Texas A&M University-Commerce

Ronnie Scott,
HVAC Supervisor

Gary Williamson
Electrical Supervisor
Campus Overview

Total Gross Square Footage (GSF) – 2.3 million
Buildings Served - 102 buildings
Size of Campus in Acres – 1,883
Number of Students, Faculty and Staff – 13,000 (<>)
FY12 Annual Purchased Utility Cost

- Electricity $3,066,681
- Natural Gas $ 294,389
- Water & Sewer $ 462,758
- Solid Waste $ 27,217
Utility Plant Production

District Cooling and Heating

- Chiller capacity:
  - Main campus 2,650 tons on main loop
  - Stand alone 1,555 tons
  - Housing 1,100 tons

- Boiler capacity
  - Main campus 47.5 mmbtu
  - Housing 16.5 mmbtu

- 40 percent of total campus GSF served by central utility plant

- Type of utility plant and building automation system:
  - Majority of campus is covered by Schneider Electric
  - Siemens in three buildings
Greatest Challenge and Priorities

Greatest challenge faced by your institution in the area of utilities and energy management:

- *Improving energy efficiency across campus while continuing to address on-going campus needs*

Three highest priorities to improve facility operation and reduce energy consumption and cost:

- *Upgrade mechanical systems in older buildings*
- *Retrofit existing buildings with energy-efficient lighting*
- *Install light and HVAC occupancy sensors in classrooms and offices*
Campus Overview

Total Gross Square Footage – 2,272,299
Buildings Served - 108
Size of Campus in Acres – 250 acres
  ▪ 85 acres (mowing, edging, weeding, blowing, landscaping, Ect..)
  ▪ 119 acres (streets, hardscape & parking lots)
Number of Students – 7,239
Faculty and Staff - 913
FY12 Annual Purchased Utility Cost
  ▪ Electricity $4,366,386
  ▪ Natural Gas $ 71,841
  ▪ Water & Sewer $ 359,184
  ▪ Solid Waste $ 138,556
Utility Plant Production

- District Cooling and Heating
- 2 - central utility plants
- 3 – 650 ton chillers per plant; 3900 - total tons
- Boiler capacity (mmbtu) – 10.89 (approx. 6.5 buildings)
- Percent of total campus GSF served by central utility plant
  - Cooling – 77.45% (1.76 Million GSF)
  - Heating - 12.04% (273,657 GSF)
- Type of utility plant and building automation system
  - Centrifugal Chillers, Chilled Water Loop, Direct Primary
  - 3-pass, wetback, fire-tube, steam boilers
  - BAS - 84% (1.8 Million GSF) – Siemens
Greatest Challenge and Priorities

Greatest challenge faced by your institution in the area of utilities and energy management

- Aging infrastructure and funding for new energy management projects

Three highest priorities to improve facility operation and reduce energy consumption and cost

- Metering of campus buildings
- Educating the building users
- Securing funding for investments into energy projects and to ensure operating efficiencies
John Casey
Interim Director
Facilities Services

Van Franks
Associate Director
Facilities Services

William Villanueva
System Programmer I
Facilities Services

Joey Vera
Facilities Maintenance Supervisor
Facilities Services
Campus Overview

- Total Gross Square Footage (GSF): 2.48 Million
- Buildings Served: 46
- Size of Campus in Acres: 390
- Number of Students, Faculty and Staff: 11,500
- FY12 Annual Purchased Utility Cost: $4.959 Million
  - Electricity: $3.683 Million
  - Natural Gas: $209,000
  - Water & Sewer: $768,000
  - Solid Waste: $88,000
Utility Plant Production

District Cooling and Heating

- Describe central utility plant (if applicable)
- Chiller capacity (tons) 6,000
- Boiler capacity (mmbtu) 30.128
- Percent of total campus GSF served by central utility plant 56.3%
- Type of utility plant and building automation system
  Chilled/Hot Water Siemens Apogee
Greatest Challenge and Priorities

Greatest challenge faced by your institution in the area of utilities and energy management:

- Humid and corrosive environment

Three highest priorities to improve facility operation and reduce energy consumption and cost:

- Automated control of Central Plant operation (chilled/hot water)
- Building automation program to gain improved efficiencies in off-peak hour (10pm-6am)
- Link building electric meters to building automation system
Texas A&M University – Texarkana

