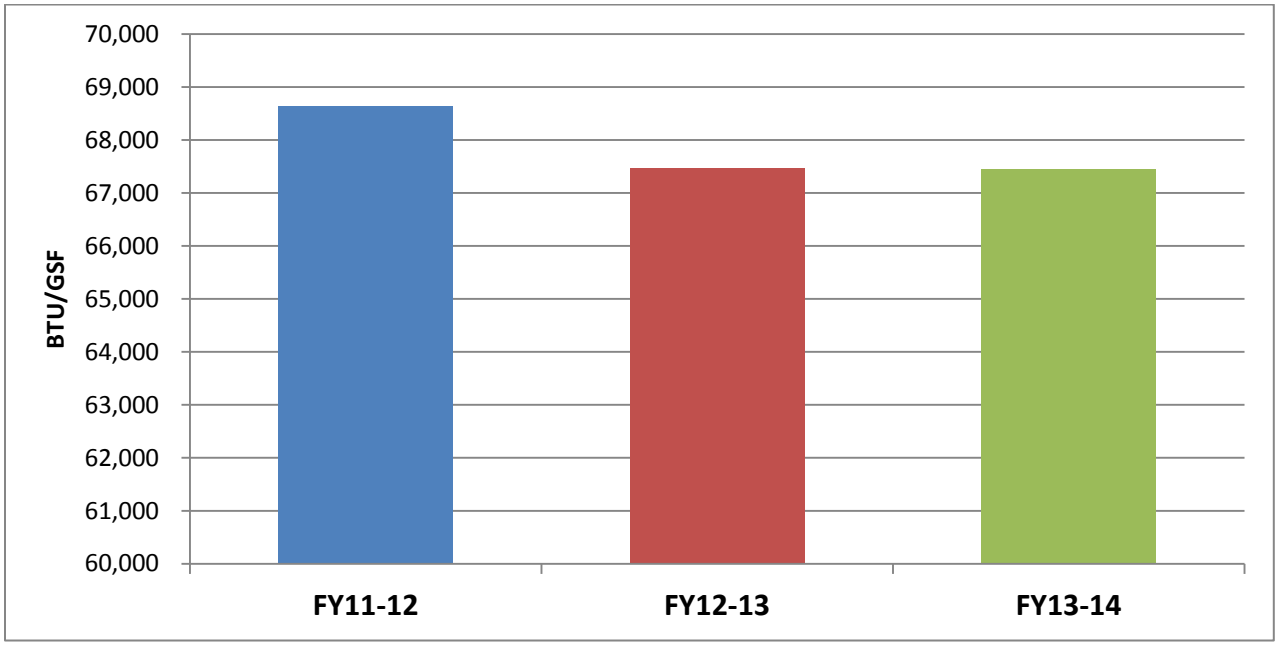

Figure 1. Energy Intensity - BTU per gross square footage

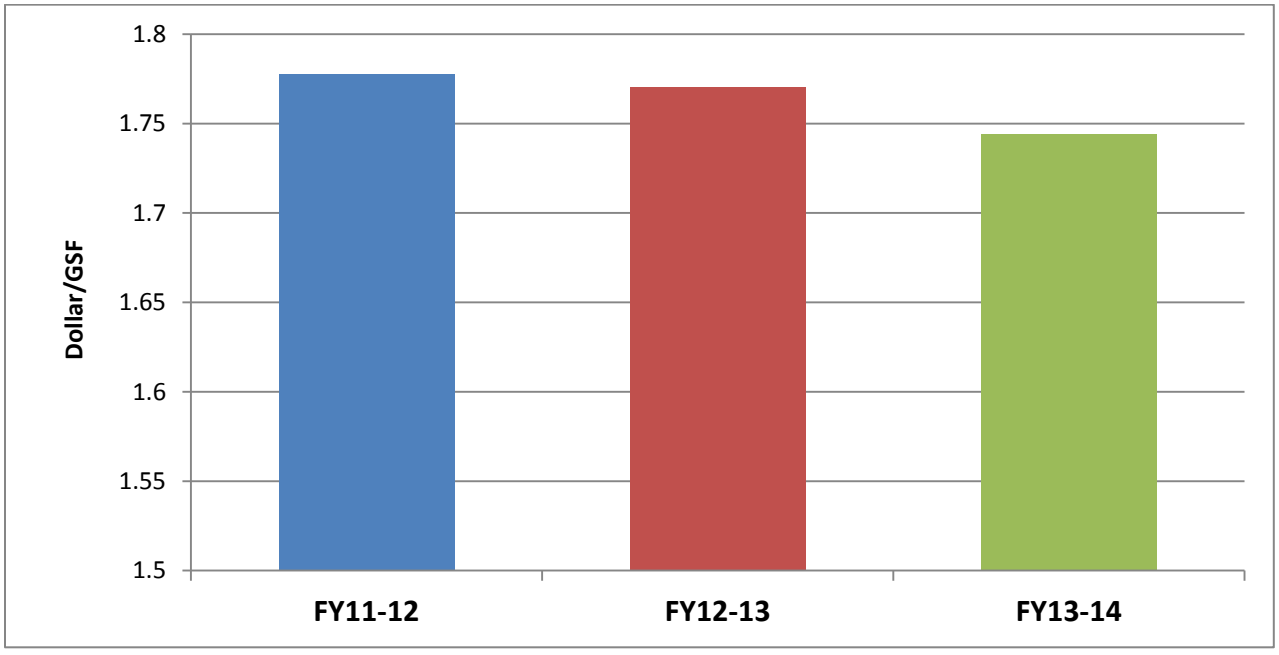

Figure 2. Utility Cost per gross square footage

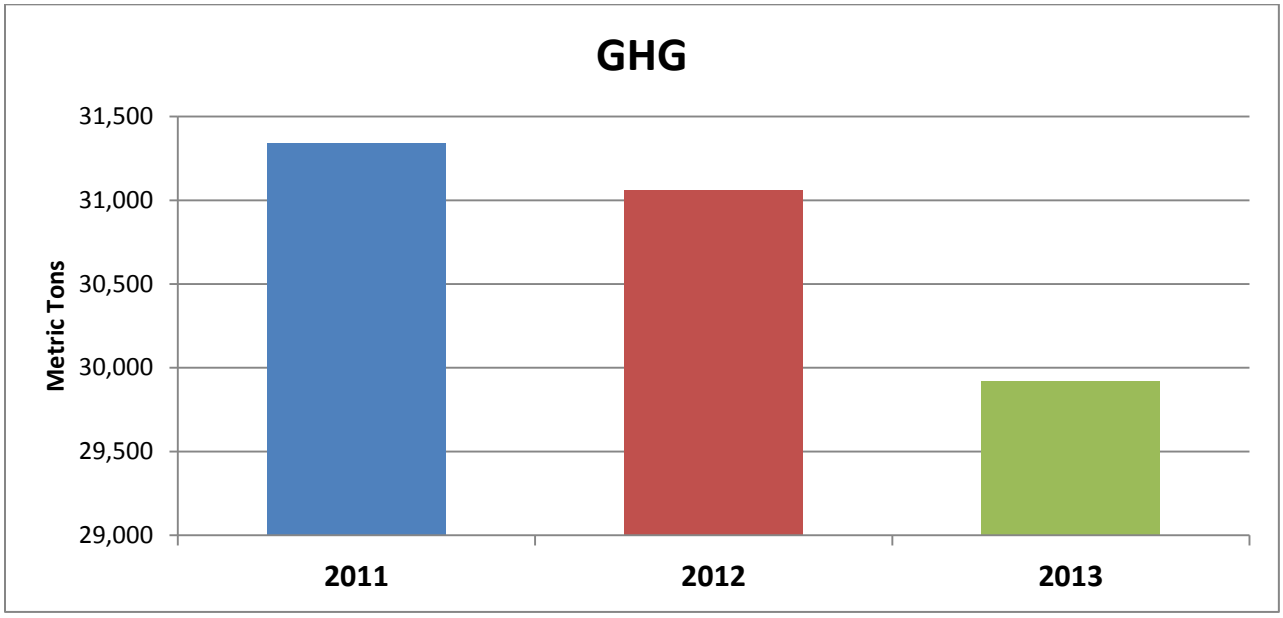

Figure 3. Greenhouse Gas Emissions

Future Energy Supply Strategy

The Utility Master Plan for SJSU specifies the approach to continue providing the campus with sustainable and reliable energy. Strategies include considering conversion of all buildings to 12kV as well as renewable energy sources such as solar panels (PV), fuel cells, and other low/no-fossil fuel technologies. New renewable energy sources are continually being reviewed and we continue to implement MBCx of campus buildings.

Green Building Design

The CSU has committed itself to sustainable building practices by establishing CSU Executive Order 987 (EO987).

All new buildings at SJSU are designed and built in accordance with LEED (Leadership in Energy and Environmental Design), a program administered by the United States Green Building Council (USGBC). Buildings have the potential to earn platinum, gold, silver or certified status in one of four categories