



EXECUTIVE ORDER RP-49

Quarterly Report for UT System – April 2009

By April 2009, each agency shall submit an Update to its Energy Conservation Plan to the Office of the Governor and Legislative Budget Board. This update shall, at a minimum, provide the following information:

- A. The extent to which the agency has met the percentage goal it established for reducing its usage of electricity, gasoline, and natural gas;**

UT System Response: The UT System has been collecting extensive energy data from its 15 institution on an annual basis since 2001. In 2001, the Board of Regents established a goal of reducing energy consumption by 10-15% by the end of FY 2011. From FYE 2002-FYE 2007, the UT System had reduced overall energy consumption by 7.8%, saving an estimated \$110.4 million over the six-year period. Data for FY 2008 was included in the quarterly report submitted January 9, 2009.

- B. The steps the agency may take to increase the percentage goal for reducing its usage of electricity, gasoline, and natural gas;**

UT System Response: The UT System reported its energy conservation goals in December 2006. These goals already include a “stretch” goal of reducing energy consumption per square foot by 10 – 15% as of FYE 2011.

- C. Any additional ideas the agency has for reducing energy expenditures relating to facilities;**

(See attached information.)

- D. Any additional ideas the agency has to minimize fuel usage in all vehicles and equipment used by the agency.**

(See attached information.)

Posting of Update to State Agency Energy Savings Program

Each agency shall post all quarterly progress reports on its website under the common heading “State Agency Energy Savings Program.” Copies of quarterly updates should be sent to the following:

energysavings@governor.state.tx.us

by mail:

Legislative Budget Board

P.O. Box 12666

Austin, TX 78711

dgeiger@governor.state.tx.us

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UT SYSTEM INSTITUTIONS RP-49

QUARTER ENDED MARCH 31, 2009

1. UT ARLINGTON

Siemens Building Technologies, Inc. conducted an energy audit of each building on campus under a previous agreement with UT Arlington to determine the feasibility of additional utility savings to establish a performance contract in which they would guarantee that utility savings would be sufficient to pay back the amount of the contract within the time frame agreed. Siemens projected the simple payback for this project to be a favorable 7.99 years with an implementation cost of \$17,989,981. An energy performance contract to implement their recommendations was then signed with Siemens on August 28, 2006 after receiving approvals from appropriate authorities. UT Arlington has only one contract with Siemens. Every other contractor is considered a sub-contractor to Siemens.

The following items, while helpful in addressing facility infrastructure, were recommended as a result of Siemens' analysis based on both utility cost savings, and operation and maintenance (O&M) savings:

ECRM 1 - Comprehensive Lighting Retrofits - Completed July 13, 2007.

ECRM 2 - Occupancy Sensor EMS Input – Completed January 31, 2008.

ECRM 3 - Transformer Upgrade

The campus has electrical transformers located in most major buildings to reduce voltage for building use. Most were built in the 1970s and 1980s and can be replaced with more efficient units that reduce energy losses and improve reliability.

Status as of 3/31/2009 – Project was completed January 2, 2009 except for two transformers which will be installed during the Christmas break in December 2009.

ECRM 4 - Campus Steam Traps - Completed July 15, 2007.

ECRM 5 - High Efficiency Motor Upgrades - Completed March 28, 2007.

ECRM 6 - Window Solar Film - Completed Dec 31, 2007.

ECRM 7 - EMS Re-commissioning - Completed May 17, 2007.

ECRM 8 - Vending Machines - Completed January 16, 2007.

ECRM 9 – NanoFab Building Chiller - Completed August 7, 2007.



ECRM 10 – Thermal Energy Plant Heat Exchanger - Completed January 16, 2007.

ECRM 11 – Capacitor Bank, formerly “ATI Building Heat Pump Unit Replacement” - Completed March 28, 2007.

ECRM 12 - Computing Center Cooling Equipment Replacement – Completed August 17, 2007.

ECRM 13 - Stadium Chiller Replacement - Completed May 17, 2007.

ECRM 14 - Wetsel Building Chiller Replacement - Completed March 28, 2007.

ECRM 15 - Satellite Chiller Plant – Completed October 31, 2008

ECRM 16 - Swift Center Rooftop Unit Replacements - Completed August 3, 2007.

ECRM 17 - Texas Hall – Three AHU Replacements - Completed August 31, 2007.

ECRM 18 - Air Mixing Box Modifications – Completed October 31, 2008.

Separate from the Siemens’ projects above, we have completed the campus natural gas meter consolidation project by the elimination of an additional 5 (five) meters. This should provide an annual utility meter cost savings of \$26,875.00.

Separate from the Siemens’ projects above, we addressed some deferred maintenance by replacing existing FCU’s (Fan Coil Units) in the Science Building with expenditures of \$145,773. This was reported to the THECB on MP-4 for FY 2007. Savings is based on an estimated 10% of the total 90-ton capacity of the existing FCU’s operating an average of 8 hours per day and 365 days per year. The average \$/kwh in 2007 was \$0.0791 resulting in \$7,299 electrical savings for that year. In 2007 the \$/kwh increased 35% over the previous year. This % increase is assumed for future years.

Additionally, we have expended over \$579,800 on deferred maintenance projects that will directly affect energy savings. These projects consist of repairing, replacing and upgrading HVAC equipment in eight separate buildings. These projects were separated from the Siemens’ projects.

2. UT AUSTIN

Energy Conservation Initiatives:

A. Energy Procurement

UT Austin continues to work with the General Land Office to establish a more effective approach for natural gas procurement.



Status as of March 15, 2009:

A long-term procurement agreement is in place and UT Austin has established a procurement portfolio that is diversified in terms of volume, pricing and time. This approach has allowed the University to more effectively manage risk and achieve budgeting goals for this commodity. In coordination with the UT System Office of Finance and the General Land Office, UT Austin is evaluating possible longer term gas procurement possibilities that may allow the institution to take advantage of the current natural gas market

B. Energy Production

The BOR has approved the Utility Infrastructure Upgrade Phase II project, which will reduce energy consumption, an estimated 15%. The project has four major components: installation of a new high efficiency gas turbine and generator, installation of chilled water storage, renovation and upgrade of existing chilling stations and the addition of inlet air cooling to improve gas turbine efficiency. These projects are scheduled to begin in fall 2008 and be completed in approximately 24 months.