Jeff Allen
Director of Facilities

Titus Turner
Utilities Manager
Campus Overview

Campus Gross Square footage: 440,651

Bringle Lake Campus: 326,666
- Science & Technology Building 44,572
- University Center 181,450
- Physical Plant 14,729
- Bringle Lake Village (Student Housing) 85,915

South Campus 113,985
- Aikin Building 51,600
- Academic Building 39,385
- John F. Moss Library 23,000

Campus Size: 382 Acres*
Students 1,960**
Faculty 197**
Staff 142**

* As per LAR Budgeted FY13
** As per Banner Enrollment Status Report
## FY12 ANNUAL PURCHASED UTILITY COST

<table>
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<tr>
<th>FY12</th>
<th>ELECTRIC</th>
<th>NATURAL GAS</th>
<th>WATER</th>
<th>TOTAL</th>
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<td>10,520</td>
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<td>10,520</td>
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<tr>
<td>MMBtu</td>
<td></td>
<td></td>
<td>15,070</td>
<td>15,070</td>
</tr>
<tr>
<td>Unit Gallons</td>
<td></td>
<td></td>
<td>19,757,406</td>
<td>19,757,406</td>
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</tbody>
</table>

Campus Overview
Utility Plant Production

Central Plant

- Two (2) 1070 ton Trane Water Cooled Centrifugal Chillers
- Two (2) 250 HP Cleaver-Brooks 4WI-700-250-150 8,368 (1000 BTU/HR) Boilers
- 75% of campus buildings on main campus currently serviced
- Siemens Insight
Challenges and Priorities

1. Greatest challenge faced by your institution in the area of utilities and energy management
   - Reduction or elimination of South Campus utility costs

2. Three highest priorities to improve facility operation and reduce energy consumption and cost
   - HVAC Scheduling
   - Campus-wide Energy Stewardship
   - Central Plant Optimization
Prairie View A&M University

Dr. Corey Bradford  
Senior Vice President  
Business Affairs & Chief Financial Officer

Charles Muse  
Energy Manager  
Senior Director in Physical Plant  
and Director of Utilities

Larry Watson  
Assistant Vice President  
Physical Plant

ALL  
SENIOR BUILDING COORDINATORS
Campus Overview

Total Gross Square Footage (GSF) and Buildings Served

1,785,679 GSF

Size of Campus in Acres

1,500 ACRES

Number of Students, Faculty, and Staff

8,343 Students
421 Faculty
706 Staff

FY12 Annual Purchased Utility Cost

Electricity = $2,621.800
Natural Gas = $404,755
Water & Sewer = n/a
Solid Waste = $103,000
Utility Plant Production

District Cooling and Heating

Prairie View A&M University’s Central Utility Plant is located centrally in the University’s core on the main campus. It contains the oldest architecture (1916) among the University’s facilities. The plant provides all chilled water, heating hot water, and steam to main campus facilities, and provides for the central monitoring/control of the University’s electrical distribution, domestic water, fire alarm/firefighting, and wastewater treatment systems/facilities. Primary machinery located and operated within the plant include 5 chillers, 4 boilers, water softeners, de-alkalizers, deaerator and other supporting equipment.

- Chiller capacity (5,500 tons)
- Boiler capacity (110 mmbtu)
- 90% Percent of total campus GSF served by central utility plant
- Johnson Controls – Metasys EMS System
Greatest Challenge and Priorities

Greatest challenge faced by your institution in the area of utilities and energy management

- *Utility Production and Distribution Optimization*

Three highest priorities to improve facility operation and reduce energy consumption and cost

- *Precise Utility Metering and Data Management*
- *Building Energy Retro-Commissioning*
- *Customers Awareness, Education, Outreach and Engagement*
Texas A&M Galveston (Facility Services)

Will Heidel
Director of Facility Services

David Lang
Asst. Director of Construction and Renovation

Pat Hebert
Facilities Coordinator

Frank Deharde
A/C & Refrigeration Mechanic II
No picture on file
Campus Overview

Total Gross Square Footage and Buildings Served = 858,113 (GSF)

Galveston A&M Campus Size = 70 Acres

2,014 Students, 430 Faculty and Staff

FY12 Annual Purchased Utility Cost

- **Electricity:**
  - Champion Energy $1,248,585
  - Reliant $17,671
  - TXU Energy $69,948

- **Natural Gas:**
  - TX Gas Services $38,206
  - TX Gen. Land Office $112,281

- **Water & Sewer:**
  - City of Galveston $155,086

- **Solid Waste:**
  - BFI Waste Services of TX $102,032
Utility Plant Production

