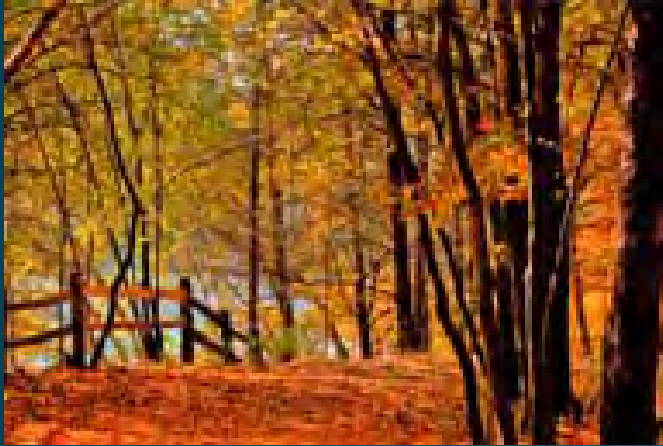


# UW Stevens Point Energy Conservation Project



- Student-centered environment
- Critical thinking, creativity, and lifelong learning
- Professional preparation
- Community involvement and outreach
- Ecological stewardship

Sustainability has been a critical component of our campus culture for decades, and we are proud to be a role model and leader for other institutions.



December 11<sup>th</sup> 2013

# Discussion Agenda

- Objective
- Activities To Date
- Review of UWSP Project Specifics
- State of Wisconsin Performance Contracting Business Process Timeline
- Discussion

# Objective

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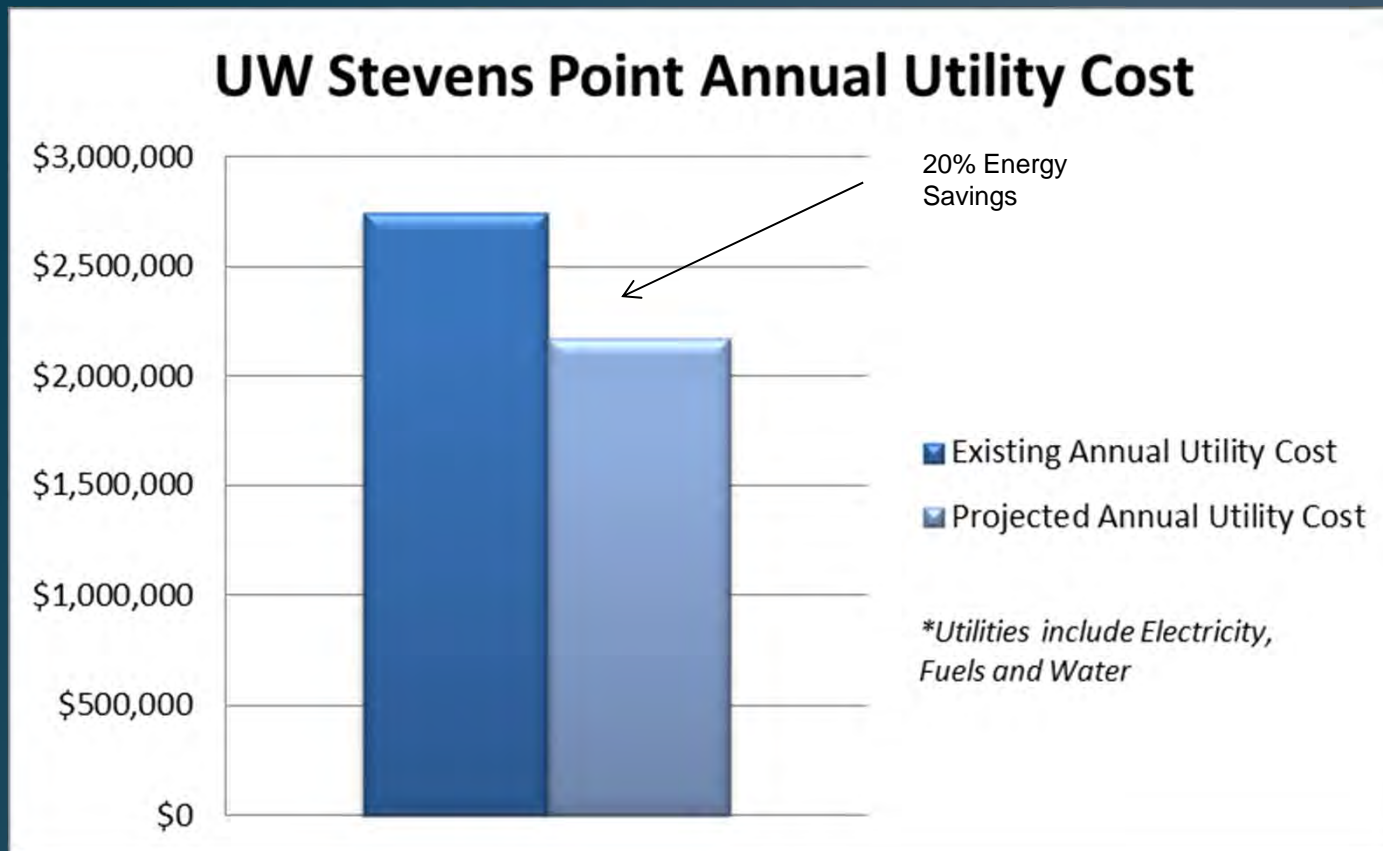
Communicate the project specific improvements included in the state submission for the campus which qualify and meet the 16.07 simple year payback criteria.