of standards. LEED participation is consistent with SJSU's commitment to sustainability and the fulfillment of EO987 and Assembly Bill 32 by incorporating our local geography in building design, minimizing operating costs, maximizing energy and water efficiency, and choosing materials and systems whose total life cycle, from manufacture to replacement, minimize environmental impacts.

Student Union

The Student Union Expansion was completed in the summer of 2014. The Student Union Renovation is scheduled to be completed in fall 2015. The entire Student Union building is currently undergoing the certification process and is anticipated to be LEED Gold at the completion of the total project. 125kV solar photovoltaic (PV) panels on the roof are estimated to generate 100,000 kWh annually. This will save approximately $1.4 million in utility costs throughout the solar panels' 20 year lifespan.

The Student Union Expansion was completed with an estimated PG&E incentive payment of $550,000. Its mechanical design is 20% more efficient than Title 24 requires, amounting to energy savings estimated at $210,000 annually. A cool roof and water efficient fixtures have been installed. Dual plumbing was also installed for recycled water use in toilets, for estimated annual water savings of 4 million gallons.

Figure 4. Student Union West Expansion

Figure 5. Student Union East Expansion

Student Health and Counseling Building

The Student Health and Counseling Building is scheduled for completion in spring 2015. The Student Health and Counseling Building is designed to LEED Silver standards. Its mechanical design is 20% more efficient than Title 24 requires. A cool roof and water efficient fixtures have been installed. The building will be plumbed for recycled water in toilets similar to the Student Union.

Figure 6. Student Health and Counseling Building

Spartan Complex

Spartan Complex (SPX) is estimated to be completed by fall 2015 and designed to LEED Silver standards.

Figure 7. Spartan Complex Renovation and Expansion

Campus Village 2

Campus Village 2 is estimated to be completed in fall 2016 and designed to LEED Silver standards.

Figure 8. Campus Village 2

Recreation and Aquatic Center

The Recreation and Aquatics Center is estimated to be completed in 2018 and designed to LEED silver.

