



EXECUTIVE ORDER RP-49

Quarterly Report for UT System – January 2010

By January 2010, 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 2009 was included in the quarterly report submitted January 2010.

- 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

brian.lloyd@governor.state.tx.us

dub.taylor@cpa.state.tx.us

by mail: Legislative Budget Board
P.O. Box 12666
Austin, TX 78711



UT SYSTEM INSTITUTIONS RP-49

QUARTER ENDED AUGUST 31, 2009

1. UT ARLINGTON (no changes)

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 (no substantial changes)

Energy Conservation Initiatives:

A. **Energy Procurement**

UT Austin continues to work with the General Land Office to establish and maintain an effective long term approach for natural gas procurement.

Status as of September 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 implementing longer term gas procurement that allows 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 September, 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 is providing substantial improvement in the efficiency of Turbine 8. Precise data will be available in the next quarterly update.
- **Renovation/Upgrade of Chilling Stations** – Project is complete.
- **Chilling Station No. 6** – Project is complete and in conjunction with chilled water distribution modeling has allowed the University to minimize operation of the least efficient chilling station.



C. **Energy Demand**

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

D **Water Use**

Status as of September 15, 2009

UT Austin will purchase reclaimed/gray water from the City of Austin for use in utility operations and campus irrigation. This effort will reduce the demand for potable water by approximately 400 million gallons per year and provide a substantial benefit to the City of Austin regarding water use and the University in terms of cost savings. The primary campus distribution system for this water was installed during a fire water distribution project and the connection to the city distribution main is expected to be completed in Summer 2010.

E. **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 September 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.

F. **Fleet Fuel Management**

Status as of September 15, 2009

- UT's motorized vehicular fleet consumed 5,597 gallons (9 percent) less gasoline than the same time period the previous year.
- Biodiesel (B20) use decreased by 784 gallons (9%) from the previous year.



- Use of Liquefied Petroleum Gas (LPG) was down by 99 gallons (18%) from the previous year.
- Total miles driven were increased by 88,294 miles (12 percent) from the same reporting period last year.
The average Miles per Gallon (MPG) per vehicle increased from 10.53 MPG to 12.86 MPG from the same reporting period last year.

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

Energy Conservation Initiatives:

- Commandants House renovation project is about to be completed. It includes the installation of new energy-efficient light fixtures and HVAC units. Additional insulation was installed in this historical facility to improve energy efficiency.
- Commissary building renovation project is currently underway. It will include the installation of new energy-efficient equipment.
- Cavalry building renovation project is currently in progress. It will include the installation of new energy-efficient equipment.
- Phase 2 of the Cavalry building renovation has also commenced. It will include the installation of new energy-efficient equipment.
- Ringgold Street received new pole lighting. Eighteen new light poles with watt pulse technology were installed allowing the removal of numerous street lights. Additionally, 26 new fluorescent light fixtures were installed in the Physical Plant office modifications.
- An initiative to install occupancy sensing light controls in several facilities is currently under way.
- Four outdated and inefficient HVAC units were replaced throughout campus with new energy-efficient models. Several more are scheduled for the next quarter.
- Phase 2 of MRC North and South Building EMS upgrades is currently under way. 31 VAV boxes were upgraded this quarter. When completed, the energy management system will replace inoperable HVAC controls and automate this facility.
- 400 ton chiller in the EDBC Thermal Plant was retrofitted with a new York VFD, replacing the soft start system that it had.
- Preventive Maintenance program has been partially automated via our new computerized maintenance management system. PM filter replacement program has been installed into the CMMS. New system will ensure that PM's are completed on time and schedule resulting in higher unit efficiency and operation.
- The installation of a new 1000-ton cooling tower is currently in progress. 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:

- **In FY 08/09, the University constructed approximately 300,000 square feet of building space more than in FY 07/08 and yet we only paid about \$94,000.00 more in electricity. This cost avoidance is due to the relentless quest for energy savings initiatives implemented by the University.**

In FY 08/09, the University consumed approximately 8,000 MCF more than in FY 07/08 and paid approximately \$300,000.00 less for the natural gas consumed. This cost savings is due to the aggressive implementation of a combination of energy savings programs and the purchasing of natural gas supplies when future pricing markets are most favorable to the University.