# Activities To Date

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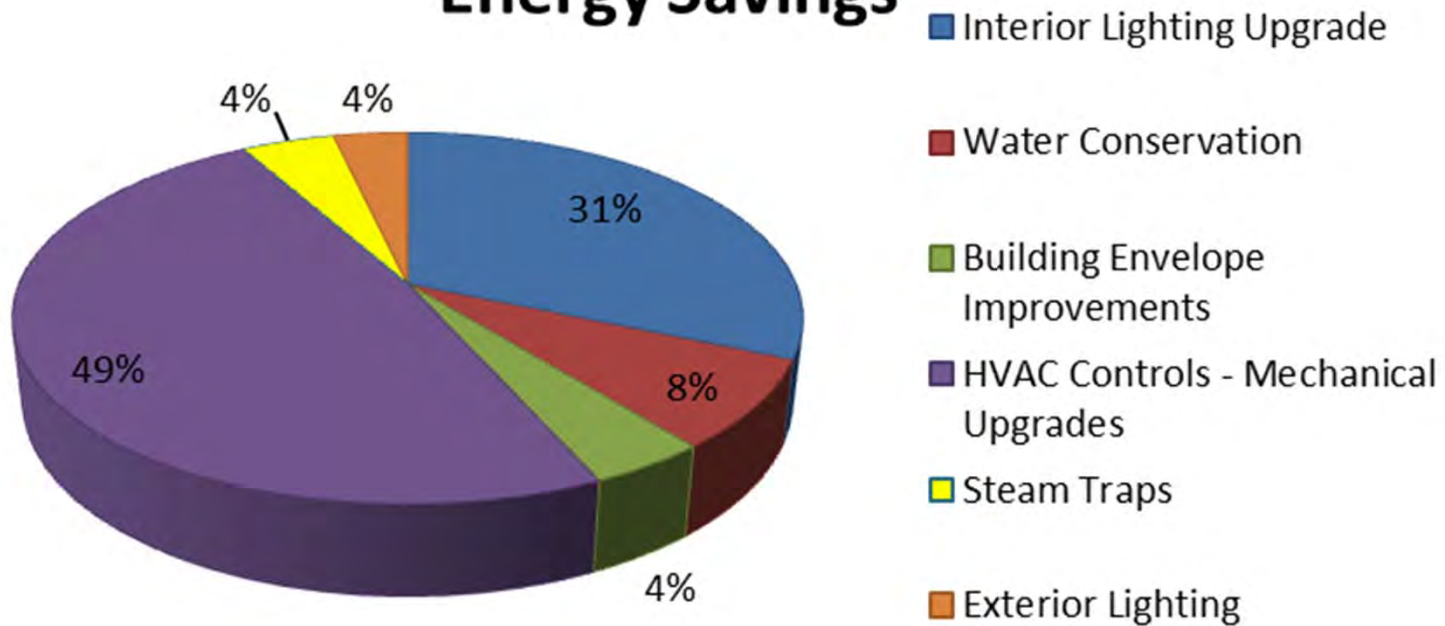
- Information & Data Gathering
  - Discussions with Campus Personnel
  - Building Site Visits
  - Blueprint Reviews
- Scope & Cost Generation
  - Building Site Visits
  - Contractor/Partner Site Visits
  - Scope Review Meetings with Campus Steering Group (Facilities, Sustainability, IT, Facility Planning, Student Representatives & Residential Living)
- Energy Savings Generation
  - Data Logging
  - Utility Analysis
  - Savings Calculations & Benchmarking
- Focus On Energy Grant Determination
- Mock Up Installations and Review
- Software Demonstrations
- Regular Status Meetings with Campus Steering Group (Facilities, Sustainability, IT, Facility Planning, Student Representatives & Residential Living)
- Energy Assessment Report Preparation