Status as of March 15, 2009:

- **High Efficiency Turbine** – project is designed and we have completed procurement of the turbine and the heat recovery steam generator (HRSG) that will provide combined cycle operation using the turbine. The turbine and HRSG have been delivered and the installation process is underway. Anticipated completion is early 2010.
- **Chilled Water Storage** – this project is in the bidding phase. The construction of 2 50 inch chilled water lines that will allow expanded chilled water delivery system to provide necessary cooling for new facilities in the center of campus will be complete in April.
- **Inlet Air Cooling** – this capacity will be provided from the new chilling station currently under construction.
- **Renovation/Upgrade of Chilling Stations** – this effort is underway; chillers and the cooling tower equipment have been installed. This project is expected to be complete in early 2009.
- **Chilling Station No. 6** – This new chilling station which replaces CS 2, is complete and will be on-line in April.

C. Energy Demand

Status as of January 1, 2009:

The BOR approved three energy conservation projects; campus-wide lighting retrofit, upgrading all steam traps and water conservation. All three projects are complete and the two energy projects, lighting and steam traps are meeting their estimated reduction on total campus energy consumption of 10%.

- **Steam Trap Upgrade** – Project will reduce steam consumption by 27 million pounds per year.



- **Lighting Retrofit** – Project will result in a reduction of 26 million kilowatt hours per year.
- **Water Conservation** – Project is estimated to reduce water consumption by 64 million gallons per year.

D. Energy Sales

UT Austin has met with Austin Energy regarding the possible sale of energy and is moving forward in this area.

Status as of March 15, 2009:

- Modifications to the power plant operating systems that are necessary for this type of operation have been completed, and UT Austin met with Austin Energy in February to discuss possible energy sales. Control systems are in place but the removal of GT 6, required to install the new GT 10, has eliminated the equipment redundancy necessary to sell power outside the campus grid. This effort will be restarted after GT 10 is completely operational.

E. Fleet Fuel Management

Status includes data from 1 September 2008 – 26 March 2009

- UT's motorized vehicular fleet consumed 5,466 gallons (5 percent) less of gasoline from the same time period the previous year.
- Biodiesel (B20) use increased by 976 gallons (6 percent) from the same time period of the previous year. B20 is now in-use at the Pickle Research Campus. 1,500 gallons have been used and an additional 1,000 gallons have been delivered.
- Use of Liquefied Petroleum Gas (LPG) was down by 15 gallons (1.5 percent).
- UT's vehicular fleet includes 120 electric carts which reduces the requirement for fossil fuel. An analysis will be conducted to ascertain the actual fuel savings through the use of these electric carts. This analysis will be included in next quarter's report.
- Total miles driven were reduced by 26,456 miles (2 percent) from the same reporting period last year.
- The average Miles per Gallon (MPG) per vehicle reduced to 11.37 MPG from 11.66 MPG from the same reporting period last year.
- Facilities Services (FS) is working jointly with Parking and Transportation (PTS) to investigate the purchase and installation of a skid mounted Ethanol (E85) fueling system for the University. Once in-place, E85-capable vehicles will be fueled with E85 versus gasoline. This initiative will support the improvement of regional air quality, add to energy security, and support Congressionally-directed mandates to reduce fossil fuel use. Grant funding may be available—FS and PTS will investigate. A status update will be provided in the next quarterly report.
- A new fleet-specific software package was recently purchased by the University that will improve overall management and efficient use of fleet vehicles.



3. UT BROWNSVILLE/TEXAS SOUTHMOST COLLEGE

Energy Conservation Initiatives:

- Newman Center renovation project is complete. It includes the installation of 104 new energy-efficient light fixtures and the replacement of 5 outdated HVAC units.
- Commissary building renovation project is currently underway. It will include the installation of new energy-efficient light fixtures and the replacement of outdated HVAC units.
- Cavalry building renovation project is currently underway. It will include the installation of new energy-efficient light fixtures and the replacement of outdated HVAC units.
- The Library parking lot received a lighting upgrade. Five outdated inefficient lights were replaced with energy efficient fixtures. Additionally, ITECC received an interior upgrade of 20 light fixtures.
- Six outdated and inefficient HVAC units were replaced throughout campus with new energy-efficient models. Two more are scheduled for the next quarter
- Phase 2 of MRC North and South Building EMS upgrades is currently under way. This will complete the energy management system for these facilities, replacing inoperable HVAC controls in these buildings.
- New EMS controls were installed in the Newman Center, to control recently replaced A/C units.
- Preventive Maintenance program is in the process of being automated via our new computerized maintenance management system. PM program is currently completed through manual logs. New system will ensure that PM's are completed on time and schedule resulting in higher unit efficiency and operation.
- A new 1000-ton cooling tower is currently under design. This will help ensure that the existing systems operate correctly promoting energy saving.
- EMS building programmer will continue to be requested for expanded Energy Management System. This will allow full control and use of system in conjunction with room scheduling.

4. UT DALLAS

Energy Conservation Initiatives:

- The University is in the process of selecting a consultant to make recommendations to upgrade the Energy Plant Steam and Chilled Water distribution system. This will result in savings due to a more efficient energy distribution system throughout the campus.
- The University is relocating and upgrading the main electrical feed to the campus. Doing so will result in savings due to the new cables being installed which offer less resistance (less voltage drop) to the transmission and distribution of electric power



- The University is collecting information from several vendors to be used in the analysis of cost/benefits ratio in the replacement of streets and parking incandescent lamps by LED lamps.