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. Meters are being systematically installed on switch gear in order to monitor and adjust usage. This gives us the data necessary to optimize the use of power across the campus. These meters are programmed to be monitored by software that will also give the end consumer the opportunity to adjust their operation to accommodate energy conservation. The Purchase Order for electric consumption meters was issued and the work completed in specific buildings and equipment. These meters will help us determine the energy use and identify opportunities for energy savings.
- New Initiative: Reflective roof coatings are being applied in several buildings in small sections. These applications are being studied for Pre- and Post R-Values.
- Lighting: Street lamps continue to be retrofitted to a more efficient Metal Halide lamp, and the use of new LED type fixtures for street and parking garage lighting is being spot tested and evaluated. The spot testing has been successful so far. With the LED street lighting fixtures, we are producing similar light with more than 50 % energy use. We have also continued to install interior drop in 2x2 LED lamps and LED cove lighting fixtures. These test fixtures have also been successful in reducing energy, improve the light and reducing lamp heat load while using less than half the energy of conventional fixtures. We continue efforts to retrofit and/or remove lamps from fixtures in offices, hallways and conference room without compromising lighting levels for lumens.
- Occupancy sensors: The initiative to install occupancy sensing light switches in building common areas continues. About 25% of common areas throughout campus have now been equipped with occupancy sensors. All new construction projects on



campus now incorporate the use of occupancy sensors as part of the project requirements.

- New Initiative: Energy management system installed at the Parking Garage has been adjusted to produce enough light for safety and still save the university substantial energy costs. Through adjustment of the day light harvesting photocells, the parking garage takes advantage of bright sun light where possible. We are spot testing LED fixtures in the staircases and some pedestrian walk ways.
- New Initiative: Standardization of space temperature settings at all campus buildings was implemented in mid January of this year. Cooling was set at 73 degrees with heating at 70 degrees F. Exceptions were made to labs, special equipment, and large gathering areas; the three degree spread allows the system to operate at a more efficient rate by ensuring that both heating and cooling are not actively cancelling each other out. The action mainly affected the heating system. This fiscal year, natural gas consumption was reduced 7.8% from the previous year.
- New Initiative: We are also testing occupancy sensors that are tied into the HVAC system and window coverings, as well as lighting, to increase space efficiency.
- Hot water distribution service lines: Replacement of 920 lineal feet of leaking pipes is underway and is expected to continue in phases through summer of 2010 to minimize disruption of service. The project will eventually result in the replacement of LF of leaking schedule 40 pipes with new properly insulated schedule 80 pipes that will help reduce energy losses. Update: the replacement of 920 lineal feet of hot water piping (supply and return) has been completed. Next pipe replacement phase will (summer of 2010) address 950 lineal feet of deteriorated pipe (Education run) and 300 lineal feet on the Museum run
- 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, North Kidd Field, Burges Hall and Education. New high efficiency transformers have been installed at Administration, Cotton Memorial, and Kidd Field. Most electrical switches and motor control components associated with these transformers were replaced with energy efficient components. Many electrical components have the element of monitoring and metering to gather energy efficiency data.
- Transformer replacement: The project is 80% complete to replace various older inefficient transformers with modern, energy efficient units. New transformers were installed during this reporting period at Cotton Memorial, Kidd Field, Administration south.
- New Initiative: Have contracted with Siemens Building Technologies to conduct a thorough evaluation of the existing DDC System in various research buildings. The evaluation results will include recommendations to enhance system performance.
- New Initiative: We are continuing in the design and evaluation of new emerging technology in the area of solar power cells. 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. We have received a design proposal for installation at the Facilities Services building.