# Projected Annual Energy Savings

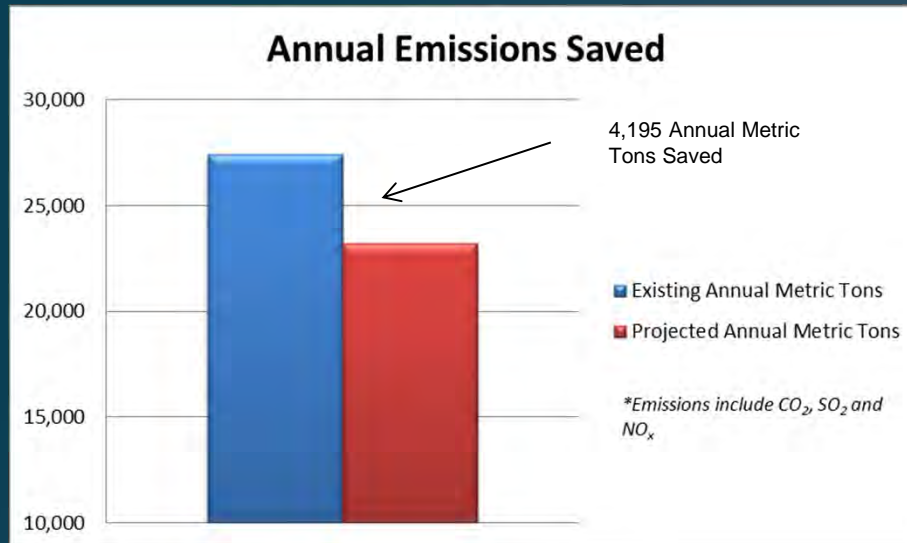


# Projected Annual Energy Savings

## UW Stevens Point Projected Annual Energy Savings



# Annual Emissions Saved



- The projected annual energy savings are equivalent to the following:
  - 874 Passenger Vehicles
  - 470,291 Gallons of Gasoline Consumed
  - 9,756 Barrels of Oil Consumed
  - 174,792 Propane Cylinders Used for BBQ's

# Project Summary

Energy Conservation Measures (ECM)		Annual Energy Savings				Annual Water Savings		Total Annual Savings \$	First Cost \$	Potential Incentive \$	First Cost \$ (After Potential Incentive)	Simple Payback Period (in Years)
		Electricity		Central Plant Steam		ccf	\$					
		kWh	\$	MMBtu	\$							
No.	Description											
1	Investment Grade Audit								247,000		\$247,000	
2	Interior Lighting Upgrade	1,921,033	\$180,577	0	\$0	0	\$0	\$180,577	\$3,012,170	\$140,940	\$2,871,229	15.9
3	Water Conservation	0	\$0	885	\$7,295	4,801	\$37,257	\$44,552	\$299,773	\$0	\$299,773	6.7
4	Building Envelope Improvements	7,822	\$735	2,778	\$22,890	0	\$0	\$23,625	\$242,109	\$0	\$242,109	10.2
5	HVAC Controls-Mechanical Upgrades	1,147,802	\$107,893	20,771	\$171,154	0	\$0	\$279,047	\$3,378,242	\$0	\$3,378,242	12.1
7	Steam Traps	0	\$0	3,157	\$26,012	0	\$0	\$26,012	\$147,000	\$0	\$147,000	5.7
8	Dashboard and Metering Service	0	\$0	0	\$0	0	\$0	\$0	\$284,298	\$0	\$284,298	0.0
9	Exterior Lighting	222,772	\$20,941	0	\$0	0	\$0	\$20,941	\$619,402	\$0	\$619,402	29.6
Total		3,299,428	\$310,146	27,591	\$227,352	4,801	\$37,257	\$574,755	\$8,229,994	\$140,940		
								Contingency	434,963	5%		
								DFD Fee	173,299	2%		
								<b>Total Cost</b>	<b>8,838,256</b>		<b>8,697,315</b>	<b>15.13</b>



# Interior Lighting Upgrade

- Interviews with Campus Steering Group – Obtain Lighting Specs, Campus Requirements and Future Vision
- Completed Campus Wide Fixture by Fixture Audit Including Pre/Post KW, Run Hours and Measurements
- Our Approach Focused on Energy Savings, Aesthetics and Providing Appropriate Lumen Levels to Meet Wisconsin State Requirements:
  - Areas currently over lit will have light levels reduced
  - Areas currently under lit will have light levels increased
- Mock Ups for proposed upgrades will be installed.
- Upgrades Include:
  - Retrofit existing prismatic fixtures in specified areas with custom fitted reflector (delamping).
  - Retrofit existing 2' x 2' fluorescent fixtures in specified areas to F17T8.
  - Retrofit parabolic lay-in fixtures in all areas with volumetric retrofit kits, while maintaining dual switching capability.
  - Retrofit existing CFL can fixtures and incandescent lamps with LED.
  - Install occupancy sensors in strategic areas.