5. UT EL PASO

Conservation Measures Project Implementation Schedule

- Ongoing initiative: The SCORE consultant continues to work on benchmarking analysis of several types of buildings as part of our efforts to update our Energy Management Plan and Energy Benchmarking Report for the campus. The first phase of the metering project will be completed by the end of June 2009.
- Lighting: Retrofitting of street lamps to more efficient Metal Halide lamp is 60% complete. The assessment of new LED type fixtures for street and parking garage lighting is ongoing. The use of interior drop in 2x2 LED lamps and LED cove lighting fixtures continues to be evaluated.
- Occupancy sensors: The initiative to install occupancy sensing light controls to incorporate control of components of the HVAC system continues.
- Parking Garage Initiative: The lighting management system at the Parking Garage has helped reduce monthly electrical consumption by about 20%.
- Hot water distribution service lines: Replacement of 920 lineal feet of leaking pipes is complete. The project will eventually result in the replacement of 4510LF of leaking schedule 40 pipes with new properly insulated schedule 80 pipes that will help reduce energy losses.
- Electrical Retrofit Projects: Continue with efforts to replace obsolete electrical switches, motor control centers, medium voltage transformers, and distribution panels in various buildings to include Liberal Arts, Miners Hall, Vowell, Bell, Benedict, Hudspeth, Cotton Memorial, Administration, Kidd field, and Education. The electrical switches and motor control components will be replaced with energy efficient components and the medium voltage transformers will be replaced with transformers that meet or exceed the DOE Efficiency Standard for 2010.
- Transformer replacement: The project is underway to replace various 25-year old plus transformers with modern, energy efficient units. New transformers have been installed at Kelly Hall, Psychology, Bell Hall, and Benedict Hall. New transformers will be installed at Miners Hall, Hudspeth Hall, Cotton Memorial, Administration, Engineering and Kidd Field by summer of 2009.
- Energy Management System Adjustments: Have commenced making the adjustments and calibrations recommended by Siemens Building Technologies to improve the energy management control system and DDC units in various research buildings to enhance system performance.
- Ongoing Initiative: We are evaluating new emerging technology in the area of thermo-photovoltaic solar energy. The new technology uses water to cool the solar power cells and uses the heat absorbed during cooling to produce domestic and HVAC hot water.
- Ongoing Initiative: Reviving a campus communications campaign to raise awareness and encourage the campus to turn off the lights and conserve energy.



- Ongoing Initiative: Undertaking a coordination study of power distribution loops throughout the UTEP grid to identify power deficiencies. The study will also identify ways to optimize the power distribution across the six loops and balance the load by transferring heavy power requirements to loops with more electrical capacity and integrating power requirements associated with the buildings under design.

Project Implementation Update

- Update on UTEP's major construction projects: Construction of a new Basketball Practice Facility is completed. Construction of the new Bookstore is scheduled to be completed in May 2009. Design of UTEP's core Science and Engineering renovation and remodeling project is underway. The Chemistry and Computer Science Building and College of Health Science / School of Nursing Building are under construction. The design for the expansion of the Swimming and Fitness Center is underway. The scope of work for the design of all new buildings and major renovations includes requirements to meet or exceed energy code standards and LEED gold criteria.
- Engineering HVAC Modifications: The primary cooling coils have been replaced with 16 degree delta T coils.

Fleet Fuel Management

- In an effort to save energy, reduce our carbon footprint and promote sustainability initiatives we have purchased four electric, gas-free trucks and 2 electric, gas-free vans. These vehicles are the first fully electric vehicles on campus, producing zero tailpipe emissions.

6. UT PAN AMERICAN

Resource Efficiency Plan - March 2009

Contact: David A. Ortega
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Conservation Initiatives

1. Electrically sub-meter auxiliary services buildings in order to conserve energy and improve utility cost allocation. Installation is in-process. Tentative completion, April 2009.
2. Add two VFD's to serve the chill water pumps and interface them to the building automation system at the old computer center (Complete).
3. Add kilowatt meter to the old computer center (In-process).
4. The energy conservation committee convened for an information meeting.
5. UTPA interim-president initiated a faculty, students, and staff cost avoidance task force.

Operations and Maintenance Initiatives



- Hire new second full time preventive maintenance mechanic at cooling plant (Complete).
- Improve low delta chill water temperature at Unity Hall through controls upgrade is under investigation.
- Annual chiller preventive maintenance and tower cleaning (Complete).
- Re-evaluate coil cleaning priority list (In-process).

Fleet/Fuel Management

- Replace 10 vehicles with more fuel-efficient models (Funding approved; requisition is in process).
- Investigate the feasibility of acquiring an in-house propane fuel station (In-process).

Capital investments

1. Major lighting upgrades for five buildings, including occupancy sensors for two buildings. (Vendor selection complete; requisition is in process).
2. Phase out plan for non-serviceable building automation components. Purchase orders have been issued to upgrade five air handlers (Complete).
3. Upgrade existing side-stream chill water filter to improve the efficiency of heat transfer surfaces and thereby decrease energy costs. RFP is in process.
4. Replace old computer center air handler with a higher efficiency unit. Installation is in process.
5. Old computer center renovation: Add VAV boxes. Renovation is in process.

7. UT PERMIAN BASIN

Energy Conservation Initiatives:

1. Occupancy Sensors

Several have been installed in various areas. More will go online this calendar year with still more scheduled for this fiscal year.

2. Vending Misers

Misers have been installed on every vending machine on campus. These maintain product quality while using the minimum amount of energy.

3. Non – Critical Hours Shut Down

We shut down the thermal plant on weekends, nights and holidays. Consider the savings of not having to heat and cool 700,000 sq.ft. during those times. Also, on mild days we ventilate with outside air to further save on electricity.



- For years we have used battery-powered utility carts similar to golf carts instead of costly gasoline powered vehicles.
- We have installed energy-efficient chillers and boilers in the Thermal Plant.
- An automated control system with "soft-start" controls on air handlers motors and energy saving devices on air mixing boxes and other climate control equipment have been installed.
- All existing light fixtures have been retrofitted with energy saving ballasts and light bulbs.
- All new light fixtures installed in construction projects must meet energy saving requirements.
- Class and event scheduling has been streamlined to minimize air handler and electrical use.

8. UT SAN ANTONIO

1st Quarter 2009 Update: Capital Projects & Other Initiatives Intended to Reduce Energy

A. Energy Savings Initiatives In Progress

1. New space at University Heights has undergone the installation of high efficiency air conditioning units. Energy conservation rebate of \$6,247 received from CPS Energy (in the form of credit to existing account).
2. Office of Information Technology reduced energy consumption by initiating server virtualization and consolidation upgrades. Hardware efficiency upgrades will further reduce energy consumption.

