



# Progress Toward Sustainability

Anton Kashiri

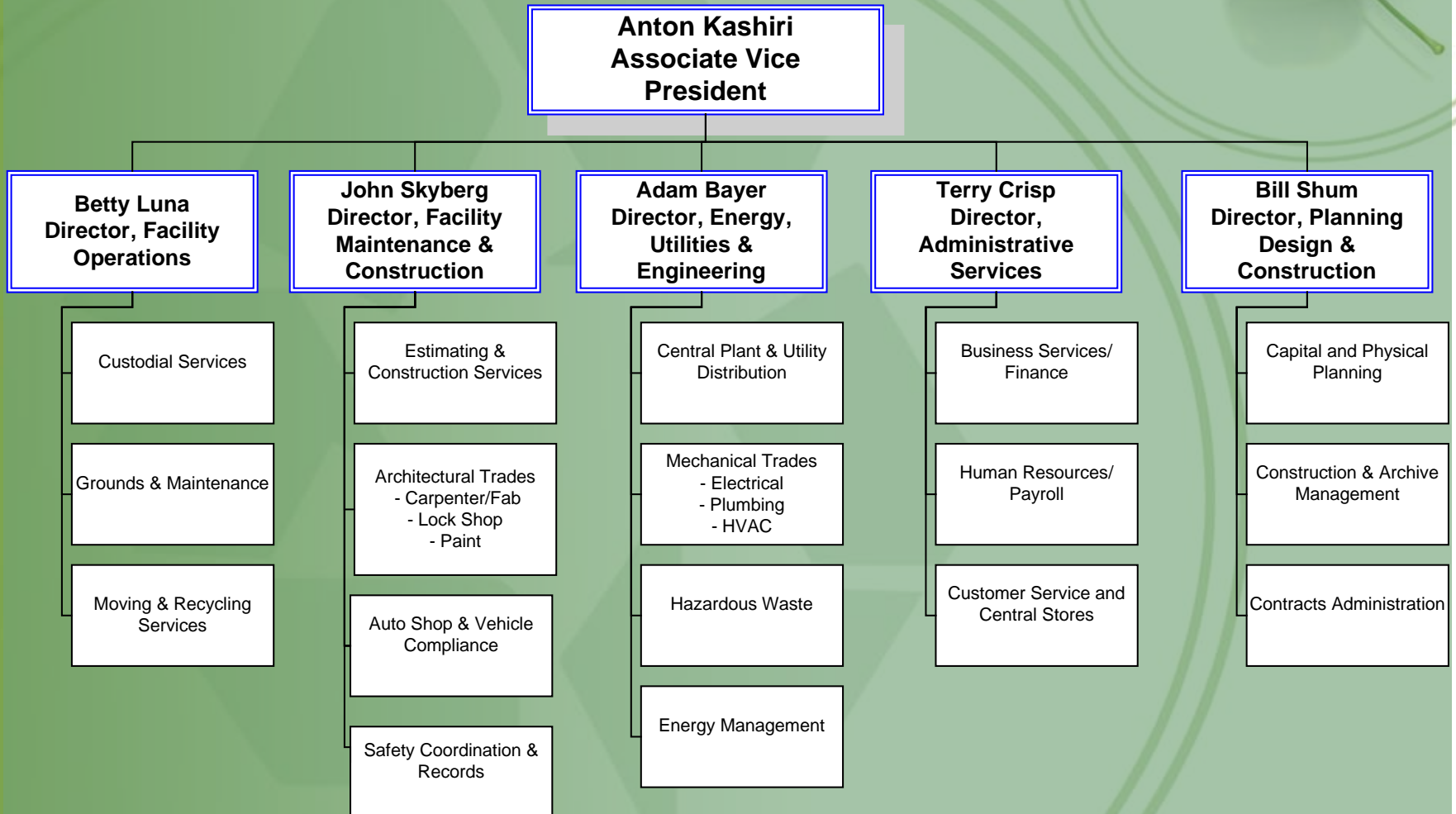
AVP

Facilities Development and  
Operations

# Facilities Development and Operations

## FUNCTIONAL CHART

Effective as of 6-30-09



# SJSU Campus Facts:



- SJSU is the Oldest CSU Campus
  - Buildings range from 1909 to 2005
  - Associated Students House is the Oldest
  - Average Building age is 40 years
  -
- Four Sites with 5 million gross sq/ft
  - Main Campus 88.5 Acres
  - South Campus 62 Acres
  - Aviation facility 5 Acres
  - Moss Landing facility 21 acres
- SJSU is one of only two CSU campuses with a large Cogeneration facility
  - Produces electricity, steam, and chilled water
  - Daily electric requirement is 8 MW
  - The Cogeneration Unit produces 6 MW of electricity
  - SJSU buys 2 MW from Constellation New Energy
- SJSU operates a Public Water System
  - Delivers 150 million gallons of potable water per year

