University of Texas at Austin Demand Side Energy Management & Conservation Projects

Overview

- UT's Energy Profile Background
- Chronology of the Project's Development
- The Projects
  - Steam
  - Water (domestic, process & landscape irriation)
  - Lighting
- Measurement & Verification
- Challenges, Lessons Learned
- Where We Are Going From Here
- Q & A

The University of Texas at Austin

Background - Energy Profile

- Generate our own electricity for main campus
- Purchase water and natural gas
- Estimated annual purchased utilities costs for FY 2009:

$59,000,000

The Projects

DSEMC Plan in Action

The Projects

Chronology of the Project's Development

March 2007
- DSEMC born by Charter
- Formally launched October 2007

December 2007
- Audit – 12.6M ft^2

May 2008
- Designs completed
- Projects started
- 122 bldgs. involved

September 2009
- Installation complete (except landscape irrigation)

The Projects

Steam Project

Replaced or Repaired 420 Steam Traps and Radiator Valves

The Projects

Steam Trap Savings

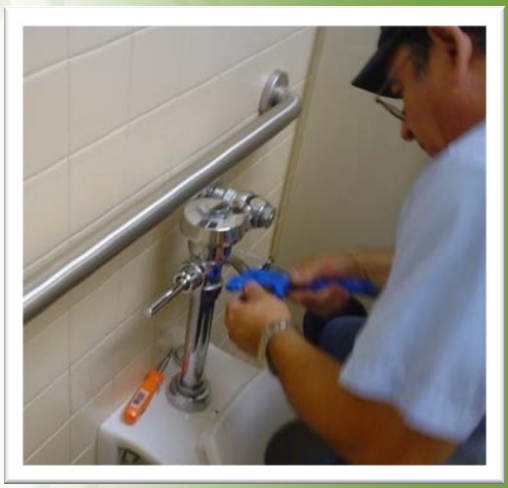
- Project cost-approximately $1M
- $235,000 / year* Steam *Avoided Cost* Savings
- 23,480 MMBTU of steam energy saved
- 5.8 Million lbs / year of CO2 from Steam
- Payback 4.25 years

*based on UT utility gas rate

The Projects

Water Project-Domestic Use

Replaced, Repaired or Installed 5,941 Plumbing Fixtures



The Projects

Water Savings-Domestic Use

- Project cost-approximately $1.5M
- $572,000* / year water savings
- 60 million gal. of water – enough to fill Olympic 92 pools
- 288,000 KWh in pumping energy (electricity)
- 246,000 lbs / year of CO2 from Water (pump power)
- 2.5 yr. payback

*Based on City of Austin rate of $10.09 per 1,000 gal of water (water & wastewater)

92 Olympic-size Pools

The Projects

Water Project-Process Use

Purchased 24 portable, closed loop, recirculating chillers and 6 recirculating aspirator vacuum pumps

The Projects

Water Savings-Process Use

- Project cost-approximately $92,000
- $31,300* / yr. water savings
- 3.7M gallons of water
- 2.9 yr. payback

*water & wastewater savings were reduced by 20% to account for energy use by the chillers.

The Projects

Water Project-Landscape Irrigation Use

- Replaced 80 existing automatic controllers with wireless type
- Installed new central computer with 42” monitor
- Installed digital flow sensors and master valves at each controller
- Provided maintenance staff with portable communication radios
- Installed 2 evaporation-transpiration gauges and 2 rain buckets
- Replaced over 13,000 spray type nozzles with MP rotary nozzles
- 1 year training to be provided to staff by contractor

