



EXECUTIVE ORDER RP-49

Quarterly Report for UT System – July 2009

By July 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 institutions 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 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 2005. 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

Under a previous agreement with UT Arlington, Siemens Building Technologies, Inc. conducted an energy audit of each building on campus to determine the feasibility of additional utility savings. The goal was to establish a performance contract in which Siemens 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. To implement their recommendations, an energy performance contract was signed with Siemens on August 28, 2006, after receiving approvals from appropriate authorities. UT Arlington has only one contract with Siemens; other contractors are considered subcontractors 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 operations 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 1970's and 1980's and can be replaced with more efficient units reducing energy losses and improving reliability. This project was completed January 2, 2009, except for two transformers which will be installed during the holiday 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 December 31, 2007.

ECRM 7 - EMS Recommissioning - 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 five (5) meters. This should provide an annual utility meter cost savings of \$26,875.

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/365 days per year. The average \$/kWh in 2007 was \$0.0791 resulting in \$7,299 in electrical savings for that year. In 2007, the \$/kWh increased 35% over the previous year. This percentage 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 and were separate from the Siemens' projects.

When renewing our natural gas contract effective May 1, 2009, we opted for pricing based on the Waha index instead of the previously contracted Houston Ship Channel index. During the period of January 2008 through April 2009, the Waha index pricing was an average of 12% lower than the Houston Ship Channel.



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 June 15, 2009:

The long-term procurement agreement continues and UT Austin has established a procurement portfolio that is diversified in terms of volume, pricing and time. This approach continues to allow 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 June 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 construction phase. The construction of two 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 is complete.
- **Inlet Air Cooling** – This element of the project is complete and testing is underway and we anticipate be in full operation by the end of June.
- **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, undergoing final testing with full operation anticipated in early July.



C. **Energy Demand**

Status as of June 15, 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 June 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**

- UT's motorized vehicular fleet consumed 5,376 gallons (9 percent) less gasoline than the same time period the previous year.
- Biodiesel (B20) use increased by 102 gallons (1%) from the previous year.
- Use of Liquefied Petroleum Gas (LPG) was down by 31 gallons (5%) from the previous year.
- Total miles driven were increased by 87,052 miles (12 percent) from the same reporting period last year.
- The average Miles per Gallon (MPG) per vehicle increased from 9.23 MPG to 11.45 MPG from the same reporting period last year.
- 65 vehicles, averaging 19 years in age, were sold during FY09
- A new fleet-specific software package was recently purchased by the University that will improve overall management and efficient use of fleet vehicles. It was put into production in April, 2009. This is the same fleet software package that Texas A&M uses, so there will be more opportunities for the two flagship universities to share ideas and best practices for improving fleet efficiency.



3. UT BROWNSVILLE/TEXAS SOUTHMOST COLLEGE (no changes)

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 company that can sign us to participate in ERCOT's electrical "Demand Response". This program could allow UT Dallas to receive up to \$40,000.00 per year in revenues if we agree to shed 3.5 MWatts of electric power when an emergency has been declared by ERCOT.



- UPDATE: The University has completed the relocation and upgrade of the main electrical feed to the main 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.

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.
- Lighting: Retrofitting of street lamps to more efficient Metal Halide lamp continues as does the assessment of utilizing LED type fixtures for street and parking garage lighting and interior applications.
- Occupancy sensors: The initiative to install occupancy sensing light controls to incorporate control of components of the HVAC system continues.
- Hot water distribution service lines: This project continues and 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, Miner's 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 will be installed at Miners Hall, Hudspeth Hall, Cotton Memorial, Administration, and Engineering in 2009.
- Energy Management System Adjustments: Completed adjustments and calibrations recommended by Siemens Building Technologies to improve the campus 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: 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 Bookstore is completed. 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 construction of the expansion of the Swimming and Fitness Center is scheduled to commence this fall. 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 criteria.

Fleet Fuel Management

- In an effort to save energy, reduce our carbon footprint and promote sustainability initiatives we plan to purchase four additional electric, gas-free trucks and vans in FY2010. These vehicles will increase our fleet of electric vehicles on campus, reducing our fuel consumption and producing zero tailpipe emissions.

6. UT PAN AMERICAN

Conservation Initiatives

1. Energy conservation committee convened to plan for an intensive energy audit.
2. UTPA interim president's cost avoidance task force developed a cost-avoidance strategies report. The VPBA met with and requested responses from directors and other staff.
3. Electrically sub-meter auxiliary services buildings in order to conserve energy and improve utility cost allocation. Installation is complete. Set-up and interfacing is in process.
4. Electricity metering of cooling plant chillers and facility (In process).
5. Collaborating with EE professor to install 24 modules of PV solar on Engineering Building roof (Tentative install is August).
6. Add kilowatt meter to the old computer center (Done).

Operations and Maintenance Initiatives

- Coil cleaning program is expected to resume in July.
- Hired a consultant to perform efficiency evaluation of cooling plant (Report pending).
- Cooling plant operator monitoring and control improvements (In-process).
- Replace boiler at Health and PE 1 building with higher efficiency model (Complete).
- Improve low delta chill water temperature at Unity Hall through controls upgrade is under investigation.



Fleet/Fuel Management

- Replace 9 vehicles with more fuel-efficient models. Switched from eight-cylinder to six-cylinder engines in five vehicles. All 9 vehicles are ethanol-based, flex-fuel. (Expected vehicle delivery is July – August).
- Research in-house and local area ethanol pumping station options (In-process).