District Cooling and Heating

One central plant for chilled/hot water a/c and heat

Chiller capacity
- One 1000 ton chiller and two 500 ton chillers

80% percent of total campus GSF served by central utility plant
- One dorm with 200 PTAC a/c units
- One building with 15 roof top units

Type of utility plant and building automation system
- Siemens control system
- 70% of campus in digital and 30% is pneumatic
Greatest Challenge and Priorities

Greatest challenge faced by your institution in the area of utilities and energy management

- Deferred maintenance funding
- Controlling equipment to meet the supply needed at different times

Three highest priorities to improve facility operation and reduce energy consumption and cost

- Chiller Scheduling; Sea Aggie Center Control; Ocean Coastal Study Building (OCSB) Control
- Train staff to be able to program and trend equipment use on campus
- Need to replace the underground hot/cold water loop lines
West Texas A&M University

Dan K. Smith
Associate Vice President for Physical Facilities
Campus Overview

Total Gross Square Footage (GSF) and Buildings Served
92 buildings with 2,612,000 GSF

Size of Campus in Acres – 190 acre Main Campus

Number of Students, Faculty and Staff
8,747

FY12 Annual Purchased Utility Cost
- Electricity - $1,722,000.00
- Natural Gas - $600,000.00
- Water & Sewer - $1,000,000.00
- Solid Waste - $17,000.00
Utility Plant Production

District Cooling and Heating

- Chiller capacity – 2,950 tons
- Boiler capacity - 132.889 mmbtu

Chillers:
- (3) 500 ton
- (2) 300 ton
- (1) 850 ton

<table>
<thead>
<tr>
<th>BOILER NUMBER</th>
<th>MANUFACTURER</th>
<th>YEAR INSTALLED</th>
<th>CAPACITY /hr</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Cleaver Brooks Burner</td>
<td>1978</td>
<td>60 HZ</td>
</tr>
<tr>
<td>2</td>
<td>Cleaver Brooks Burner</td>
<td>1978</td>
<td>60 HZ</td>
</tr>
<tr>
<td>3</td>
<td>Erie City - Keystone</td>
<td>1963</td>
<td>16,000 KBTU</td>
</tr>
<tr>
<td>4</td>
<td>Erie City - Keystone</td>
<td>1963</td>
<td>16,000 KBTU</td>
</tr>
<tr>
<td>5</td>
<td>Erie City - Keystone</td>
<td>1969</td>
<td>25,700 KBTU</td>
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</tbody>
</table>
Utility Plant Production

Percent of total campus GSF served by central utility plant
- 2,167,000 GSF or 83%

Type of utility plant and building automation system
- Boiler and Chiller Plant
- Automation by Johnson Control Incorporated (JCI)
Priorities

Two highest priorities to improve facility operation and reduce energy consumption and cost

- **Boiler Efficiency**
- **Boiler Controls**
Texas A&M University at Central Texas

Christopher Hill  Director of Facilities

103,000 GSF - Founders Hall (owned)
170,000 GSF - 2 leased spaces

FY12 Annual Purchased Utility Cost

- Electricity $40,000
- Natural Gas $5,000
- Water & Sewer $20,000
- Solid Waste $10,000
Utility Plant Production

District Cooling and Heating

- No central utility plant
- Chiller capacity (tons)…350 tons
- Boiler capacity (mmBtu)… 1.5 million (quantity 2)
- Siemens utility plant/building automation system
Greatest Challenge and Priorities

Greatest challenge faced by your institution in the area of utilities and energy management

- *Being a new campus, the toughest part will be to make sure the policies become part of the culture as we grow*
Steven J. Bowman
Director of Energy and Utility Operations
Campus Overview

98 Buildings, 2,047,492 GSF, 1,317,707 Total NASF and 791,589 E&G NASF

Main Campus 169 acres, Dairy 81.1 acres, Farm 699.6 acres, Ranch 1,174.2 acres Total 2,124 acres

10,281 Students, 279 Faculty and 667 Staff – Stephenville, Ft. Worth, Weatherford, and Waco

FY12 Annual Purchased Utility Cost

- Electricity - 34,425,270 kilowatt-hours $ 2,707,104
- Natural Gas – 78,732 MCF $ 309,362
- Water & Sewer – 48,182,679 Gallons $ 411,552
- Solid Waste – n/a
Utility Plant Production

District Cooling and Heating

- Describe central utility plant – Five (5) 1,000 ton Trane Chillers, two (2) devalued due to cooling tower issues one (1) out of service. Nine (9) Aerco Benchmark 3.0 Condensing Boilers.