- New Initiative: Continuation of undertaking a coordination study of power distribution loops throughout the UTEP grid. This study identifies power deficiencies within the distribution of power to the campus buildings. 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 building under design. Although this effort is lengthy and time consuming, it is well underway. The survey has been completed. Analyzing the data and making adjustments is scheduled to begin the next 2 quarters.
- New Initiative: The recently completed Green Roof at the Biology Building is in the process of having sensors installed in order to monitor the intended effect of energy savings for that building. Facilities Services is taking the lead in fine-tuning the monitoring process between this department, academic and research concerns on campus.
- New Initiative: A study is to soon be implemented to maximize irrigation water by the acquisition and utilization of an Irrigation Central Control System that will allow precise application of water resources as they are used in grounds, landscape, sports-turf & other areas. The system has the capability to be tied into weather & climate monitoring systems that will adjust irrigation water to evapo-transpiration (ET) rates, wind conditions, precipitation, temperature, sunshine or any combination of these. Lateral cost saving from increased efficiencies, time-saving & reduced manpower needs will add to cost benefits and hasten return on investment.

Project Implementation Update

- Update on UTEP's major construction projects: Design of UTEP's core Science and Engineering Renovation and remodeling project is completed and construction underway. Both the Chemistry and Computer Science Building and College of Health Science / School of Nursing Building broke ground in November 2008 and both projects are well ahead of schedule. The design for the expansion of the Swimming and Fitness Center is completed and will break ground 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.
- Engineering HVAC Modifications: The project to replace the primary cooling coils is underway and will be completed by January 8, 2010. The upgrade in efficiency is from 8 degrees delta to 16 degrees delta.

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 two electric, gas-free vans and plan to purchase five more this fiscal year. These vehicles are the first fully electric vehicles on campus, producing zero tailpipe emissions. These new mid-sized electric vehicles enable the university to save energy since each new electric truck costs less than \$5 a day to charge and draws power from a regular 110v outlet resulting in overall lower life cycle costs; and, in the near future we plan to use solar energy to recharge these vehicles.



6. UT PAN AMERICAN

Conservation Initiatives

1. Detailed energy audit and comprehensive sustainability baseline assessment: Vendor selection is in process.
2. Cost avoidance strategies are being pursued either internally or in conjunction with item #1 above.
3. Electrically sub-meter auxiliary services buildings in order to conserve energy and improve utility cost allocation. Added Academic Services Building.
4. Electricity metering of cooling plant chillers and facility is in process.
5. Collaborating with EE professor to install 24 modules of PV solar on Engineering Building roof. Solar panels have been installed. Electrical hook up is in progress.
6. Upgrade Staefa controls to Siemens at engineering building's air handler B. PO has been issued.

Operations and Maintenance Initiatives

- Coil cleaning program: SBSC air handler 1 and 1A and LIBR air handlers 4,5, and 6 are complete.
- Hired a consultant to perform efficiency evaluation of cooling plant. Preliminary report was received in late December and is being reviewed.
- HSHW hot water and chill water pipe/insulation replacements are in progress.
- Replace boiler at Science building with higher efficiency model. Boiler is operational.
- Reclassified operator position to energy management system technician. Expect to make an offer in early January 2010.

Fleet/Fuel Management

1. Replace 9 vehicles with more fuel-efficient models. All 9 vehicles have been received.
2. Existing ethanol pumping stations are not an option since none are available within a 10 mile radius.
3. Continue to research the purchase of 4 off-the-road electric vehicles. One procurement attempt was cancelled due to vendor non-compliance.
4. Five-year vehicle replacement schedule is due Jan. 31, 2010.
5. Repair and replace older models with more fuel efficient models.
6. Include electric and hybrid vehicles as procurement options.
7. Use data such as fuel and mileage reports to investigate conservation options.