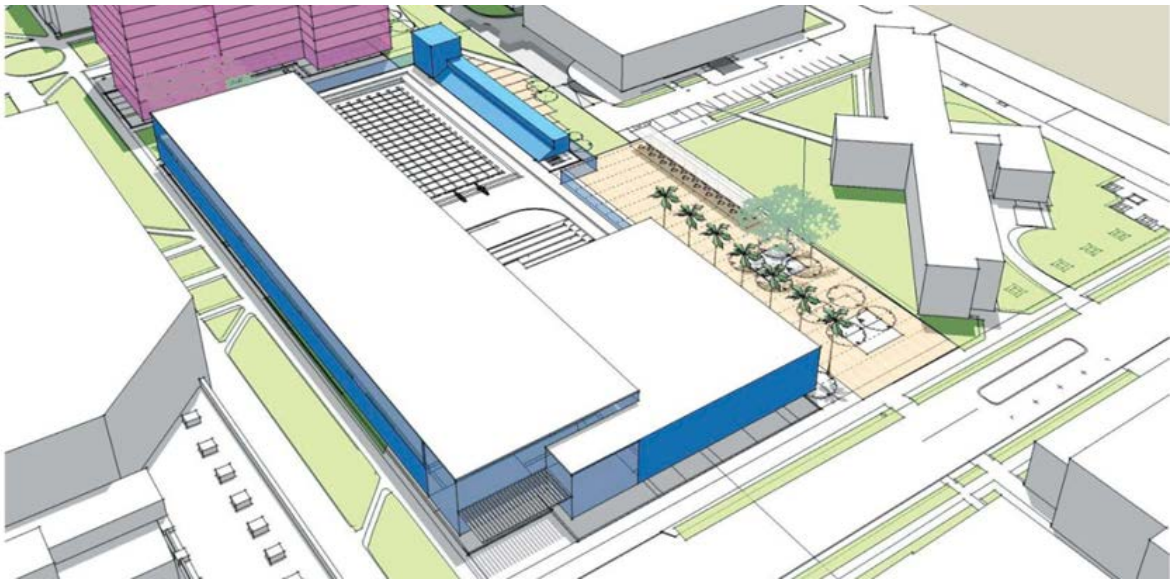

Figure 9. Recreation and Aquatic Center

SJSU has implemented an energy efficiency design strategy for all new construction. Buildings will be designed and built with new, more efficient variable air volume HVAC systems. Staged systems and CO_2 controls are installed to respond to varying occupancy. Buildings will have energy efficient fluorescent and LED lighting and controls. Building management systems and metering helps to monitor and improve performance. Options for solar photovoltaic or other emerging technologies are evaluated for each new project.

Other planning and design strategies that help with energy efficiency include light color building facades and “cool” roofs that help deflect more sunlight to reduce cooling demand. Canopies, custom vertical screens, and high performance low-e glazing are used to shade windows to reduce cooling demand. Better-than-code wall and roof insulation are also used to reduce heating and cooling demands.

SJSU has also implemented a water and material efficiency strategy for new construction. The use of drought resistant, native plants and recycled water irrigation are used for all new landscape projects. Low-water use fixtures are used and piping for municipal recycled water for non-potable uses is installed.

Sustainable building material for new construction include regionally-sourced and recycled content materials, sustainable wood products, construction waste recycling recovery and selecting low volatile organic carbon (VOC) emitting materials. For example, the tops for the outside benches of the Student Union came from lumber salvaged from the old Student Union, essentially creating a symbol of celebrating our past while embracing a sustainable future.

Water Reduction

Major water usage reduction accomplishments since FY 12-13 include converting 400 toilet/urinal fixtures throughout the campus. This is estimated to save 80% of water usage in these fixtures, reducing water use by approximately 2 million gallons of water annually. Over a 10 year lifespan of low flow fixtures, we are expected to save over $250,000 and 20 million gallons of water. Drought tolerant vegetation, native plants, and vegetation that have high tolerance for recycled water have been installed throughout most of campus landscaping. Green custodial and landscaping practices that require less water have been implemented. Figure 9 shows our progress since FY 09/10 in converting to recycled water usage and implementing water saving procedures. The trend indicates that not only are we successful in reducing potable water usage, we are successful in reducing total recycled and potable water usage.

South Bay Water Recycling, a program administered by the City of San Jose, has provided recycled water to both the main and south campus since 2010. We use recycled water mainly for irrigation, water for the Central Plant cooling tower and increasingly for toilet flushing.

The Central Plant cooling tower began using recycled water in 1999, becoming one of the first industrial cooling towers to use recycled water. Since its implementation, we have saved over 240 million gallons of potable water and over $1.5 million.