B. Energy Savings Initiatives Under Evaluation

1. Steam Trap Survey conducted at 1604 campus. Recommendations have been made for repair and improvements with estimated savings. Project will be recommended for implementation and savings will be documented if funded.
2. A negative building pressurization air situation has been reported and confirmed at the BSE (Biotechnologies, Sciences, and Engineering Building). Solution has been identified and initial repairs are in process.

C. Awareness

1. Sustainability Task Force has been formed and is actively meeting. Implementation plan with recommendations are being formulated and a sustainability policy will be drafted for review.

D. Capital Investments

1. Installation of energy recovery wheel at the Combined Science Facility Renovations project will offset the purchase/installation of 200 tons of cooling. Simple payback, including maintenance, is estimated at 4 years.

E. Fleet Management

1. No update.



9. UT TYLER

Significant impacts during past year and anticipated future impacts:

- A. Last Year's Impacts
 - Major savings by aggregating electrical contract
 - Major increase in natural gas prices
 - Purchased and Commissioned Graduate Nursing Ornelas Activity Center. Commissioned new major building (Bill Ratliff Engineering and Science Complex, North Building)
 - Completed new energy management system for chilled water distribution piping systems
 - Avoided costs due to energy management initiatives
- B. Anticipated Impacts
 - Projected future avoided costs by monitoring and metering electrical usage
 - One new buildings will be constructed (University Center Renovation/Expansion Phase I)
 - A new utility distribution system to be in operation
 - Additional 36,000 sq. ft. Building (University Center Expansion) will come online the end of December 2008
- C. Conservation Initiatives
 - Maximize use of variable speed drive 1,000 ton chillers
 - Maximize use of 500 ton Water Source Heat Pump
 - Develop/review technical specifications for energy-efficient motors, variable speed drives, lighting fixtures and lamps
 - Identify opportunities to consolidate activities and reduce energy consumption in resulting unoccupied spaces
 - Continuously monitor and measure building level consumption data
 - Reduce pneumatic controls with direct digital controls in all buildings
 - Install window film on the windows at University Center Link; this would reduce the solar heat transmitted to building space, thus decreasing cooling energy use.
 - Installed window film in westward office in the Robert R. Muntz Library to reduce radiant heat load.
 - Installed internet enabled thermostats at the Graduate Nursing Ornelas Activity Center.
 - Networked existing thermostats in the Ornelas Residence Hall Dormitory for better temperature and humidity control.
 - Connected anemometer to Spence Fountain variable frequency drive pump to reduce water from blowing out of the fountain basin.
 - Installed 29 additional "Watt Stoppers" on vending machines to reduce energy consumption in times of inactivity; if no activity is sensed in the area, the lighting remains off and the compressor runs only to maintain the desired product temperature.
 - The campus has a number of opportunities for replacing larger, older motors on fans and pumps with new more efficient motors. The measure replaces the



motors at Science & Math, Hudnall-Pirtle-Roosth and University Center. Energy-efficient motors quickly pay for themselves in lower energy costs and reduced maintenance.

- All new light fixtures installed in new construction must meet energy savings requirements.
 - Plans to continue the installation of additional electricity sub-metering to better manage and conserve energy.
 - Standard practice to maximize economizer modes on campus HVAC systems.
 - Electrically sub-meter auxiliary services buildings in order to conserve energy and improve utility cost allocation.
 - Reduce domestic hot water set points temperatures.
 - Continuing monitoring of air handling schedules and duty cycling.
 - New construction and renovations projects to have VAV systems installed.
 - Investigating the possibility of reducing the ACH (air changes per hour) on fume hoods within code requirements in the Ratliff Engineering Building South.
 - Utilize bicycles in lieu of vehicles where applicable.
- D. Operations and Maintenance Initiatives
- Monitor maintenance activities with specific focus on maintenance energy conservation through preventative management program
 - Review and prioritize calibration plan for sensors and control devices
 - Institute a training program to make sure all mechanics and technicians understand the importance of energy conservation and the role system optimization plays
 - Identify early warning indicators in all buildings to help quickly identify problems that may result in excess energy consumption
 - Develop program to ensure system controllers are properly tuned
 - Replace incandescent lamps with compact fluorescent lamps
 - Remove fluorescent bulbs in building corridors to produce a 25-30 foot candles.
 - Establish room temperature set points of 68° in the winter and 74° in the summer to assist in energy conservation.
 - Use a classroom scheduler to mirror HVAC operations, also to reduce energy.
 - Installed two natural gas sub meters to monitor consumption. On each in the University Center and Herrington Patriot Center.
 - Changed Weekly Emergency Generator Preventative Maintenance Schedule to Monthly generator load testing to reduce the consumption of diesel.
- E. Capital Investments
- Utility Assessment Report
 - Review energy consumption data to create capital investment opportunities
 - Energy Cost Savings Projects (New power plant and Ratliff Buildings)
 - Projects on CIP List
 - Commissioned at Ratliff Engineering and Sciences Project, a new central plant with variable volume water distribution, exhaust fan energy recovery systems resulting in 30% energy savings
 - Review campus standard specs to ensure that energy-efficient components and systems are included.



- Require A/E consultants to describe and evaluate specific energy conservation measures of capital projects at programming stage
- Savings monitoring and evaluation plan
- Establish baseline consumption patterns and reduce expenditures

10. UT SOUTHWESTERN MEDICAL CENTER - DALLAS

Energy Conservation Initiatives:

A. Maintenance and Operations:

- Energy Set Backs
 - ND Change static set point from 2.25” to 1.75”
 - ND AHU’s Improve economizer mode to better use free cooling – In progress
 - Install VFD’s on CHW pumps B and E building
 - NB2 Auditorium: Replaced defective supply/return air VFD’s
 - AHU NB2A turns off at 8pm and on at 6am
 - Virtual motion detector to shut AHU off when not in use during day – Complete
 - NB1.2M4 main electrical room
 - Change set point from 60 to 70 degrees F. – Complete
 - NB Exhaust Fans
 - Change static set point from 2.25” to 1.75” – complete
 - L Make up unit CHW Coils
 - Completely eliminated the use of chilled water - complete

B. Procurement:

- The gas supply contract is complete and it was awarded to TXU Energy Retail Company. The transportation contract review and analysis is complete and UTSWMC to contract directly with ATMOS.