Capital investments

1. Major lighting upgrades for five additional buildings, including occupancy sensors for five buildings: RFQ in progress.
2. Upgrade existing side-stream chill water filter to improve the efficiency of heat transfer surfaces and thereby decrease energy costs. Procurement is in process.
3. Replace three air handlers and controls at University Center with more efficient units. Project is on schedule. Estimated completion is mid-January 2010.



4. Replace four air handlers at Health and Physical Education building. Proposals and pricing from job order contractor are in-process.

7. UT PERMIAN BASIN (no changes)

UTPB Energy Conservation Initiatives

Projects underway:

The university has completed a programmable thermostat retrofit in all student housing apartments (308 beds). As they have not been in a less than a year, we do not have good estimates of energy savings at this time. This has a secondary benefit of limiting resident errors resulting in freezing up their system.

The DDC system at our center for economic and energy diversification building has been replaced. The convention drives for the exhaust fans and air handlers are being replaced with variable frequency drives. The SCORE program consultant has completed the pre inspection and we expect to have this project complete before November.

The University is in the process of selecting a company that can sign us to participate in ERCOT's electrical "Demand Response."

Minor adjustment to thermostat set points of + 2 degrees during the summer in several building.

Projects that are being evaluated at this time:

Conversion of HID metal halite high bay lighting to T-5 florescent packages for our gymnasium.

Conversion of metal halite wall packs to LED for exterior building lights.

Conversion from T-8 florescent lighting to LED tube lights in our industrial technology building.

Evaluating the capital cost and potential energy savings of a geothermal ground exchange system for heating and cooling of a proposed dormitory.

Evaluating the possible savings from replacing a 1000 ton steam driven absorption chiller with a 1250 electrical variable frequency drive chiller. This will also allow us to use modern refrigerants at a great savings to the university.



Continuing efforts:

Occupancy sensors technology is to be used in infrequently occupied spaces to better control lighting.

Minimizing HVAC run times during non occupied hours.

8. UT SAN ANTONIO

4th Quarter 2009 Update: Capital Projects & Other Initiatives Intended to Reduce Energy

A. Energy Savings Initiatives In Progress

1. Variable Speed Drives have been installed and are being commissioned at the North Thermal Energy Plant. Drives will increase efficiency of current pumping configuration. Pump upgrades are also being incorporated to ensure efficiency improvements function properly and to parallel North and South Thermal Energy Plants.
2. College of Engineering's Institute for Conventional, Alternative, & Renewable Energy (ICARE) will undertake installation of a solar array system and wind turbine at West Campus. Stimulus funds through the State Energy Program are being pursued in order to increase size of proposed system.
3. Energy Audit of dining facilities is underway by campus dining contractor. Kitchen exhaust and HVAC systems are currently being audited.
4. Premium efficiency exhaust fan motors installed by Preventative Maintenance Shop on several campus buildings.
5. South Thermal Energy Plant upgrades to include weather station, pressure/temperature sensors, metering, and dual plant sequencing will allow for operational efficiency improvements.
6. Housing staff completed the installation of water meters at Chaparral Village housing units. Goal is to reduce water costs through consumption monitoring and to identify/correct inefficiencies.
7. Campus electrical loop consumption is being monitored and recorded on a daily basis. Will allow for creation of a baseline and to identify potential periods of high consumption.

B. Energy Savings Initiatives Under Evaluation

1. College of Engineering, University Center Management, and Office of Facilities have partnered to submit a funding request through the State Energy Program for the installation of photovoltaic panels at the University Center.
2. Use of ground water at the Hemisfair Plaza Campus for water fountain use has been implemented. Estimated annual savings of 633,000 gallons and \$3,900 have been projected.
3. Water reclamation projects are under initial evaluation at various buildings. Meeting held with the Edwards Aquifer Authority to ensure regulatory compliance. Cooling tower blowdown and cooling coil condensate are being evaluated.



4. Cooling coil UV lights at several buildings are under evaluation. Walkthroughs and cost proposals have been conducted. Payback analysis will be conducted to determine if feasible to proceed.