Martin Luther King Jr. Library is the first building on campus to have dual plumbing installed (plumbing which uses both potable and recycled water). This has saved a total of 12 million gallons of potable water since the completion of the library in 2001.

The conversion of irrigation on both the south and main campuses to recycled water saves almost 70 million gallons of potable water a year. In addition to reducing the amount of potable water used, this also saves the campus almost $1 million annually in water costs. Since conversion to recycled water in 2010, SJSU has saved almost 228 million gallons of potable water.

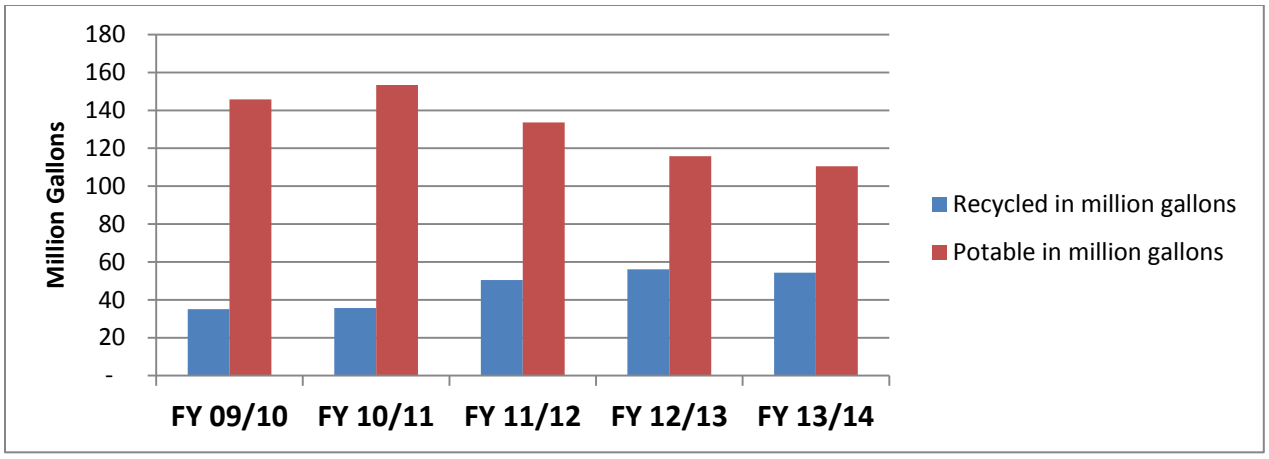

Figure 10. Total Campus Water Usage

Water Conservation Strategy

Long term strategies to conserve potable water include converting the steam plant make up water from potable water to recycled water. This will save an estimated 15 million gallons of water a year. We will be installing water meters at individual buildings and landscaped areas. This helps identify heavy water consumption and opportunities for conservation. We installed dual plumbing for toilet flushing in all new construction and are currently installing a main line through San Carlos St. to provide recycled water to the rest of our campus buildings. We have a maintenance schedule to install or replace remaining toilets, urinals, faucets and showerheads to low flow fixtures.

Short term strategies to conserve potable water include requesting the campus departments to consider low water use and Energy Star dish washing machines. We have eliminated most automobile washing of State vehicles. All vehicles, except shuttle buses, will be washed by using self-service car wash stations, which use recycled water. We will be launching more educational and awareness initiatives such as flyers, signage and e-mails, informing the campus community to educate the campus of conservation efforts.

Bottled Water Reduction

During the spring 2014 semester, Environmental Studies 128 conducted a study to examine the drinking water habits of students on campus. The aim of the study was to lay groundwork to create a campaign to encourage drinking water use from campus water fountains rather than single use water bottles, which are environmentally harmful. The study found that approximately 5 million bottled waters are purchased each year costing students about $7.5 million in addition to the harm on the environment. A survey the class conducted showed that students would be much more likely to use drinking fountains if they were configured to more easily fill reusable water bottles. As a result of the study, FD&O will be installing water filling stations in every building throughout FY 14-15. This will potentially save students and staff millions of dollars and reduce the use of plastic water bottles.