# Sustainability

- Sustainability Definition
  - Use of natural resources to meet current needs without compromising the needs of future generations



# What Is LEED?



- LEED = Leadership in Energy and Environmental Design
  - Program administered by the United States Green Building Council (USGBC)
  - Certification Process
    - NC - New Construction – focuses on new structures and mechanical systems
    - EB - Existing Buildings – focuses on operations
      - LEED O&M is replacing EB
    - CS - Core & Shell projects

# LEED Certification Levels



## 4 Levels of Certification

	<b>NC</b>	<b>EB</b>	<b>CS</b>
LEED Certified	26-32	32-39	24-29
Silver Level	33-38	40-47	30-35
Gold Level	39-51	48-63	36-47
Platinum Level	52-69	64-85	48-64

## LEED Point Distribution

	<b>NC</b>	<b>EB</b>	<b>CS</b>
Sustainable Site	14	14	15
Water Efficiency	5	5	5
Energy & Atmosphere	17	23	16
Materials & Resources	13	16	11
Indoor Environmental Quality	15	22	13
<i>Sub-Total</i>	<b>64</b>	<b>80</b>	<b>60</b>
Innovation Credit	4	4	4
LEED Professional	1	1	1
<i>Total Possible Points</i>	<b>69</b>	<b>85</b>	<b>65</b>

# Why participate in LEED?

- CSU Executive Order 987 requirement
- Assembly Bill 32
- Consistent with SJSU Sustainability commitment
- Student-Faculty-Staff Demand



# Achievements



- Moss Landing Marine Lab – Gold EB 2.0 pilot
  - Up for re-certification in LEED O&M
- King Library – Designed and built to LEED Silver Standards
  - Going through certification process under Existing Building guidelines
- Construction of Campus Village - reduced number of commuters
- King Library Lighting Project – projected electricity savings of \$180,000 per year
- Transportation – Use of electric carts
- Installation of Artificial Turf at Spartan Stadium
  - Annual water savings of 1 Million Gallons



# Spartan Stadium artificial turf



# Tower Hall

## Sustainable Features



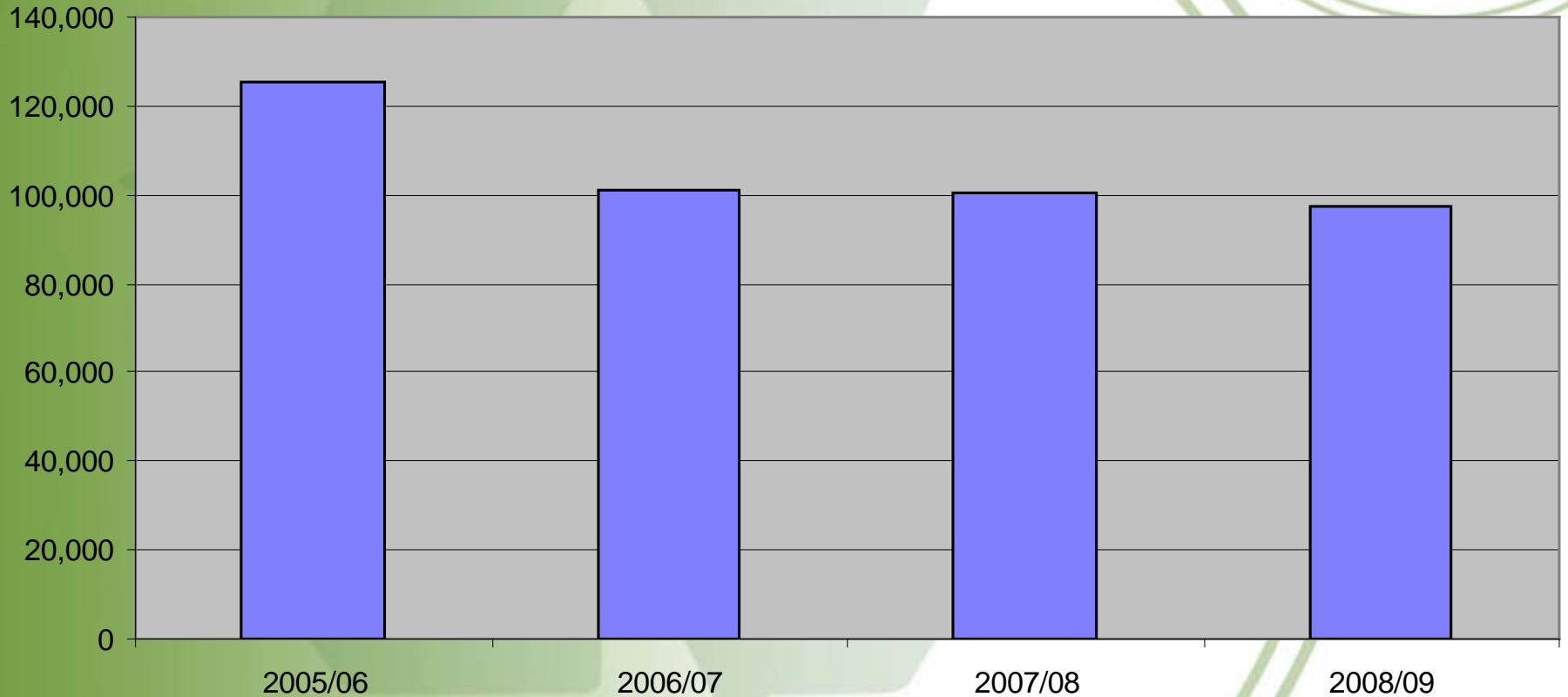
- Energy Efficient lighting, controls and Occupancy Sensors except in Auditorium
- Green Label Carpeting
- Low emission Paint
- Natural light for most spaces
- Restored existing walls, exterior doors, windows and shutters
- Restored original concrete floor & stairs
- Restroom floor tiles have recycled content
- Low Water use Fixtures
- Drought tolerant native landscaping
- Installed White, Cool Roof
- Installed Energy Efficient HVAC components
- Morris Daily auditorium has Displacement Ventilation – no air conditioning