Capital investments

1. Major lighting upgrades for five buildings, including occupancy sensors for two buildings. (Held kick-off meeting. Contractor start date is in July).
2. Upgrade existing side-stream chill water filter to improve the efficiency of heat transfer surfaces and thereby decrease energy costs. On-hold.
3. Replace old computer center air handler with a higher efficiency unit. Installation and piping are complete. Controls and T&B are pending.
4. Old computer center renovation: Add VAV boxes. Installation is complete. T&B is pending.
5. Replace air handlers and controls at University Center with more efficient units.

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

2nd Quarter 2009 Update: Capital Projects & Other Initiatives Intended to Reduce Energy

A. Energy Savings Initiatives In Progress

1. Window shades are being installed at Roadrunner Café student dining facility to reduce solar heat radiation.
2. Skylights at the John Peace Library are being tinted to reduce solar heat radiation.
3. New Engineering Building II is nearing completion. Condensate recovery system has been connected and tested and will route condensate from cooling coils to the South Thermal Energy Plant for cooling tower make-up.

B. Energy Savings Initiatives Under Evaluation

1. Variable Speed Drives will be installed at the North Thermal Energy Plant. Drives will increase efficiency of current pumping configuration.
2. Photovoltaic Panel installation at the University Center is being investigated. Local rebates and alternate funding sources will be explored.
3. Heat Recovery Chiller application at the South Thermal Energy Plant was presented and will be evaluated.
4. Evaluated Electrical Demand Response program from electrical supplier that would provide credit for load shedding. Not pursued at this time due to the campus dynamics, but will re-evaluate annually for potential cost savings.
5. Membership in Education Advisory Board has provided case studies from universities across country. Potential strategies for energy consumption reduction and cost saving opportunities will be evaluated.

C. Awareness

1. Sustainability Task Force has provided recommendations to senior leadership on proposed sustainability policy and program structure and implementation. Emphasis will be placed on awareness efforts.

D. Capital Investments

1. Preliminary LEED certification analysis is being conducted on a proposed capital project. Rainwater harvesting and condensate recovery systems are also being explored.
2. Boiler and Chiller studies have been conducted at the North Thermal Energy Plant to begin replacement of equipment that is approaching end of useful life. Replacement equipment will have increased energy efficiency. Additional investments with potential for increased efficiencies will be evaluated on a continuing basis.



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. One 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
 - DF Building Energy Set Backs – In Progress
 - R Building Controls Upgrade to perform Setbacks – In Progress
 - B Building Energy setbacks – In progress
 - ND Change static set point from 2.25” to 1.75” - Complete
 - ND AHU’s Improve economizer mode to better use free cooling – In progress
 - Install VFD’s on CHW pumps B and E building – In progress
 - NB2 Auditorium: Replaced defective supply/return air VFD’s
 - AHU NB2A turns off at 8pm and on at 6am – In Progress
 - 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.
 1. **Building Y** – Phase II – complete – Implementation phase remaining
 2. **Building NA** – Phase II – complete – Implementation phase in progress. Estimate completion time FY09.
 3. **Building G** – Phase I – complete
 4. **Building K** – Phase I – complete
 5. **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 – In Progress
 - Insulation Systems
 - Replace AHU LLD-2
 - Air Handler 5F6 Refurbishment
 - Refurbish AHU 5C1Controls System – In Progress
 - HVAC Controls Upgrades
 - Plant Controls (Boiler 1 and 2 controls upgrades installed)
- University Hospitals – **Zale Lipshy Building** – Estimated completion is spring 2009
HVAC System – In Progress
 - 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 (NO UPDATE DUE TO HURRICANE IKE)

- 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 continue to work through the damage and restore the University to pre-hurricane condition.
- 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. We have hired an engineering firm and are in the process of evaluating the damage to our system. We are in operation providing heating and cooling in our facilities, with limited capacity.
- UTMB will be 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. We are proceeding to establish new bench marks and in the process of restoring conservation programs and services to pre-Ike status.
- Recycling – We have restored our recycle programs, with a goal of 22%.



- A University Sustainability Steering Committee has been created and is addressing the following subjects: Energy and Water Efficient Practices, Alternative Energy Practices, Climate Protection Practices, Sustainable Transportation Practices, Water and Recycling Management, Environmentally Preferable Purchasing, High Performance Buildings, Sustainability Awareness and Training, Curricula Integration, Student Involvement, Community Outreach, Annual Plans and Reporting. Goals have been defined and Target Dates assigned for each of these activities.

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.
- At the School of Nursing and Student Community Center Building two new meters have been added to the grey water system. Meters have been added to the City of Houston domestic water makeup line and to the secondary output line that is used to supply water to the irrigation system.
- A new Chilled Water Cla-Valve has been installed at the School of Nursing and Student Community Center Building. The School of Nursing and Student Community Center Building is now able to run its pumps efficiently while meeting the demand necessary to pump back to TECO.
- 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.

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. The Medical School Building Complex is now 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 have been replaced. As a result of this audit, 12 valves have been replaced.
- A chill water valve audit of the eight office AHU's has been completed and leaking valves are being replaced as needed. As a result of this audit, 5 of 24 valves have been replaced.



- 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.
- The offices on the Basement and Ground floors now operate under an Occupied/Unoccupied schedule. This should result in a significant utility reduction in those spaces.

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 complete. This will ensure the zones return to an unoccupied mode automatically when the customer leaves the 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.
- A new steam condensate return pump was installed on the TECO-side steam return line to improve condensate return savings.
- 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 increased 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.

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 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 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.. 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.
- 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.
- All pre-heat coils have been secured for the summer to reduce steam production and unnecessary distribution.
- The steam supply in the Physical Plant building has been secured for the summer to reduce steam production, and unnecessary distribution. This measure also reduces the cooling load for the building for savings in chilled water production and distribution.

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 (no change)

Energy Conservation Initiatives:

Patient Care and Prevention Facilities

- The development phase of CenterPoint Energy's retro-commissioning program in the Mays 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