- Chiller capacity (tons) - 3,650 tons

- Boiler capacity (mmbtu) - 27,000 mbh

- Percent of total campus GSF served by central utility plant – 1,139,965 GSF of 2,047,492 GSF or 55.6%

- Type of utility plant and building automation system – Trane Tracer Summit controls the boilers, chillers and cooling towers. The Central Plant distribution pumps and the main campus irrigation, fire panels, security alarms and HVAC points are controlled by Johnson Controls MetaSys (bacnet)
Greatest Challenge and Priorities

Greatest challenge faced by your institution in the area of utilities and energy management:

- **Obtain staffing and funding to continue increasing the energy reduction measure we have already obtained in the last 5 years**

Three highest priorities to improve facility operation and reduce energy consumption and cost:

- **Get new electrical contract in place for a multi-year period**
- **Proceed with Energy Conservation Projects planned for an ESCO**
- **Support and funding to continue making improvements each year**
Texas A&M University-San Antonio

Marshall Lasswell
Director of Facilities and Physical Plant

Polo Cervantes
Assistant Director of Physical Plant
Campus Overview

TAMU-SA now operating at 4 sites:

- Main Campus
- Brooks City-Base Campus
- Gillette Campus
- Educational & Cultural Arts Center

Total Gross Square Footage: 277,148 GSF

Size of Campus: 694 Acres

4,112 Students, 260 Faculty and Staff
Greatest Challenge/Opportunity: Rapid Growth

Enrollment grew 187% from fall 2008 to fall 2012 at TAMU-SA
Greatest Challenge and Priorities

Greatest challenge faced by your institution in the area of utilities and energy management:

- Operating at Multiple Campuses (3 of 4 leased)

Three highest priorities to improve facility operation and reduce energy consumption and cost:

- Continue to implement best practices into design standards
- Increase facility utilization hours of existing buildings
Texas A&M International University

Richard Gentry
Director Physical Plant

Albert Lopez
Asst Director

Arnulfo Marquez
HVAC Supervisor
Campus Overview

Total Gross Square Footage (GSF) and Buildings Served
900,416 GSF   15 Total Buildings

Size of Campus in Acres  300 Acres

Number of Students, Faculty and Staff
7,000 Students   945 Faculty and Staff

FY12 Annual Purchased Utility Cost

- Electricity   $1,804,311
- Natural Gas   $   66,409
- Water & Sewer $  407,484  62% Irrigation  25% CP Makeup
- Solid Waste   $   27,071
Utility Plant Production

District Cooling and Heating

Central utility plant

- Chill Water
- Hot Water & Domestic Hot Water production via 4 pipe direct buried
- HVAC System

Chiller capacity (tons) 4-1000 Ton Water Cooled Centrifugal
Heat Pump 250 Tons
Boiler capacity (mmbtu) 2-8400 MBH gas fired
Percent of total campus GSF served by central utility plant 100%
Building automation system Siemens Apogee (all buildings)
Greatest Challenge and Priorities

Greatest challenge faced by your institution in the area of utilities and energy management

- Steady Growth
- Budget Reductions
- Staffing

Three highest priorities to improve facility operation and reduce energy consumption and cost

- Thermal Storage
- Electrical System Maintenance Plan
- Power Factor Correction
Texas A&M Health Science Center

Richard Lynn P.E. LEED\textsuperscript{AP}
Director of Utilities

Joe Fix P.E. LEED\textsuperscript{AP} – Electrical Engineer

Dan Clawson – Facilities Coordinator Round Rock & Temple

Mike Young – Manager Of Facilities Services & Planning – Dallas BCD

Terry Hoppe – Maintenance Foreman II– IBT Houston

Donnie Loftin – Assistant Facilities Coordinator - Temple

Charles Suarez – Business Coordinator - Kingsville COP

Reynaldo Escobedo – Building Attendant McAllen
## Campus Overview

<table>
<thead>
<tr>
<th>HSC Location</th>
<th>Total GSF</th>
<th># Students, Faculty &amp; Staff</th>
<th>Electricity (kWh)</th>
<th>Natural Gas (MCF)</th>
<th>Water &amp; Sewer (mGals)</th>
<th>Solid Waste (tons)</th>
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<td>7,901</td>
<td>2,021.8</td>
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<td>College Station – SRPH Only</td>
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<td>447.5</td>
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<td>Corpus Christi</td>
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<td>50</td>
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# Campus Overview