Waste Diversion and Recycling

Ongoing waste reduction programs have continued to be successful through FY 13/14. The surplus furniture reuse program remains active as not only a method of waste diversion, but cost savings for campus departments looking for furniture.

We continue to recycle paper, cardboard, cans & bottles, metal, wood, toner cartridges, electronics, batteries, and appliances. Yard waste and food waste generated at SJSU is composted at an off-site facility. Our efforts have achieved a waste diversion rate of 83% for 2013. (Baseline 2006 diversion rate was 59%)

Green Procurement Programs

Custodial supplies purchased by FD&O adhere to EPA guidelines and Green Seal Certified where possible. Bathroom tissue contains 95% total recycled content and paper towels are 100% total recycled content. The SJSU procurement department published Environmentally Preferable Purchasing (EPP) guidelines to encourage all university employees to purchase more environmentally responsible supplies or reusing available material.

FD&O Vehicles

FD&O vehicles remain compliant with Air Quality requirements. The 108 electric maintenance carts, 8 E-85 fleet vehicles are capable of using 85% ethanol fuel, and the exhaust systems of various mowers, shuttle buses and forklifts have been retrofitted with particulate filters.

Spartan Shops

Spartan Shops believes that sustainability plays an important role in creating a healthy campus. Spartan Shops is constantly finding ways to improve eco-friendly practices and partner with the campus to work towards a better environment. In the last fiscal year Spartan Shops launched two major campaigns to educate students about environmental impacts related to food waste and disposal beverage containers. The Erase Waste Campaign incorporated marketing strategies with interactive activities to encourage students to reduce their personal food waste to reach a goal of a 5% reduction from the previous semester. Students were educated about the modern food paradigm and sorted non-food waste from their food waste during hourly waste audits. The campaign successfully reduced waste by 12%. A marketing campaign was implemented to encourage students to bring their own mug to the eateries to receive a $0.50 mug discount. The campaign will continue with the goal of increasing average mug usage to 15% across all eateries.

In the Spartan Shops administrative office, sustainable practices are utilized every day. In order to reduce the ecological footprint, 100% recycled copy paper and over 50% recycled office supply products, including pens, file folders, paper clips and scissors are being used. In all eateries on campus, locally grown produce is sourced as much as possible. Ground beef is locally grown, grass-fed and antibiotic free, chicken is locally grown, free range and hormone and antibiotic free and seafood is wild caught and MSC certified seafood when available. Discarded cooling oils are recycled for biodiesel production. In order to reduce waste, tableware is sourced that is composed of 100% post-industrial recycled fiber products. Cups, lids, straws and utensils are compostable/biodegradable. Bamboo plates and bowls at Dining Commons are used instead of plastic dishware. Tray-less dining has also been implemented at the Dining Commons and the to-go salads at Union Square are made from recycled plastic water bottles. We continue to establish a sustainable culture on our campus through research and experimental programs.

SJSU Transportation Solutions

Mission

The Associated Students Transportation Solutions (TS) is dedicated to serve the commute needs of students and employees at SJSU. Its region-wide operation emphasizes alternatives to driving alone. These alternatives are primarily made of carpools and vanpools, public and private transit including buses and shuttles, local and regional rail, and non-motorized travel, including bicycling and walking.

By increasing the usage of alternative transportation, TS fulfill the goals of reducing single occupant vehicle trips to SJSU and Downtown San Jose area, enhance students' educational experience and improve air quality. TS offers incentives for using alternative transportation, as well as providing commute information and services to the SJSU community.

TS's mission is to alleviate automobile traffic to SJSU and reduce its impact on the University's parking facilities. The core strategies for accomplishing the TS mission are:

- Program development and implementation
- Communication, marketing, and outreach
- Corridor - mobility mapping and analysis
- Program evaluation and measurement
- Linking TDM to broader initiatives and service improvements
- Funding opportunities and grants

University Transit Pass (Eco Pass) and Other Alternatives

Since 1994, the Associated Students, in contract with Santa Clara Valley Transportation Authority (VTA), provides a deeply discounted transit program for the entire student and employee populations. The combination of Eco Pass sticker affixed to the SJSU ID provides a pass to unlimited rides on all VTA buses and light rail lines 24/7, 365 days a year. TS also offers discounts on for the Altamont Corridor Express (ACE), Highway 17 Express, and Amtrak.