C. Awareness

1. Student work study program continues to provide UTSA with operational assistance while providing real-world training. As students become more familiar and knowledgeable with operations, assistance with utility-related projects allows for potential efficiency improvements.

D. Capital Investments

1. Funding for comprehensive metering of campus buildings has been approved. Metering will be installed over a 4-year period to distribute costs. Options are under evaluation and scope of work will be posted for bidding.

9. UT TYLER (no changes)

Significant impacts during past year and anticipated future impacts:

A. Last Year's Impacts

- Continued savings by aggregating electrical contract.
- Revised temperature set point policy for seasonal and uniform space temperatures.
- Major decrease in natural gas consumptions
- Commissioned Graduate Nursing Ornelas Activity Center. Commissioned new major building (University Center Renovation/Expansion Phase I)
- 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 commissioned (University Center Renovation/Expansion Phase II)
- A new utility distribution system University Center Phase I completed.
- Additional 28,887 sq. ft. Building (New Art Building) will come online the end of December 2009.

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.
 - Installed low flow water sprinkler heads in the north lawn of the Robert R. Muntz Library.
- 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.
 - Mid July of 2009 connected RBN corridor lighting to EMS.
 - August of 2009 connected RBS corridor lighting to EMS.
 - September of 2009 replaced 41, 75 watt incandescent bulbs with compact fluorescent bulbs at the Robert Muntz Library.
 - Installed two additional programmable thermostats in the Physical Plant Building.
 - Investigating switch from dimmable incandescent bulbs to LED light fixtures in the Administration conference room and several large lobby areas in the R. Don Cowan Fine and Performing Arts Center.
- 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
 - 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 (no changes)

Energy Conservation Initiatives:

A. Maintenance and Operations:

- Energy Set Backs
 - DF Building Energy Improvements and Set Backs – In Progress – Completion date estimated December 2009.



- R Building Controls Upgrade to perform Setbacks – In Progress – Completion date estimated December 2009.
- B Building Energy setbacks – In progress – Completion date October 31, 2009.
- ND AHU's Improve economizer mode to better use free cooling – Complete
- NB AHU's Improve economizer mode to better use free cooling – In progress
- Install VFD's on CHW pumps B and E building – Complete
- NB2 Auditorium: Replaced defective supply/return air VFD's
 - AHU NB2A turns off at 8pm and on at 6am – Complete
- NA6 AHU Energy Set Backs (Ramp down to minimum Hz at 8pm and at 5am) – In Progress
- CA Building – 5 AHUs off 8pm and on 5 am.
- Bass Thermal Energy Plant VFDs on Three (3) Boiler Feed Water Pumps – In Progress
- Bass Complex AHUs are on a fixed scheduling, Economizer mode, Set Backs – In Progress

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 End of Year 2009.

| | Description | Cost | M & V Cost | Savings | Payback |
|--------------|---|---------------------|-----------------------|---------------------|----------------|
| 1 | Install Substation Capacitor Banks - | \$200,000.00 | \$4,000.00 | \$80,000.00 | 2.6 |
| 2 | NB Building Air Balancing (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. (NB Building) | \$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 2009
 HVAC System – In Progress
 - Insulation Systems
 - Replace AHU LLD-2
 - Air Handler 5F6 Refurbishment
 - Refurbish AHU 5C1
 Controls System – In Progress
 - HVAC Controls Upgrades
 - Plant Controls (Boiler 1 and 2 controls upgrades installed) - Complete
- University Hospitals – **Zale Lipsy Building** – Estimated completion is 2009
 HVAC System – In Progress
 - Plant Controls (Boiler 1 and 2 controls upgrades installed) - Complete