<table>
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<th># Students, Faculty &amp; Staff</th>
<th>Electricity (kWh)</th>
<th>Natural Gas (MCF)</th>
<th>Water &amp; Sewer (mGals)</th>
<th>Solid Waste (tons)</th>
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<td>Kingsville - Vivarium</td>
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<td>5</td>
<td>949,440</td>
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<td>McAllen</td>
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<td>638</td>
<td>$2,967.64</td>
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<td>HSC Location</td>
<td>Central Plant (Y/N)</td>
<td>Chiller Capacity (tons)</td>
<td>Boiler Capacity (mmBtu)</td>
<td>% of total Campus GSF Served by Central Plant</td>
<td>Type of Utility Plant System</td>
<td>Type of Building Automation System</td>
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<tr>
<td>---------------</td>
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<td>N/A</td>
<td>Fed From TAMU</td>
<td>On TAMU</td>
<td>Siemens</td>
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<tr>
<td>Corpus Christi</td>
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<td>N/A</td>
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<td>?</td>
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<td>Dallas</td>
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<td>N/A</td>
<td>N/A</td>
<td>Fed from Baylor Med Ctr</td>
<td>CHW – Steam from Baylor</td>
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## Utility Plant Production

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<th>HSC Location</th>
<th>Central Plant (Y/N)</th>
<th>Chiller Capacity (tons)</th>
<th>Boiler Capacity (mmBtu)</th>
<th>% of total Campus GSF Served by Central Plant</th>
<th>Type of Utility Plant System</th>
<th>Type of Building Automation System</th>
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<td>JCI</td>
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<td>N/A</td>
<td>Fed From TAMUK</td>
<td>CHW / HHW from TAMUK</td>
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<td>Electric Strip Hgt</td>
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<td>550</td>
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<td>Air Cooled Chiller VSPSP – VSP for HHW</td>
<td>Siemens</td>
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Greatest Challenge and Priorities

Greatest challenge faced by your institution in the area of utilities and energy management:

- Getting our private utility suppliers to provide us detailed bills with consumption and cost for utilities
- Getting greater support from our upper management
- Getting funds to implement Energy Audits at the facilities

Three highest priorities to improve facility operation and reduce energy consumption and cost

- Perform ASHRAE Level One audits in all of our facilities
- Perform ASHRAE Level II & III audits in facilities that need it
- Backing and funding to implement the recommendations from the audits. In many cases the age of the equipment will dictate spending the money
Utilities & Energy Services
Energy Management Program
Workshop

October 16-17, 2012
Energy Management Program Update

Jim Riley, Executive Director
Les Williams, Director

October 16, 2012
Energy Management Program Update

Phase I
- Establish consumption baselines (EUI)
- Identifying ‘low hanging’ opportunities
- Begin discussion about EUI targets and Energy Stewardship

Phase II
- Establish campus EUI targets
- Documenting and tracking energy performance
- Documenting opportunities

Phase III
- Identifying opportunities for improvement
- Identifying funding challenges / opportunities
Energy Management Program Update

Campus Visits

- Texas A&M University Commerce (Commerce, TX)
- Texas A&M University Kingsville (Kingsville, TX)
- Texas A&M University Corpus Christi (Corpus Christi, TX)
- Texas A&M University Texarkana (Texarkana, TX)
- Prairie View A&M University (Prairie View, TX)
- Texas A&M University (Galveston, TX)
- West Texas A&M University (Canyon, TX)
- Texas A&M University Central Texas (Killeen, TX)
- Tarleton State University (Stephenville, TX)
- Texas A&M University San Antonio (San Antonio, TX)
- Texas A&M International University (Laredo, TX)
- Texas A&M Health Science Center (College Station, TX)
Energy Management Program Update

Energy Action Plan 2015

- Energy Stewardship Program (ESP)
- Awareness, Education, Outreach and Engagement
- Comprehensive Building Automation & HVAC Management
- Precise Utility Metering, Data Management, & Cost Recovery
- Building Energy Retro-Commissioning
- Server Room Consolidation and Virtualization
- Utilities and Energy System Capital Planning
- Utility Production and Distribution Optimization
- Academic and Research Collaboration and Partnering
- Building Energy Efficiency Upgrades and Optimization - Capital
- Sustainability (Environmental Benefit) and GHG Reduction
- Energy Action Plan 2015 Advisory Committee
Energy Stewardship Program
College Station, Texas