# Utility System Upgrades

## BTUs per Square Foot



BTU/gsf



# SJSU Recycled Water Use



- South Bay Water Recycling
  - City of San Jose program
- South Campus Athletic fields
  - 20 million gallons per year for irrigation
- Central Plant cooling tower make up water
  - 20 million gallons per year used for production of chilled water for campus cooling
- Avoided cost of \$100,000 per year
- Award for recycled water use since 1999



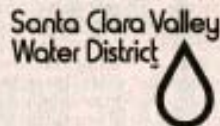
IN APPRECIATION OF  
**SAN JOSÉ STATE  
UNIVERSITY**

South Bay Water Recycling recognizes  
San José State University  
for its commitment to protecting the  
environment through the use of recycled  
water for industrial cooling since 1999.

---

*More than 20 million gallons of drinking  
water saved in 2008, enough to supply about  
150 South Bay households for one year*

---



For more information about how your business can save money  
and conserve our drinking water supply by using recycled water,  
visit [www.sanjoseca.gov/sbwr](http://www.sanjoseca.gov/sbwr) or call (408) 277-3671.



# Major Accomplishments since 2006



- **Energy Management**
  - Lighting Retrofit Phase 1 - 20 buildings
    - \$2 million project with a \$1.8 million PG&E incentive
    - Annual utility savings of \$500,000
  - Energy Infrastructure Improvements
    - \$2.5 million project with a \$360,000 PG&E incentive
    - Annual utility savings of \$300,000
- **Projects**
  - Roof replacements 8 buildings. Improved insulation, light color reduces heating load
- **Recycling**
  - Contracted with Materials Recovery Facility (MRF) to bring our campus recycle rate over 90% in 2009
- **On-going Mechanical and Electrical Building System commissioning**
  - Multi-year 52 week Preventative Maintenance Schedules for each building and each system within building and all utility systems
    - Organized method of planning and scheduling staff to accomplish 52 week PM

# GOALS



- Design of New Buildings and renovation of existing buildings to attain minimum LEED Silver rating
- Encourage use of local landscape/plant materials
- Reduce carbon footprint
- Comply with energy saving & sustainable design standards and CSU Directives
  - 15% reduction by 2010 as compared to 2003/04
- Implement GREEN procurement strategies campus-wide
- Continue to leverage incentive funding (UC/CSU/IOU)
- Install Electric Hand Dryers in building restrooms
- Installation of Waterless Urinals in new buildings
- Retrofitting existing buildings with low flow fixtures
- Eliminate Use of Space Heaters
- Work with building occupants to turn off lights when rooms not in use
- Encourage Faculty and Staff to turn off computers at the end of the day

# Efforts and Initiatives Underway: Building Operations and Maintenance



- Green Procurement
- Waste Reduction
- Recycled water
- Vehicles
- Energy efficiency projects
- Future Strategies