C. Teaming and Training:

- By utilizing our existing electric meter for each building, we were able to determine the buildings’ energy utilization indexes (EUI) that are out of range. RFQ was reviewed by Physical Plant energy task force to select energy engineers for qualifications. Energy Engineer was selected. The purpose of the study is to determine the inefficiency and make appropriate energy savings recommendations to the heating ventilation and air conditioning (HVAC) system for the identified buildings. The expected outcomes are to identify measurable inefficiency and implement the recommended energy conservation measures.



- Physical plant energy task force selected five buildings that appeared to be out of range in comparison from the rest of the buildings in the Campus. Due to budget constraints, the energy task force selected two buildings (Y & NA) out of the five buildings to determine why the buildings' energy utilization indexes (EUI) are out of range this fiscal year. The energy task selected Building NA for the final implementation phase.

- Building Y** – Phase II – complete – Implementation phase remaining
- Building NA** – Phase II – complete – Implementation phase in progress. Estimate completion time FY09.
- Building G** – Phase I – complete
- Building K** – Phase I – complete
- Building L** – Phase I – complete

D. Project Plans: Energy Projects Approved: The projects are in design and implementation phase. Estimated completion is FY09.

| | Description | Cost | M & V Cost | Savings | Payback |
|--------------|---|---------------------|-----------------------|---------------------|----------------|
| 1 | Install Substation Capacitor Banks - | \$200,000.00 | \$4,000.00 | \$80,000.00 | 2.6 |
| 2 | S. Campus Air Balancing – | \$100,000.00 | \$5,000.00 | \$100,000.00 | 1.1 |
| 3 | Insulate thermal energy lines campus-wide | \$100,000.00 | \$1,666.67 | \$33,333.33 | 3.1 |
| 4 | University air handling systems are typically balanced to design and not to load. | \$95,000.00 | \$6,500.00 | \$130,000.00 | 0.8 |
| 5 | The University has a great many laboratories that are 100% outside air. Implementing heat recovery could reap many dollars in savings. The cost will vary per system and will be evaluated on a system-by-system basis. | \$25,000.00 | \$1,200.00 | \$5400 | 4.9 |
| 6 | Convert inlet vanes to VFD's at Zale. | \$65,000.00 | \$1,800.00 | \$36,000.00 | 1.9 |
| 7 | NA Building - Reduction of the Energy Utilization Index - Implementation Phase - Option 1 | \$292,073.00 | \$9,959.00 | \$199,180.00 | 1.5 |
| TOTAL | | \$877,073.00 | \$29,195.67 | \$583,913.33 | 1.6 |

- University Hospitals -- **St. Paul Building** Estimated completion is spring 2009 HVAC System
 - Insulation Systems
 - Replace AHU LLD-2



- Air Handler 5F6 Refurbishment
- Refurbish AHU 5C1

Controls System

- HVAC Controls Upgrades
- Plant Controls (Boiler 1 and 2 controls upgrades installed)

Project completed in Fall of 2008 include: Replaced LLD1, LLD5, LLD2 and 1F5. Converted controls in MSICU, CVICU and Labor and Delivery from Pneumatic to electronic. Repaired 59 patient induction unit controls in 2008.

- University Hospitals – **Zale Lipsy Building** – Estimated completion is spring 2009

HVAC System

- Plant Controls (Boiler 1 and 2 controls upgrades installed)

The physical plant energy task force is meeting monthly to discuss accomplishments and future projects including commodity procurement, capital project progress, maintenance, and various initiatives.

11. UT MEDICAL BRANCH – GALVESTON

- An important part of the University of Texas Medical Branch comprehensive program of Energy Management, Recycling and Environmental Control is the “*UTMB Resource Conservation Initiative.*” Representatives from Community Outreach, Utilities, Recycling, and Environmental Health and Safety lead in this effort. See <http://intranet.utmb.edu/conservation/>.
- **Hurricane Ike September 13, 2008 has dramatically affected our utility consumptions and the efficiency of our systems.**
- **We are currently consuming Electricity, Natural Gas and Water at a volume of approximately 15% less than last year.**
- **HVAC controls system components that were damaged by Ike are being re-commissioned and restored to service.**
- **Large sections of our chilled water and Steam distribution system were compromised by hurricane flood waters and will require significant repair.**
- **A major effort of our return to operations will be the re-commissioning of damaged systems to return them to an efficient operating condition.**
- **As the University repairs and rebuilds we will seek opportunities to incorporate sustainable solutions that will result in lower levels of energy consumption.**
- **The next few months will be spent establishing new bench marks and restoring conservation programs and services to pre-Ike status.**



12. UT HEALTH SCIENCE CENTER - HOUSTON

SON

- The School of Public Health Building and the School of Nursing and Student Community Center Building share a City of Houston domestic water meter. A second flow meter has been installed and commissioned to allow for separate metering of the SON building. The flow meter confirms that the School of Nursing and Student Community Center Building uses just 6% of the billed usage.
- Occupied/Unoccupied schedules and minimum/maximum set points have been established and are being reviewed for potential utility savings.
- The School of Public Health Building and the School of Nursing and Student Community Center Building share a common KW meter. A second KW meter has been installed at the SON building to allow for separate metering. Trends have been put in place to better monitor the building usage.
- A strip heater audit was conducted to ensure no units are running during the summer months with minimal usage during the winter months.

SPH/RAS

- At the School of Public Health Building, control strategies and schedules have been implemented to reduce chilled water and natural gas consumption. These schedules are undergoing review and are being refined. For example, controls are programmed to run the chilled water pumps only on an as needed basis. Before, the chilled water pumps would run at a minimum of 20Hz regardless if they were needed or not. This reduces chilled water consumption and KW usage.
- The DDC VAV retrofit project for the first floor of The School of Public Health Building has been completed allowing for a reduction in utilities consumption. Schedules have been finalized & established.
- The DDC retrofits are continuing on the second floor.. Also, communication cabling is being added for future DDC retrofits on floors 8 through 10. Additional VAV retrofits will occur as funding becomes available.
- The installation of automatic damper actuators on the outside air intakes at the School of Public Health Building and the associated programming has been completed. This will allow for free outside air cooling when the outside air conditions are favorable.