The Projects

Water Savings-Irrigation Use

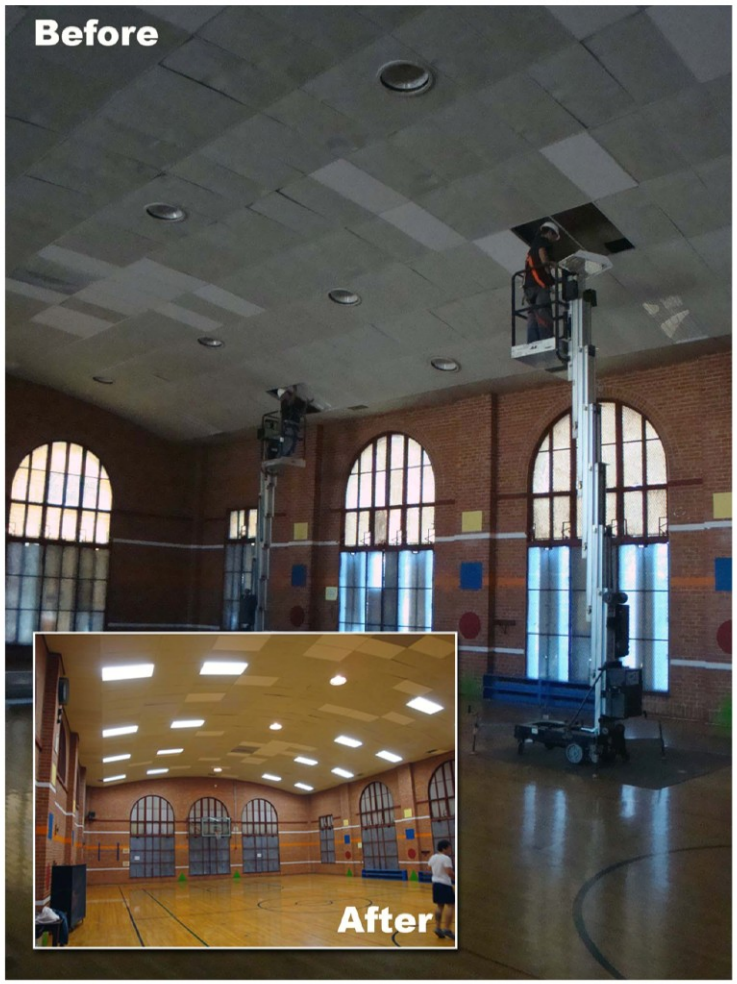
- Project cost-approximately $2M
- $576,730* / year water Savings
- 49M gallons / year of water
- 240,000 KWh in pumping energy (electricity)
- 205,000 lbs / year of CO2 from Water (pump power)
- 3.5 yr. payback

*Based on City of Austin 2010 rate of $11.77 per 1,000 gallons of water (water & wastewater)

The Projects

Lighting Project

- More Than 200,000 Lighting Fixtures & 500,000 Lamps / Ballasts
- 2,300 lighting occupancy sensors



The Projects

Lighting Savings

- Project cost-approximately $11.5M
- $2,000,000* / year electrical savings
- 28M KWh per year in electricity
- 24M lbs / year of CO2 from lighting
- 5.7 years payback

*Based on UT utility rate of 7.3¢ / kWh and City of Austin 9.3¢ / kWh

1,998 Cars Off The Road

Measurement & Verification

Measurement & Verification

General for Steam, Water & Lighting

- Results measured in accordance with Federal Energy Management Program Measurement and Verification protocol: FEMP M&V Protocol
- Some of the data provided by contractors and university consultants included:
  - Audit of existing conditions (e.g., operating hours, condition, size, etc.)
  - Inventory of units (e.g.steam traps, flush valves, lighting fixtures, etc.)
  - Summary of savings report, including savings calculation methodology
  - Post installation final report

Battle Hall – 1st floor hallway

BEFORE

AFTER

Challenges/Lessons Learned

Challenges

- Communication with building stakeholders
- Working times and conditions
- Keys for building access
- Security clearance for subs into sensitive areas

Lessons Learned

- Have sub-metering in place prior to start of work to verify savings
- Make program presentation to Auxiliary Enterprises early on in order to get their participation
- Develop stakeholder communication methods more fully
- Using outside firms to do work as opposed to UT resources

Where We Are Going from Here

- Completion of staffing
- Retro-commissioning
- Design and construction standards
- New & evolving technologies
- Renewable energy
- Ongoing culture change

Questions?