TS utilizes 511.org, the Metropolitan Transportation Commission's Regional Rideshare program. Every semester, the TS Commute Coordinators register many students and employees from Santa Clara, San Mateo, San Francisco, Alameda, Contra Costa, Santa Cruz, and Monterey counties into the 511.org rideshare matching service to find their carpool partners. In 2013, 6.8% of SJSU's population (2,363) carpooled to campus. The University Police Department (UPD) operates a vanpool system for SJSU employees which provides quick and affordable transportation from Modesto, Manteca, Tracy, Livermore and Pleasanton.

TS operates six bicycle enclosures located throughout campus. The total storage capacity for all the six cages is 417, at any given time. Currently 1,300 students and employees have signed out access keys. Bicycling to SJSU has been on the rise for some time as the following chart indicates. In 2013, 3.8% of the population or about 1,320 biked to campus, a 0.1% drop from 2012 that may be attributed to usage

of Bay Area Bike Share stations that started operation around SJSU on August 29, 2013. The average biking distance to SJSU was 3.0 miles.

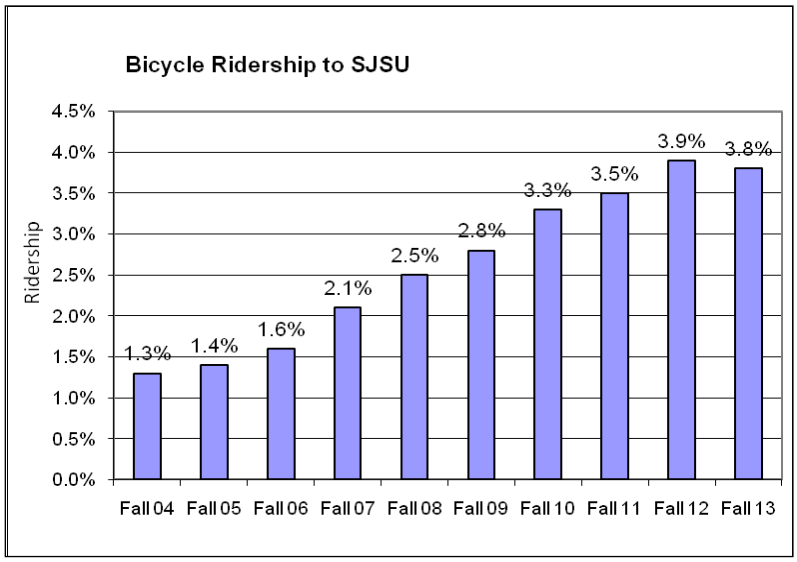

Figure 11. Bicycle Ridership

Transit ridership and Commute Data

Every November, TS administers a transportation survey to collect data on all the transportation modes to SJSU and measure the changes in the students' commute behavior.

Based on the annual TS surveys, Figure 11 below shows the increase in overall alternative transportation usage since 2001. Extrapolated over the total population of 34,744 (Regular, Open University and Extended Studies enrollment), alternative transportation users were estimated at 18,136. The total VTA ridership to campus increased 1.9% from 34.0% (11,528) in 2012 to 35.9% or 12,473 riders in 2013.