MSB

- The installation of an FCU in the Heart Transplant Tissue Lab has been completed. The area has been commissioned to run more efficiently. This reduces the 24/7 heat load on the AHU. As a result, we were able to reduce utility consumption by raising the cold deck temperature to other laboratories.
- The Medical School Building Steam PRV Station project is complete. Three existing steam valves were replaced with new ones. The steam station was down-sized to reflect actual consumption requirements. This enables an appropriate size valve to be used to meet smaller load demands of the building. The better control leads to more efficient use of the steam.
- The Medical School Building Complex Chilled Water Cla-Valves, which control the pressure on the North and South penthouse risers, were replaced. An operable DP can now be maintained on our risers. While doing so we are able to run our pumps efficiently while meeting the demand necessary to pump back to TECO. Pressure Sensors have been added to the valves to allow for trending. The trending to date shows the valves are operating efficiently.
- The six Medical School Building Complex exhaust manifolds and risers are being evaluated for optimal control. An actuator audit was conducted and actuators will be replaced as needed. Concurrently the controls are being commissioned, reprogrammed, and retested.
- A chill water valve audit of the eight lab AHU's has been completed and leaking valves are being replaced as needed. As a result of this audit, 6 of 12 valves (across four of the eight lab units) have been replaced. After the lab units are finished the office units will be audited.
- In the Learning Resource Center section, process controls were modified. As a result, heating occurs only when there is a need for heating and increased air volume for cooling occurs only when there is a need for cooling.
- With the completion of the new Research Replacement Facility/ Medical School Expansion Building, major population changes in the Medical School Building Complex will be finalized and occupancy surveys will be conducted. The controls and utilities group has begun adjusting the building automation system control sequences to reduce utility consumption in the areas where the space reallocation has occurred..

RRF/MSE

- With the completion of the new Research Replacement Facility/ Medical School Expansion Building, major population changes in the Research Replacement Facility/ Medical School Expansion Building are being finalized and occupancy surveys are



being conducted. The controls and utilities group is continuing to adjust the building automation system control sequences to minimize utility consumption in recently occupied areas.

- Lighting schedules are being reviewed for implementation as the Research Replacement Facility/ Medical School Expansion Building becomes occupied. The schedules are installed and being adjusted as needed to meet the needs of the facility while minimizing utility costs.
- Detailed 10-minute trends have been established and weekly graphs are being made with that data. This has allowed for reduced usage and the start of predictive maintenance. In addition, warranty issues have been captured and are being addressed.
- The glycol heat recovery system is being evaluated for optimum performance.
- An audit of the Phoenix valves has been completed. As a result, the heating/cooling PID loops have been modified to reduce both Chilled Water & Steam consumption.

UCT

- The project at the University Center Tower Building to retrofit the HVAC system with variable air volume systems and variable frequency drives is nearing completion. When the project is complete, there will be a significant reduction in chilled water consumption, natural gas, and electrical energy consumption related to HVAC applications.
- The installation of 1-hour temporary occupancy sensors is in progress. This will ensure the zones return to an unoccupied mode automatically when the customer leaves the occupied area.

IMM/SRB

- The manufacturer has modified the HeatPipe system design. This has improved efficiency by approximately 200% while in cooling mode. All five of the main air handlers have been retrofitted and tuned for optimum performance.
- During the winter months the five main air handlers are being used to take advantage of free cooling (as the outside air temperature allows). As a result, during the times when free cooling was available, the buildings chilled water cooling needs were met with outside air and our incoming air was heated using the buildings load. This has resulted in a reduction in gas and a significant reduction in district chilled water usage.
- In the lab section of the building, temperature sensors have been relocated to more appropriate locations to properly represent the zones to which they serve.



- In the lab section of the building, heating and cooling set points have been fine-tuned to insure that there are no temperature swings. As a result, heating occurs only when there is a need for heating and increased air volume for cooling occurs only when there is a need for cooling. The laboratory temperature sensors are being evaluated for accuracy.
- The first phase of programming for air handler temperature reset took place last winter. The needs for chilled water and gas for hot water have been reduced by raising the temperature set point of the main air handlers. This has been accomplished by monitoring outside air dew point, outside air temperature, and inside worst case temperature load.
- The next phase included resetting the DP set points for the chilled water and the hot water systems. This has been accomplished through cascade programming that uses the valve position of the system's greatest user to reset pressure set points to the supply water. As a result, there is a reduction in the building load. The variable frequency drives that circulate water thought the building can operate at a lower set point that is easier to achieve with less KW.
- The final phase was used to fine tune and combine the heat recovery system with secondary-air-handler supply temperature reset. The objective is to properly switch between heating and cooling modes on the heat recovery system. The system will maintain inside temperature needs with free cooling during the winter (as the outside temperature allows), and use only what is needed during other times.
- A retrofit of the office section of the building has been completed. First, the under-floor ventilation system has been reconfigured to meet the actual occupancy needs. Second, four VAV's have been installed and four zones have been added to the building automation system. Third, both the secondary-air-handlers and the local fan-powered boxes have 1-hour temporary occupancy sensors installed on each. Fourth, cascade controls have been installed on the secondary-air-handlers and the local fan-powered boxes. The combined changes will allow the offices to switch from 24/7 operation to a 12 hours on/12 hours off schedule.

DBB

- At the Dental Branch Building, new controllers are being added to the steam stations to reduce utility usage.
- A building-side chilled water valve audit has been completed and leaking valves are being replaced as needed.
- A steam trap audit is under way and leaking traps are being repaired or replaced as needed.