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

- 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.
- An important part of the Sustainability program 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/>. Building audits are conducted year round to document current conditions and address efficiencies and operating problems.
- Hurricane Ike September 13, 2008 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.
- The hurricane Ike damaged Chilled water and Steam distribution system repair in kind costs are being finalized. These costs will establish reimbursement baselines that justify mitigation alternatives that reduce future hurricane impacts and improved system operations. The design of the mitigation alternatives take into account computer simulation models that reduce operation costs and optimize system configuration.
- A Utility Production Equipment Program targets an energy use reduction of 2% per year by completing the following four projects:
 - Installation of a cooling tower, two new chillers and associated pumps and electrical gear to add 6200 tons of capacity to the West Plant,
 - The aging Central Plant Boiler Auxiliaries will be replaced with a new energy compliant packaged condensate, de-aerator, boiler feed pump and economizers.
 - The development of an Energy Demand Management Program that will be used by designers to meet projected building Energy Utilization Index. Initiatives resulting from the program include:
 - Selection of an Energy Management Data mining software
 - HVAC system re-commissioning of three buildings, one from each building type, research, academic/business and healthcare. This will include baseline of existing system condition and a summary of energy change when the project is completed.
 - Development of scope and construction documents for the upgrade of a campus wide meter upgrade related to chilled water, steam/condensate and electricity.



- Development of a replacement program for exterior lighting with the standard lighting fixture fixtures and controls.
- The relocation of specific overhead electrical service and reconnection to underground service will reduce the risk of damaged power lines in future storms.
- 5. This will reduce generator rental costs related to temporary power requirements which are currently needed now while the lines are being repaired. As the University repairs and rebuilds we are requiring materials that endure the local environment and adhere to State and SECO energy compliance codes.
- Recycling – We have restored our recycle programs, and are reaching our goal of 22%.
- UTMB Has established Energy Goals for Recovery from the Damages incurred by Hurricane Ike. They are:

Return to a Campus E.U.I of 206 kBTU \sqft at a rate consistent with the rate of return of damaged space to service. I.e. Our current E.U.I. is 242 kBTU\sqft our current Goal is to return 40% of our damaged space to Service by August 2010, so our E.U.I Goal will be for a campus E.U.I of 228 kBTU\sqft.

To Achieve That Goal will require that space be returned to service as follows.

1. Administrative and Academic @ 85 kBTU\sqft
2. Inpatient health care @ 365 kBTU\sqft
3. Outpatient health care @ 188 kbtu\sqft
4. Research @ 265 kbtu\sqft

Design Teams will need to submit as part of their Schematic Design an estimate with associated backup for calculated E.U.I. of the space they are returning to service to the director of Utilities.

- If the estimated E.U.I. is above the Target Levels they will need to submit proposed energy project to lower the E.U.I.

12. UT HEALTH SCIENCE CENTER – HOUSTON (no changes)

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 are being 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, 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 affected zones.

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. Occupied/unoccupied schedules are being evaluated.

- Lighting schedules have been reviewed for implementation as the Research Replacement Facility/ Medical School Expansion Building becomes occupied. The schedules are installed and have been adjusted to meet the needs of the facility while minimizing utility costs. Done. Office motion sensors. Labs 24/7 schedule, but user shuts on/off.
- 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 have been addressed
- The glycol heat recovery system is being evaluated for optimum performance. The winter mode of the economizer will be fine tuned further as weather allows, thus continuing to improve the performance of the glycol system.
- 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.



- 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.
- A retrofit of the lab section of the building has been completed. First, the temperature sensors have been relocated to more appropriate locations to properly represent the zones to which they serve. Second, the Phoenix valve operating parameters have been adjusted to better respond to load. Third, 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.

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. Last year these savings were \$114,995.30.
- 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 replaced three failed condensate return units. This has enabled these buildings to return more condensate back to the energy plant to conserve the thermal energy. An additional failure under the Auditorium is also not repairable. Will be purchasing a temporary unit until funding for final replacement is available.