# Interior Lighting Upgrade



CAC Can Lighting

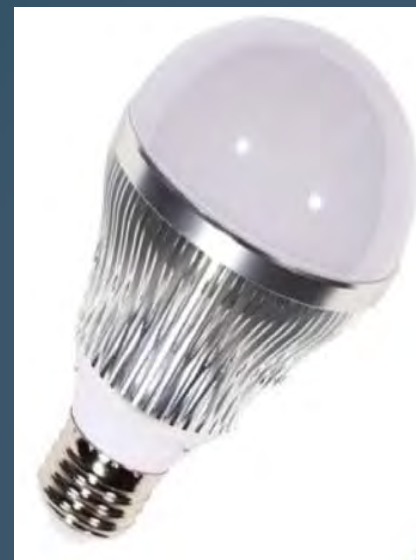


Over Lit Hallway at SSC – Bring Lighting to Correct Lumen Levels

# Interior Lighting Upgrade



# Interior Lighting Upgrade



# Interior Lighting Upgrade

- Benefits
  - Less Energy Consumption
  - Longer Lamp Life with Less Depreciation
  - Reduction of variety and quantity of lamps for stock maintenance
  - Better Quality and Quantity of Light
  - Improved Aesthetics

# Exterior Lighting Upgrade

- Interviews with Campus Steering Group – Obtain Lighting Specs, Campus Requirements and Future Vision
- Completed Campus Wide Fixture by Fixture Audit that Includes Pre/Post KW Readings and Run Hours
- Developed Proposal That Focuses on Lumen Levels, Security, Aesthetics, Savings and Meets or Exceeds UWSP and Wisconsin State Requirements
- Mock Ups for proposed upgrades will be installed.
- Upgrades Include:
  - Specified parking lots containing HID lighting will be upgraded to Beta LED technology.
  - Walkway Lighting: In the Academic Areas, fixtures will be retrofitted with a Relume's Illumadisk LED unit.
  - Building Perimeter Lighting: Replacing existing HID fixtures with LED technology.