- The combination of new controllers, valves, and traps have allowed for an overall reduction in demand, pump usage, and pressure. In addition, this has led to increased stability and controllability of the water that is supplied to the air-handling units.
- A new chill water control valve was installed and the Cla-Val has been repaired. on the TECO-side chilled water return line. This has allowed the DP to be reduced which has resulted in reducing the chilled water pump speed/KW consumption. A higher delta-T has also been established reflecting the increased system efficiency. MSI
- A building-side chilled water valve audit has been completed and leaking valves are being replaced as needed.
- A steam trap audit is under way and leaking traps are being repaired or replaced as needed.
- The combination of new controllers, valves, and traps have allowed for an overall reduction in demand, pump usage, and pressure. In addition, this has led to increased stability and controllability of the water that is supplied to the air-handling units.

OCB

- Due to space reallocation, a stand-alone high-efficiency chiller has become available. Plans are being developed to tie this chiller into the existing chilled water loop to take advantage of the higher efficiency characteristics.
- Two of the oldest chillers have been replaced with more efficient chillers which has reduced the overall KW consumption.

13. UT HEALTH SCIENCE CENTER - SAN ANTONIO

Energy Conservation Initiatives:

A. Utility Contracts

- The HSC completed negotiations with CPS Energy for a long-term agreement to lower our natural gas costs.
- The HSC joined a consortium led by UTMB to aggregate electrical requirements with UTMB, UTHSCH, and MDA for our facilities in the Rio Grande Valley. GLO's retail provider, Reliant Energy Solutions, was selected as best value bidder. This contract began March 1, 2008 when the existing contract expired. We are using UTMB's energy consultant to determine when to purchase natural gas for generation of this electricity.



B. Energy Savings Initiatives

- Funding has been identified and we have replaced three failed condensate return units. This has enabled these buildings to return all condensate back to the energy plant to conserve the thermal energy.
- The HSC just completed an energy study comparing the HSC energy cost and use with those of other UT institutions. Although the HSC compares favorably with others in pricing, consumption does not. We are evaluating both short and long-range actions that will help reduce energy costs. Most actions require significant funding to accomplish and may, or may not, be cost effective at this time.
- Facilities Management (FM) believes that energy conservation is not only the responsibility of their department, but also the faculty, staff, and students at the HSC. Therefore, we have prepared a list of energy conservation tips for individuals to implement in their labs, offices, classrooms, and clinics. This list has been incorporated into Facilities Management's website along with an article discussing energy management and energy awareness. Additionally, the Utilities Division has placed their SOP on their website.
- The new Chief Operating Officer at the HSC has decided to reinstate the Energy Conservation Committee. The members have been selected and will be given a "charge" at the first meeting. The goal of the committee will be to promote energy conservation initiatives and develop policies for the institution.
- The energy plant personnel are working with the building operations personnel to optimize the campus chilled water system so the energy plant can achieve a higher chilled water temperature differential to increase the overall plant efficiency. These personnel also monitor steam consumption and condensate return to identify any deficiencies.
- Facilities personnel are pursuing the possibility of installing a "Super" boiler in the Central Energy Plant and/or the North Energy Plant when the South Texas Research Facility is constructed. We are currently working with Cleaver Brooks, CPS Energy, and the Gas Technology Institute to bring this to a reality. This boiler will operate at better than 90% efficiency.
- As new facilities are constructed, the HSC engineers insist that the design teams specify occupancy sensors, heat recovery equipment, energy-efficient equipment, and control schemes to provide the means to operations personnel to operate facilities more efficiently. HSC engineers have developed a set of energy conservation guidelines for new facilities. This list is given to consultants at the beginning of the design phase for all new projects.
- The current design of the South Texas Research Facility (STRF) includes the addition of two 1250-ton chillers in the energy plant. This added capacity will allow the two



stand-alone buildings on the Greehey Campus to be connected to the plant after construction is completed. Funding will have to be identified for this project.

- Our facility control technicians and electricians replaced nine variable speed drives on air handlers and pumps that were placed in by-pass due to drive failures. These systems will operate at reduced horsepower. Funding is continuously being sought to replace other failed drives.
- The HSC police and housekeeping staffs are tasked with turning off lights during evenings and nights when they discover areas that are not being occupied.
- The Central Energy Plant personnel saved \$26,500 by reducing the electrical demand by operating emergency generators for a limited time to avoid reaching new peak electric demands this summer.
- Facilities Management will continue to pursue funding for energy conservation initiatives such as the replacement of old, inefficient equipment, controls re-commissioning, air balancing, additional sub-metering, energy conservation projects, etc. A current PUF request includes replacing 40-year-old air handlers in the Medical School and replacing a 40-year-old boiler in the energy plant.
- The HSC has contracted with an engineering firm to perform an analysis on the Hayden Head Building to determine if equipment upgrades and existing building commissioning will provide a reasonable ROI. We have received the final report, and are currently considering the recommendations.
- Installation of Vending Misers on cold drink machines for the three campuses in the San Antonio area is complete. HSC engineers are exploring the possibility of installing “Snack Misers” for non-refrigerated vending machines.
- Facilities Management has initiated a program to more closely evaluate and analyze data collected from our existing sub-meters.
- Sub-metering was installed on the Cyclotron Addition to the McDermott Building that will assist engineers in analyzing energy consumption of the facility.
- The underground steam piping serving three buildings has been replaced. Replacing this “failed” piping system will save significant thermal energy and will reduce gas consumption this winter.
- As the new South Texas Research Facility is being designed, HSC engineers are insisting on heat recovery devices and connecting the building to the North Energy Plant for chilled water and steam service. Sub-metering will be included.



- HSC engineers completed development of a list of energy conservation measures (ECM's) that will be presented to the administration for funding.
- As renovations occur in our existing buildings, we are converting our pneumatic controls systems to DDC, where feasible.
- HSC engineers continue to pursue funding to initiate re-commissioning of several buildings on our campuses. We have initiated a meeting with the Texas A&M Energy Services Lab to explore their Continuous Commissioning Services.

Fleet Fuel Management:

- We have continued to purchase more fuel-efficient vehicles as replacements for older, less efficient models. This has helped reduce our overall vehicle fuel cost.
- The institution has purchased a hybrid vehicle and is in the process of evaluating the feasibility of replacing aging vehicles with hybrids where practical. We have also purchased John Deere Gators and GEM electric utility vehicles to reduce the use of full-size, gasoline-powered trucks.