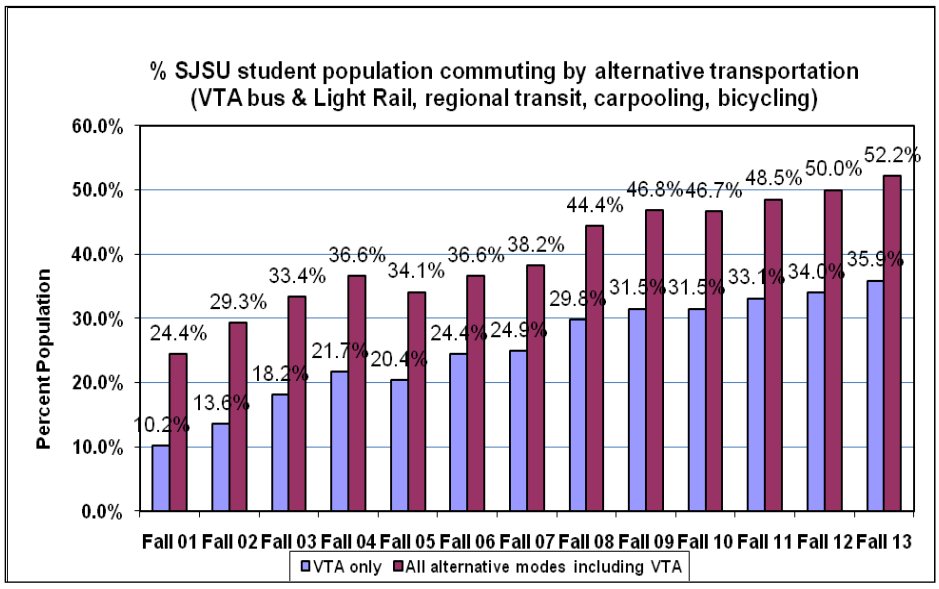

Figure 12. %SJSU student population using alternative transportation

Figure 13 shows that solo-driving to campus decreased from 34.9% (11,833) in 2012 to 32.9% (11,431) in 2013.

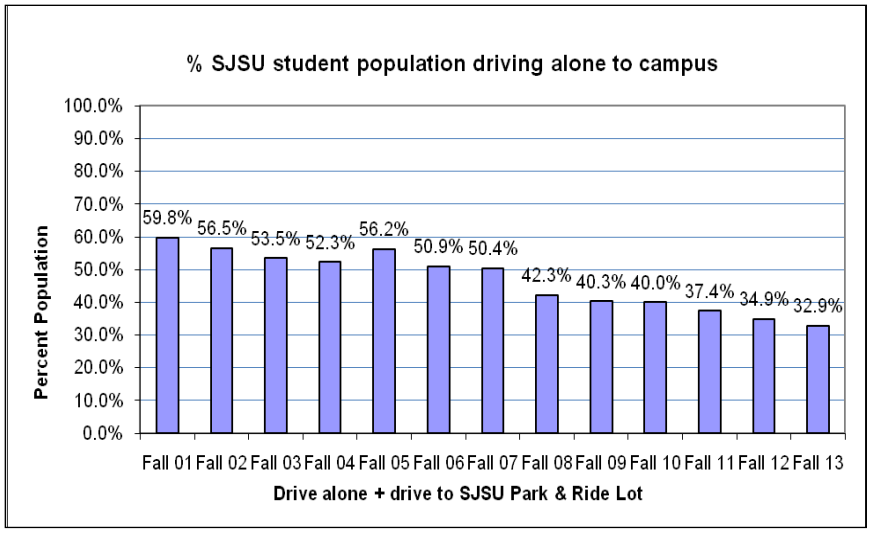

Figure 13. Trending of solo-driving to campus

Conclusion

San Jose State University, Facilities Development & Operations, the Campus Sustainability Board, and the campus community as a whole, embraces the philosophy and goals of a sustainable environment for the benefit of future generations. The campus is soundly committed to the continued improvement in the sustainability of the physical campus. Our guiding principles include integrating sustainability practices in visible and accessible ways to contribute to the learning environment, being conscientious stewards of campus, local, and state resources, and to be leaders in sustainable practices not just for the CSU, but for the state. As can be seen from this report, as a campus we have accomplished an amazing amount of progress with regard to building and operating a sustainable campus. That said, there is always more that can be done and we are committed to doing so into the future.