# Green Procurement Programs

- Custodial Supplies
  - Adhere to EPA Guidelines
  - Purchasing Green Seal Certified product where possible
  - Bathroom tissue 95% total recycled content
  - Paper towels 100% total recycled content
  - Cleaning supplies



# Waste Reduction Programs



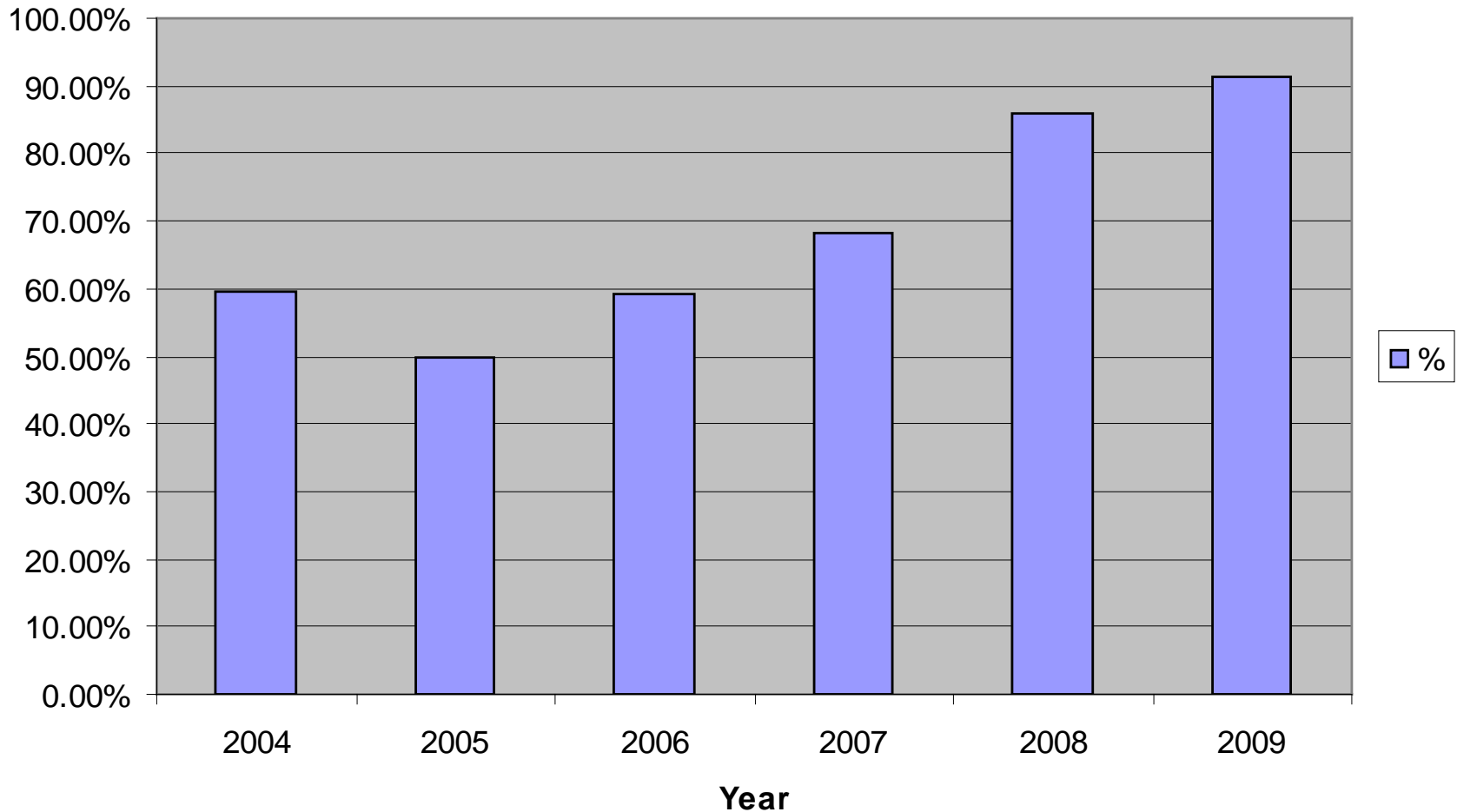
- Implemented Surplus Furniture Reuse Program
- Recycled items include: paper, cardboard, cans & bottles, metal, wood, toner cartridges, electronics, batteries
- Yard waste and food waste generated at SJSU is composted at an off-site facility
- SJSU 2009 waste diversion rate is 91%
  - 2006 diversion rate was 59%

# Waste Reduction Programs cont.



- New waste hauler established as of May 1<sup>st</sup>, 2008 ( Green Waste Recovery inc.)
- All Waste is now sorted at the off-site Material Recovery Facility (MRF)
  - “Clean” MRF line for Mixed Recycling
  - Established “Dirty” MRF line for Waste