Charlie Shear, Supervisor
Energy Stewardship Program

October 16, 2012
Energy Stewardship Program
Energy Stewardship Program

Improve Energy Efficiency and Conservation

Work Closely With
- Students
- Faculty
- Staff
- Building occupants
- Departmental representatives
- Facility managers
- Building proctors
- Technical staff

To
- Educate
- Inform
- Raise awareness
Energy Stewardship Program

Improve Energy Efficiency and Conservation

- Customer comfort
- Quality customer Service
- Eliminate energy waste
## Energy Stewardship Program

<table>
<thead>
<tr>
<th>PROCUREMENT</th>
<th>TRANSMISSION</th>
<th>PRODUCTION</th>
<th>DISTRIBUTION</th>
<th>METERING &amp; BILLING</th>
<th>CUSTOMER SERVICE</th>
</tr>
</thead>
</table>
| Calculate and nominate campus energy requirements | TAMU owns:  
- Domestic water transmission system  
Atmos owns:  
- HP (600 psi) NG delivery system  
ERCOT/BTU owns:  
- 138kV electrical transmission system  
UEM coordinates closely with Atmos and ERCOT/BU | Management of:  
- Four campus utility plants  
- System Building utility plant  
- Solid Waste & Recycling  
- 2 wastewater treatment facilities  
Production of:  
- Electricity  
- Chilled water for cooling  
- Hot water for heating  
- Domestic cold & hot water  
- Steam  
Atmos owns:  
- LP & IP natural gas delivery system  
TAMU owns campus delivery systems:  
- 12.5kV electrical  
- Domestic water (hot & cold)  
- Chilled Water  
- Heating Hot Water  
- Steam  
- Sanitary Sewer  
- Storm Drainage | Over 2,000 revenue-quality meters in over 500 buildings  
Manage utility rate model and rate setting  
Cost recovery for all utilities and energy – both operating budget and purchased energy  
Direct customer invoicing through FAMIS  
Energy efficiency improvement services | First response to ensure customer comfort  
Building automation and HVAC regulation  
Energy stewardship & building system optimization  
Design review and capital project coordination  
Customer requests thru AggieWorks Center  
Key performance indicators and resource management |
Energy Stewardship Program
The overall financial goal is to reduce the energy cost of TAMU College Station by a minimum of the following:

<table>
<thead>
<tr>
<th>Year</th>
<th>FY12</th>
<th>FY13</th>
<th>FY14</th>
<th>FY15</th>
<th>FY16</th>
<th>FY17</th>
<th>FY18</th>
<th>FY19</th>
<th>FY20</th>
<th>FY21</th>
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<tr>
<td></td>
<td>$500,000</td>
<td>$750,000</td>
<td>$802,500</td>
<td>$858,675</td>
<td>$918,782</td>
<td>$983,097</td>
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<td>$1,125,548</td>
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<td>Strategy</td>
<td>Annual Cost Avoidance</td>
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<tr>
<td>31 HVAC Schedules</td>
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<td>1,365 PCs in Power Management</td>
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<td>Building Use Adjustments</td>
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<td>Holiday Break Adjustments</td>
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<td><strong>TOTAL</strong></td>
<td><strong>$1,109,331</strong></td>
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We’re All Energy Stewards
Building Automation System Management

Homer Bruner, Assistant Director
IT & Energy Services

October 16, 2012
Building Automation System (BAS)

- First responders to all HVAC calls
  - DDC
  - Pneumatic
  - DX systems
- 182 Buildings with DDC
- 19 Million Conditioned Square Feet
- 373,900 Points
- 841 Field Panels
- 24/7/365 Support
- 15 Technicians (in-house and contract)
Building Automation System (BAS)

- BSL3 Labs – Animal Research – Chemistry Labs – Fume Hoods – Clean Rooms – Data Center
- Work Order System – Dispatching – Custom Performance Reports – Command Center
Retro-Commissioning Program (RCP)

- 99 buildings since 2002
- 13.8 Million Square Feet
- 1992 Campus EUI was 364mBtu/gsf
- 2012 at 214 mBtu/gsf
- 2015 EUI goal is 190 mBtu/gsf
- Integral component of EAP 2015
- Target to commission 1 million GSF per year
Retro-Commissioning Program (RCP)