# Exterior Lighting Upgrade



Parking Lot J, HID Cobra Head  
Fixture to be Converted to LED



Parking Lot E, HID Shoe Box  
Fixture to be Converted to LED



# Exterior Lighting Upgrade



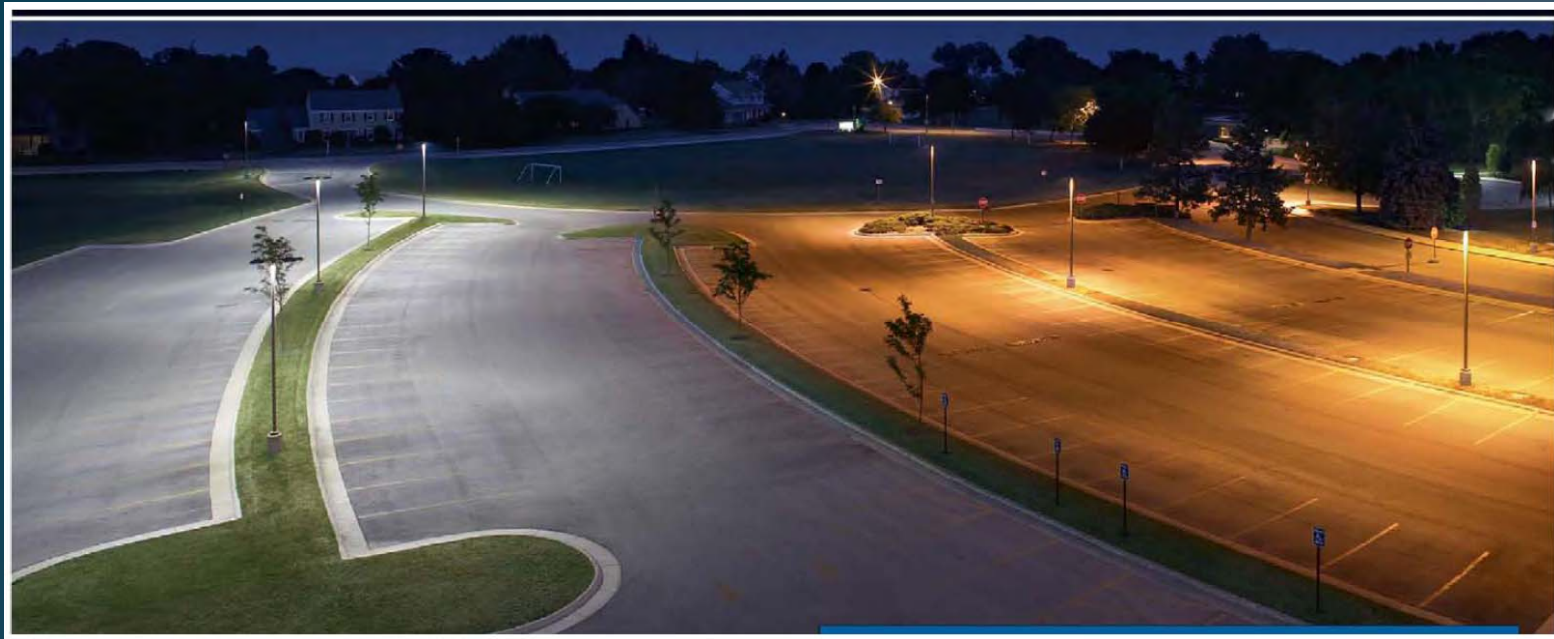
Existing Walkway Lighting



# Exterior Lighting Upgrade



# Exterior Lighting Upgrade



# Exterior Lighting Upgrade

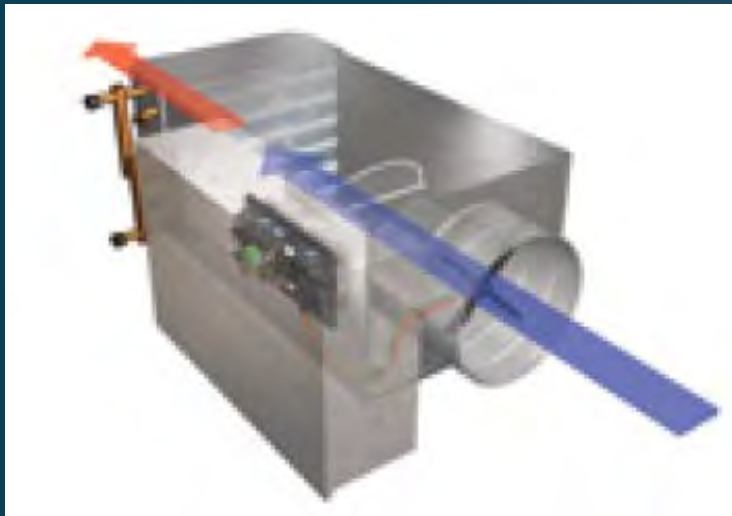
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- Benefits
  - Less Energy Consumption
  - Longer Lamp Life with Less Depreciation
  - Reduction of variety and quantity of lamps for stock maintenance
  - Better Quality and Quantity of Light

# HVAC Control – Mechanical Upgrade

- Conducted detailed building audits to assess existing control/mechanical systems.
- Discussions with Campus Steering Group to understand system operation and needs.
- This measure focuses mostly on occupancy based zone level control and control sequence changes.
- Approach was to key in on occupant comfort and maintained or increased humidity control.
- Upgrade includes:
  - DDC controls in 41 zones and controls changes to 3 AHUs in SSC
  - Innovative zone-level VAV conversion in CCC and CPS building that include a custom diffuser.
  - DDC controls in 162 zones and controls changes to 4 AHUs in NFAC.
  - Occupancy based Zone level control for 168 zones in TNR.

# HVAC Control – Mechanical Upgrade

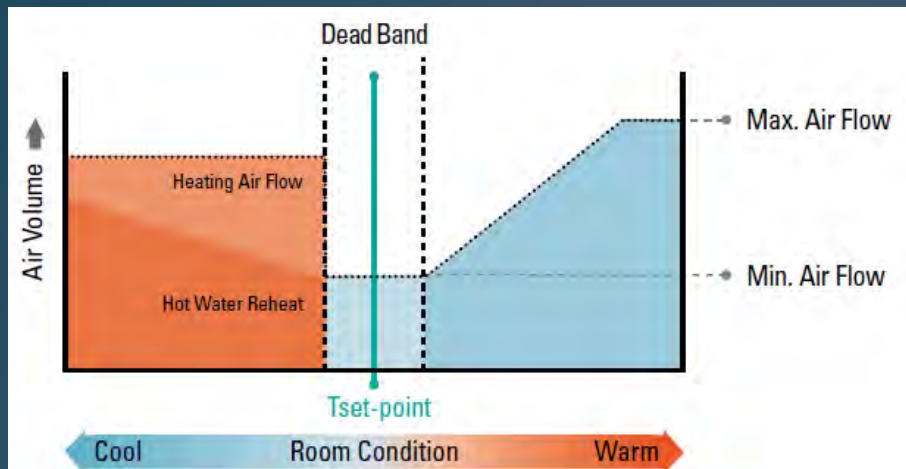


Airflow in a typical VAV box (above)

Temperature control in a VAV box with reheat (right)



AC-1 in the SSC



# Dashboard Implementation

- Discussions with Campus Steering Group to determine needs
  - Building energy analysis to allow for a proactive approach to facility operation.
  - Public accessibility and awareness
  - No hardware required for point integration
  - Web and kiosk capabilities
- Investigated Four Different Providers: eSight Energy, Johnson Controls, Lucid and McKinstry
- Conducted Software Demonstrations for the Facilities Group