# SJSU Waste Diversion Rate



# FD&O Vehicles



- Compliance with Air Quality requirements
  - Decommissioned 4 vehicles
  - FD&O has 68 Electric Maintenance Carts
  - FD&O has retrofitted the exhaust systems of a riding mower, shuttle bus and 3 forklifts with particulate filters

# Energy Efficiency Projects Underway



- MBCx Projects
  - Monitoring based commissioning
    - Install meters and other monitors to see where energy is being used
    - “Tune up” and make systems work as efficiently as possible
    - Tools and training on building systems to sustain savings
  - Business Classroom and Moss Landing MBCx
    - \$152,000 project cost
    - \$76,000 incentive funding
    - \$54,000 in annual utility savings

# UC/CSU/IOU Energy Efficiency Partnership



- Collaboration of UC and **CSU** systems with CA's Investor Owned Utilities (IOUs) [**PG&E**, **SCE**, SoCal Gas, **SDG&E**]
- Funding for projects based on the amount of energy savings achieved
  - Building System and Central Plant Retrofits
  - Lighting Retrofit Projects
  - MBCx Projects
- To date received \$2.5 million in incentive funding
- Participation in MBCx Express pilot program and contribution to CSU Smart Grid proposal

# Demand Side Management Energy Savings



- Projects over the past 5 years:
  - Avoided consumption of more than 8 million kWh and 150,000 therms of natural gas per year
  - valued at \$1.4 million per year in utility costs
  - 4,000 Metric Tons of avoided CO<sub>2</sub> emissions per year



# Future Energy Supply Strategy



- Rooftop Solar Photovoltaic (PV) panels on campus buildings
- PV Feasibility study prepared by SJSU Mechanical Engineering students
- Five Potential Buildings
  - Sweeney, Business Classroom, Art, Clark, Industrial Studies
- 600 kW (total) PV array would generate over 1,000,000 kWh per year

# Joint University/City Recycled Water Projects



- Convert Irrigation Piping from the SJSU drinking water system to Recycled Water
- Convert King Library toilets/urinals only to Recycled Water
- Convert Central Plant district steam system make up water to Recycled Water
- Provide Recycled Water main to Student Union Renovation & Expansion
- Working with the City to include new Student Health & Counseling Facility
- Will save over 65 million gallons of potable water per year
- American Recovery and Reinvestment Act [ARRA] funding through South Bay Water Recycling

# Recycled Water Projects Funding



Funding splits:	Campus Irrigation	King Recycled Water	Central Plant
ARRA funding	\$210,000	\$100,000	\$50,850
RDA		\$100,000	
SJSU	\$165,000		\$210,000
City of San Jose	\$165,000	\$60,000	\$62,150
Total	\$540,000	\$260,000	\$323,000

# Sustainable Renovation Projects



- Tower Hall
- King Library
- Moss Landing
- Spartan Stadium

# New Construction Projects



- Student Union Renovation & Expansion
- Student Health Services Building

# Student Union Project - LEED Goals



- Minimum of LEED Silver certification required
- Mechanical design is 20% more efficient than Title 24
- Installation of water efficient fixtures
- Installation of Cool Roof
- Use of Recycled Water for toilet flushing



# Student Union Project Cont.



# Student Health & Counseling Facility

- LEED Silver Certification Required
- Installation of Cool Roof
- Mechanical design is 20% more efficient than Title 24
- Installation of water efficient fixtures
- Use of Recycled Water for toilet flushing





# Planning and Design Strategies

- Light color building facade
- Canopies and custom vertical screens shade windows
- High performance Low-e Glazing
- Better-than-code wall and roof insulation
- “Cool” roofing systems



# Energy Efficiency Strategy



- New, more efficient Variable Air Volume HVAC systems
- Staged systems and CO<sub>2</sub> controls to respond to varying occupancy
- Energy Efficient Fluorescent and LED Lighting and controls
- Building Management System and metering helps to monitor and improve performance
- Design buildings for solar Photovoltaic

# Water and Material Efficiency Strategy



- Water-efficient landscape planting and irrigation systems
- Low-water use fixtures
- Piping in municipal recycled water for irrigation and other non-potable uses
- Collection of storm water for irrigation
- Regionally-sourced and recycled content building materials
- Sustainable wood products
- Single-stream waste recycling recovery
- Low emitting materials

# Questions?

**For a copy of the presentation, go to:**

**[www.sjsu.edu/fdo](http://www.sjsu.edu/fdo)**