Focus on:
- Safety
- Comfort
- Meeting the customers needs
- Energy Reduction
Building Automation System (BAS) Retro-Commissioning Program (RCP)

- Come to BAS & RCP break-out sessions to see how we do it

Please ask questions
Utility Metering and Cost Recovery

Les Williams, Director

October 16, 2012
Utility Metering and Cost Recovery

In the United States alone, buildings account for¹:

- 72% of electricity consumption
- 39% of energy use
- 38% of all carbon dioxide (CO2) emissions

Why meter utility consumption at each building?

- You can’t manage what you don’t measure – you wouldn’t spend millions of dollars without proper financial accounting, but it happens routinely with energy.
- optimize system and building performance
- verify targeted energy and water consumption reduction

Utility Metering and Cost Recovery

Key Points

• All major buildings on campus metered
• Utility bills are based on actual consumption
• Metered data facilitates discussion between UES and customer being billed
• Metering encourages energy conservation
  – Measurement alone can lead to energy conservation of up to 2%
  – Invoicing for consumption can result in additional 5% savings
  – Using data to tune buildings can result in savings of 15 to 45%
• Educated and motivated customers are key to significant improvement in energy consumption and cost reduction

General Services Complex

**Consumption Profile**

**Average Consumption per thousand sq.ft. Profile**

**Chilled Water in mBtu**

**Average Consumption per thousand sq.ft. Profile**
Capital Planning and Financial Justification

Les Williams, Director

October 16, 2012
CHW Projections – Main Campus

CHW 30 Year Load and Capacity Projections - Main Campus

Chilled Water Load Growth vs. Capacity - Main Campus

Note: Includes electric chillers only
CHW Projections – West Campus

CHW 30 Year Load and Capacity Projections – West Campus

Chilled Water Load Growth vs. Capacity - West Campus

- New SUP4 Capacity
- New SUP2 Capacity
- New SUP 1 Capacity
- Existing SUP2 Capacity
- Existing SUP1 Capacity
- Load
- Firm Capacity w/equipment replacements

Fiscal Year:
- 2012
- 2013
- 2014
- 2015
- 2016
- 2017
- 2018
- 2019
- 2020
- 2021
- 2022
- 2023
- 2024
- 2025
- 2026
- 2027
- 2028
- 2029
- 2030
- 2031
- 2032
- 2033
- 2034
- 2035
- 2036
- 2037
- 2038
- 2039
- 2040
- 2041
- 2042

CHW (Tons):
- 0
- 5,000
- 10,000
- 15,000
- 20,000
- 25,000
- 30,000
- 35,000
- 40,000
- 45,000
### Resource Allocation

**DIVISION OF ADMINISTRATION**
**UTILITIES & ENERGY SERVICES**

Completed AggieWorks Request for BAS Team ending 10/13/2012
Sorted by Tech Complete Date

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<tr>
<th>Technician</th>
<th>Work Order</th>
<th>Problem Code</th>
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<th>Requestor</th>
<th>Building Name</th>
<th>Request Date</th>
<th>Request Time</th>
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<th>Tech Complete Time</th>
<th>AggieWorks</th>
<th>Dispatcher</th>
<th>Assigned</th>
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<td>CAMP ANIMAL HOUSING UNIT</td>
<td>10/11/2012</td>
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Production & Distribution Optimization

Jim Riley, Executive Director

October 16, 2012
Texas A&M University, College Station, Texas

Total Campus GSF vs. Total Campus Energy Consumption

- **Campus Square**
  - Significant growth in campus square footage
  - Energy consumption per GSF reduced by 40% over 10-year period (FY02-FY12)
  - $140 million in purchased energy

- **Campus Energy**
  - Requires continuous optimization and improved efficiency

Note: From FY02 to FY10, gross square footage of facilities served increased by 17.9% while total energy consumption decreased by 22.9%
Energy Use Index Chart

Energy Use Index (Energy Consumption per GSF)
Texas A&M University, College Station, Texas

- $140 million cost avoidance realized over 10 years
- Achieved 40 percent reduction of energy consumption per GSF over ten years (from FY02 baseline through FY12)
- EAP 2012 goal is to reduce overall EUI 20% over 5 years (from FY10 baseline)

Notes: FY10 through FY15 data projected with new CHP operating in FY12