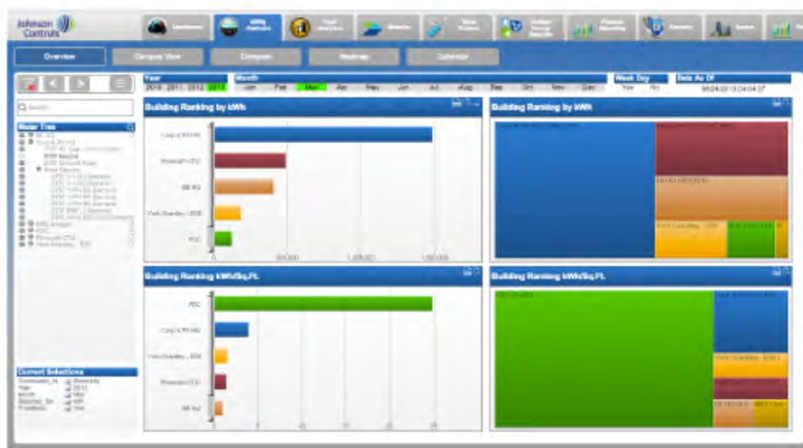
# Dashboard Implementation

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- **Operations Dashboard:**
  - Utilized by facilities staff for energy analysis and actions
  - The Operations Dashboard organizes the performance information in priority order, and offers a simple workflow to respond to events and alerts.
  - Ability to analyze and compare electric, steam, and chilled water meter data utilizing the existing building automation.
- **Green Kiosk Dashboard:**
  - A public facing, dynamic display of building efficiency in easy to understand metrics (*Cars and trees vs kWh and gpm*) & graphics.
  - Used to raise awareness, and easily accessible to be used by staff and students for everything from curriculum to contests
  - A well informed occupant is a powerful tool for energy efficiency and sustainability, especially when they using energy information from their own campus.



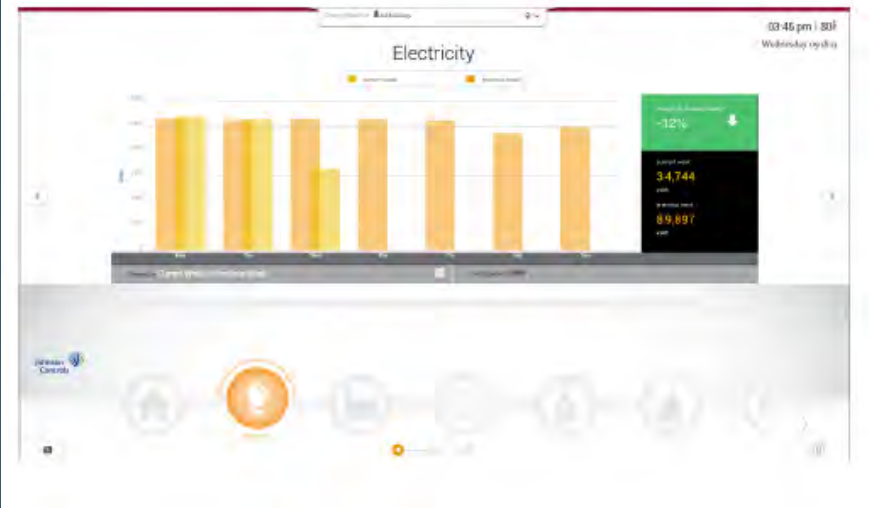
# Operations Dashboard



The Meter Analysis Tool application includes a collection of visualization widgets to explore and uncover energy and other metered utilities. Visualization widgets include energy intensity, campus view, facility comparisons, utility use heat maps, and usage profiles mapped to calendar days. With the Utility Analysis application, revealing insights about how and when utilities are consumed help uncover inefficiencies, explain past performance, and direct attention and further investigation to areas of importance.