14. UT HEALTH SCIENCE CENTER - TYLER

Energy Conservation Initiatives:

A. Operations and Maintenance:

- Thermostat recalibration is in progress and ongoing.
- Variable air volume units and controls calibration and repairs are in process and ongoing.
- Monitoring of filters on all air-handling units will improve the operating efficiency of the air-handling units, thereby reducing energy costs.
- Preventive maintenance is being completed on all kitchen equipment monthly and quarterly to eliminate improper operation that causes excessive energy consumption.
- Energy consumption will be reduced by the replacement of one Air Handling Unit (A8).
- Police and Housekeeping staffs are monitoring unoccupied areas for lights left on during routine rounds.

B. Capital Projects:

- A project for upgrades and expansion of the campus electrical distribution system is in progress. The scope of work includes a power factor correction capacitor bank to reduce electric use fees. The target completion date is October 2009.
- A project to replace/upgrade Exterior signage is in progress. This will help with utility savings due to more efficient lighting.



- A project to convert the Graphics building to a Fitness Center is still in progress. Elimination of major printing equipment and has allowed for a reduction in energy consumption.
- A project to renovate the Police Dispatch Area has been completed. Upgrades of the air conditioning system and electrical components have more energy-efficiency thereby reducing energy use.
- A project to demolish four (4) older buildings is still in progress. The utilities to these locations have been terminated, which eliminates energy use in these utilities.
- The project to replace air handling unit A-8 and B-7 is completed.
- New patient food carts have been in use and should save in energy cost due to the efficiency of the equipment and product..
- A project to upgrade down B Bldg corridor to the cafeteria. This will allow new energy-efficient lighting along with new exterior doors for better energy efficiency
- A project to move the current ICU to the 2nd floor is progress. DD are being completed at this time. This will allow for more efficient operation and control of HVAC and Lighting, thus allowing for energy savings.
- A project is in process to renovate the 5 West Nursing Floor. This will be an upgrade of lighting, wall coverings, flooring and doors. The upgrades will help with energy efficiency.

15. UT M. D. ANDERSON CANCER CENTER

Energy Conservation Initiatives:

Patient Care and Prevention Facilities

- The development phase of CenterPoint Energy's retro-commissioning program in the May's Clinic is in process. The preliminary study identified \$1 million per year annual energy savings with low cost of implementation.
- The following retro commissioning activities have been identified for implementation in the next 90 days with targeted energy savings of \$500,000 per year.
 - Primary and secondary chilled water pump control
 - Dual duct air handler hot deck reset
 - Dual duct air handler reheat control
 - Old Clark kitchen unoccupied exhaust reduction
 - Unoccupied clinic outside air reset
 - Unoccupied lighting shutoff
 - Unoccupied escalator shutoff
- Retro-commissioning studies are also underway in New Clark, Love and LeMaistre. The preliminary report for New Clark and Love Facilities identifies 15 energy conservation measures with potential annual energy cost savings of \$330,000.
- A preliminary report for LeMaistre Facility also identifies 15 energy conservation measures with potential annual energy savings of \$170,000.



- The design of a heat recovery chiller to serve the Mays Clinic and the Cancer Prevention Building has been completed. The project is expected to reduce energy costs by \$900,000 per year. Construction contracts are in negotiation. This project has qualified for a subsidy from the CenterPoint Clean Air Technology Program.
- A project to upgrade the Alkek G8 infrastructure is in design. Energy savings features to compartmentalize the hot and cold decks and return air to hot deck are expected to reduce the existing facilities energy cost by \$500,000 annually.
- The feasibility of installing heat recovery chillers in the following two locations is in progress and has the potential to reduce energy costs in the main campus by \$3 million annually.
 - Develop G4 to serve BSRB, Gimbel, Anderson, BRB, Bates Freeman
 - Develop A8 to serve CRB and Alkek
- Outside air handler preheat set point changes in New Clark and the Mays Clinic have resulted in annual energy savings of \$480,000 with no cost of implementation. \$300,000 of the savings is steam reduction and \$180,000 of chilled water has been saved.

Research & Education Facilities

- A feasibility study to install a recool system in the Basic Science Research Building (BSRB) has been completed with annual energy savings estimated at \$600,000 per year. Phased implementation of low or no capital cost items is planned for pilot testing.
- South Campus Research Buildings 1&2 exhaust fan sequence of operation has been made more efficient with savings of \$60,000 per year.
- Exhaust fan discharge velocity standards have been reviewed and all major exhaust fan systems will be recommissioned to the current standard with estimated savings of \$90,000 per year.
- The Cancer Research Building radioisotope hoods will be recommissioned to the current velocity standards with estimated annual energy savings of \$40,000.
- Minimum air change standards for both open low hazard labs and traditional labs were extensively studied in collaboration with Research and Education Facilities, Environmental Health and Safety and the Research Community. M. D. Anderson's minimum air change standard has now been reduced approximately 40% to 6 air changes an hour. The following laboratory air change reduction projects have resulted from this change in standards.
 - BSRB - Open laboratories in BSRB have been re-commissioned to the new ventilation standards with annual energy savings of \$420,000
 - SCRB1&2 - Open laboratories in SCRB1&2 have been re-commissioned to the new ventilation standards with annual energy savings of \$160,000.
 - CRB - Traditional lab air change testing identified several savings opportunities in CRB. Annual savings of the fully developed and identified projects (items 1-4) are \$256,000 with an anticipated payback of 2 years. Projects will be considered for implementation after completion of a complete building energy audit current underway.



1. Lower the ventilation rate of main laboratory areas in CRB (4th-8th floors) to a minimum air change rate of six.
 2. Lower face velocities across the sash openings of chemical fume hoods and radioisotope hoods from 115 fpm (or higher) to 100 fpm to meet current MDACC guidelines.
 3. Reduce the minimum airflows of chemical fume hoods to meet current NFPA 45 and NFP 30 recommendations.
 4. Tuning of aging Phoenix controls for maintenance and comfort improvements
- The following energy saving fume hood projects are active:
 - Close the sash campaign
 - Test and evaluate zone presence sensors
 - Evaluate automatic sash positioner installation
 - High performance fume hood evaluation program