Progress Toward Sustainability

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Facilities Development and Operations
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

<table>
<thead>
<tr>
<th>Level</th>
<th>NC</th>
<th>EB</th>
<th>CS</th>
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<tr>
<td>LEED Certified</td>
<td>26-32</td>
<td>32-39</td>
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<td>Silver Level</td>
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<td>Gold Level</td>
<td>39-51</td>
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<td>Platinum Level</td>
<td>52-69</td>
<td>64-85</td>
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#### LEED Point Distribution

<table>
<thead>
<tr>
<th>Category</th>
<th>NC</th>
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<th>CS</th>
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<tbody>
<tr>
<td>Sustainable Site</td>
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<td>15</td>
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<tr>
<td>Water Efficiency</td>
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<tr>
<td>Energy &amp; Atmosphere</td>
<td>17</td>
<td>23</td>
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<tr>
<td>Materials &amp; Resources</td>
<td>13</td>
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<tr>
<td>Indoor Environmental Quality</td>
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<tr>
<td><strong>Sub-Total</strong></td>
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<td>Innovation Credit</td>
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<td>LEED Professional</td>
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<td><strong>Total Possible Points</strong></td>
<td><strong>69</strong></td>
<td><strong>85</strong></td>
<td><strong>65</strong></td>
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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

2005/06 2006/07 2007/08 2008/09
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 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\textsuperscript{st}, 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 CO2 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
# Recycled Water Projects Funding

<table>
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<th>Funding splits:</th>
<th>Campus Irrigation</th>
<th>King Recycled Water</th>
<th>Central Plant</th>
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<tr>
<td>ARRA funding</td>
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<td>SJSU</td>
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<td>City of San Jose</td>
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<tr>
<td>Total</td>
<td>$540,000</td>
<td>$260,000</td>
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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$_2$ 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