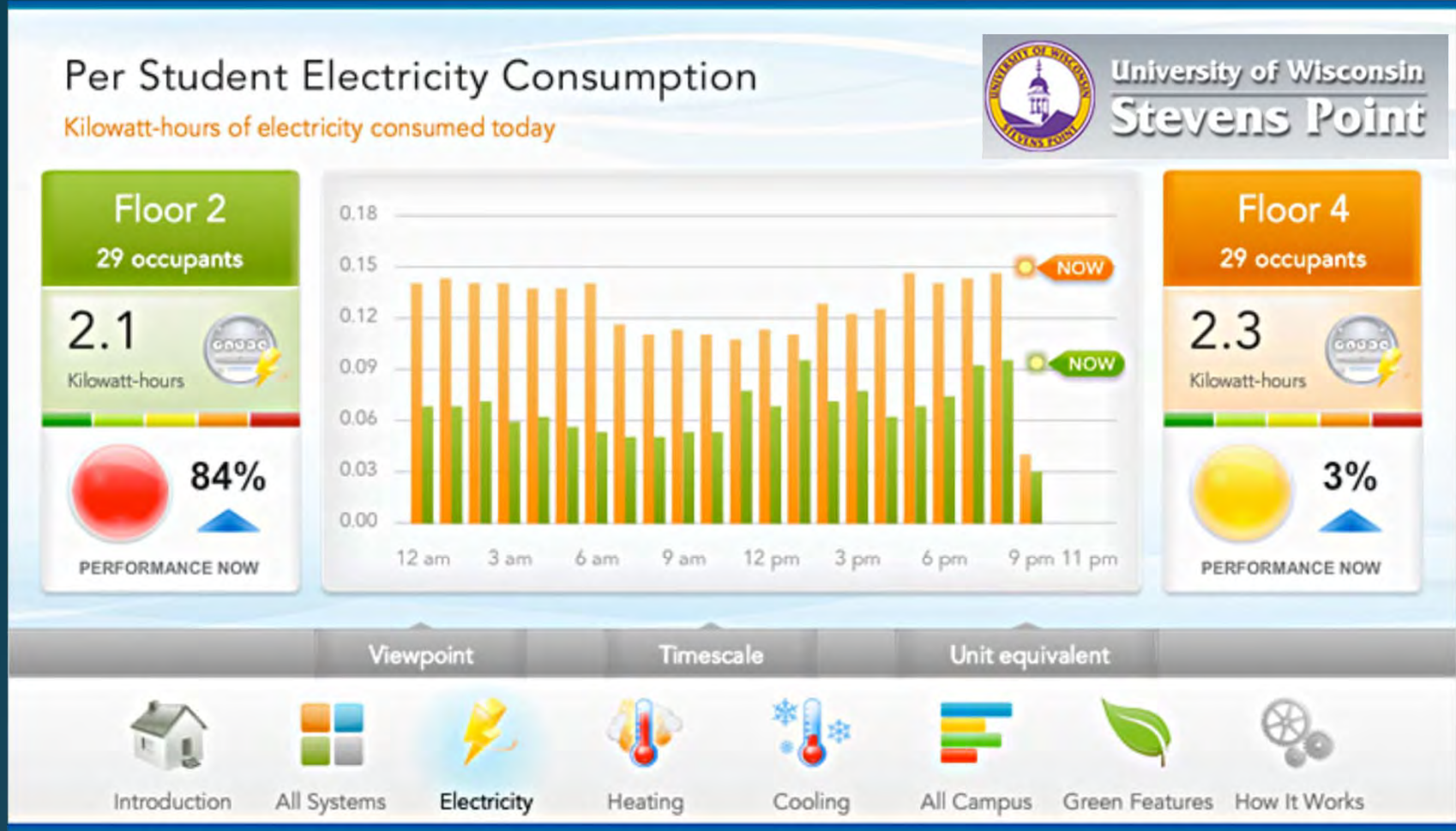
# Green Kiosk Dashboard

Most energy-saving technologies and programs are well hidden from public view. In fact, the average occupant of today's facilities has no idea whether the buildings they occupy are well run, or highly inefficient. Further, they have little insight on how their own behaviors and actions might affect building efficiency.





# Dashboard Photos



# Building Envelope Improvements

- Building by Building audit conducting visual inspection of gaps and utilizing air leakage tools such as smoke puffer pencil.
- Calculated the Amount of Conditioned Air Migrating Out and Unconditioned Air In of the Building Envelope
- Developed a Proposal That Helps to Create a Continuous Air Tight Building Envelope
- Improvements Include:
  - Weatherstripping and sealing of exterior/interior doors.
  - Sealing of roof wall joints with a foam.
  - Window caulking
  - Installation of horizontal and vertical type door sweeps.
  - Sealing of pipe penetrations with foam.
  - Sealing of roof level changes with foam.

# Building Envelope Improvements

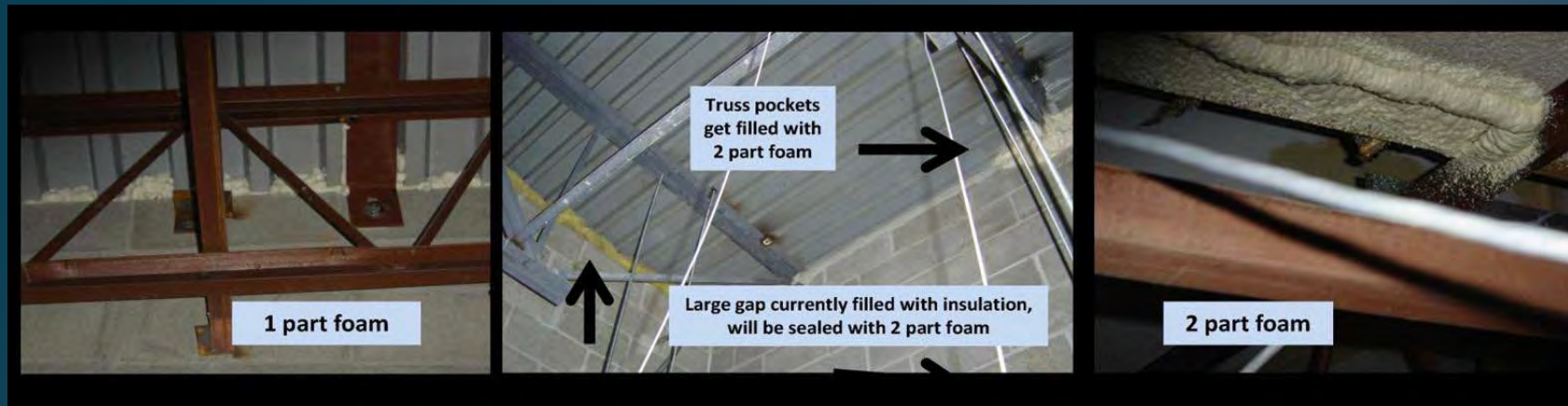


Smoke Puff Test – Leaking Window Pane



Failed or Nonexistent Door Sweep

# Building Envelope Improvements



# Building Envelope Improvements

- Benefits
  - Energy savings through reduced exfiltrating/infiltrating of conditioned and unconditioned air.
  - Increase Comfort with Draft Reduction
  - Reduce Pressure Differences Between Floors (Stack Effect)



# Steam Trap Replacement

- Audited the Campus Wide Existing Steam Trap Condition.
- Measured Each Trap – State Required – Seeking Which Traps Failed and How Much Blow by is Associated with Each Trap
- Interviews with Campus Steering Group – Discussed options, Campus and State Specs, and Desires
- Developed Proposal That Replaces Failed Traps and Meets State Standards
- Replacement Highlights Include:
  - Bring all Campus Traps to Full Functionality
  - Consistency with Product for Ease of Maintenance
  - Eliminate Blow By for all Failed Traps Saving on Steam Production

# Steam Trap Replacement



Typical Steam Trap at SSC

# Water Conservation Upgrade

- Completed Campus Wide Water Fixture by Fixture Audit
- Interviews with Campus Steering Group – Discussed options, Campus Specs, and Desires
- Developed Proposal That Focuses on Fixture Internal Upgrades to Meet As-Designed Standards, Achieve Water Use Reductions, and Greatly Improve Function
- Mock up installed in Maintenance & Materials Building
- Upgrades Include:
  - Replace internals of toilet/urinal flushometers to individually tune and achieve factory intended performance. Chrome piping will be replaced and infrared sensors installed, as required.
  - Upgrade will include incorporating dual flush technology (i.e. two level flushing).
  - Replace internals of tank toilets to individually tune and achieve factory intended performance.
  - Install vandal-resistant low flow aerators on sinks.
  - Install reduced flow shower heads at HEC.



# Water Conservation Upgrade



# Water Conservation Upgrade



# Water Conservation Upgrade



# Water Conservation Upgrade

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- Benefits
  - Reduced Water Consumption
  - Increased consistency and performance of systems
  - Standardization of equipment

# Measures Investigated, Not Moving Forward

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- Swimming Pool Covers
- New Solar Thermal System at HEC (replacing existing panels).
- Solar PV at various buildings.
- Window Replacements at Delzell and Student Services, option of Visqueen on the outside of the windows, Lexan glass on the inside of the windows.
- Window Air Conditioners Winter Covers at Delzell and Student Services.
- Retrocommissioning
- Vending Machine Controls
- Duct Replacement at Old Main
- Certain Control/Mechanical measures at buildings such as Old Main.
- Exterior Lighting Pole and Decorative Head Replacement

## Measures Being Considered for Phase 2

- Upgrade Existing Solar Thermal System at HEC (utilize existing panels)
- Conversion of AHUs in the Quandt Gym to VAV.
- Green IT
- UWSP Outlying Buildings

# Project Timeline

State of Wisconsin Process Steps	Date
Energy Assessment Report Submission to the Division of Facilities Development (DFD)	Week of January 6, 2014
DFD Technical Review and Approval	TBD – Typically 6 weeks or more
Submit initial agenda request for BOR/BC approval meetings.	February, 2014
Submit Final Agency Request	March 2014
Board of Regents (BOR) & Building Commission Approval (BC)	BOR – April xx, 2014 (meeting schedule not advertised yet) BC – April xx, 2014 (meeting schedule not advertised yet)
Contract & Notice To Proceed	Projected – End of May, 2014

Initial BOR/BC Agenda Request: The information about potential BOR/SBC agenda items, which is required two months before the meeting, only needs to include the name of the project and a brief one or two sentence project description.

# Discussion

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