- 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. Over the fall, these efforts continued in an improvement in energy consumption on a degree day cooling basis. Techniques using set back temperature settings, replacing mixing boxes, renovating outside air dampers, repairing air handling unit controls and topping off refrigerant in chillers were used.
- Facilities personnel are pursuing the possibility of installing an advanced heat recovery system on an existing boiler in the Central Energy Plant. We are currently working with CPS Energy, DMI Intergraland Cannon Boiler Works to bring this to a reality. This new equipment will increase the steam system efficiency from 82% to better than 87%. A Recovery Act Fund Request has is being submitted to fund this project.
- As new facilities are constructed, the HSC engineers insist that the design teams specify occupancy sensors, 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. On a current building project, the heat recovery equipment was value engineered out for a savings of \$1.5 million. Otherwise HSC engineers carefully review submittals to ensure compliance with specifications.
- The current design of the South Texas Research Facility (STRF) includes the addition of two 1500-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. If this funding is not available, the cooling towers for these two buildings will have to be upsized for more efficient operation of the building's cooling systems.

- Our facility control technicians and electricians previously replaced eleven 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. This one more drive was replaced. Funding is continuously being sought to replace 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 last summer.
- Additionally, chilled water storage using the existing piping system capacity helped lower peak electric demands. By pre-cooling the water supply in the chilled water loop to 38 degrees F, the water temperature could be allowed to rise to 43 degrees F, as demand increased. This technique flattens the load on the chillers by using the existing chilled water pipes storing energy.
- Another Energy Plant initiative contracted with City Public Service Energy to reduce CPSE's peak loads by running the HSC's emergency generators. At CPSE's request, HSC's Central Plants would transfer 600KW of load off of CPSE's grid. This benefited CPSE which had two unplanned generator shutdowns during the summer and the net earnings to the HSC will be around \$32,000.
- A Utilities Department initiative manually staged the operation of two chillers in the CTRC so that each chiller would operate in a more efficient manner. This resulted in an estimated 28% savings. Funding is required to upgrade or replace the BAS so that automatic staging of chillers can be accomplished.
- 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. This request was for \$5.5 million.
- An example of this type of opportunity is the replacement of the Medical School Reverse Osmosis System. This old and inefficient water purification system was replaced with a new system that in addition to producing purer water for research; uses 33% less electricity and 15% less water to produce the same amount of permeate. With the new water quality now available, a purchasing study will need to be performed to



- The HSC 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. Based upon the final report, we are adding this opportunity to the Recovery Act Fund Request.
- 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. A proposal and cost estimate has been prepared to add other submeters.
- 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. The value of the gas savings is approximately \$15,000 per year.
- 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 Direct Digital Control, where feasible. This fall with internal funding, four boxes have been upgraded and three more have been planned.
- 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. D

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 due to Domestic Water pumps being taken of line. This is due to County Water Department installing new pump system thus serving our facility with 110psi pressure and no longer a gravity feed system of 15-20psi.
- 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 90% completed. The scope of work includes a power factor correction capacitor bank to reduce electric use fees. The target completion date is 1/31, 2010.
- A project to replace/upgrade Exterior signage is completed. This will help with utility savings due to more efficient lighting.
- A project to convert the Graphics building to a Fitness Center is still ongoing.. Elimination of major printing equipment and has allowed for a reduction in energy consumption.
- A project to upgrade down B Bldg corridor to the cafeteria is 100% completed. 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. The Project is 90% completed at this time. This will allow for more efficient operation and control of HVAC and Lighting, thus allowing for energy savings.
- A project to have all outside lighting on the Siemens control system is in progress. This will reduce the cost of electricity due to operating hours. 18 lighting circuits have been completed to date
- A project to renovate the Emergency Room is at 100% DD's. This will allow for more efficient operation and control of HVAC and Lighting, thus allowing for energy savings.
- A project to renovate the 4th Floor Rite Center Shell Space is at 100% DD's. This will allow for more efficient operation and control of HVAC and Lighting, thus allowing for energy savings.



- A project is being investigated to drill for water wells in order to feed the campus landscaping with well water instead of domestic water, thus reducing water consumption.
- A Survey is being completed by the Trane Company to evaluate the present Central Plant for Upgrading and cost savings. Survey should be completed by 1/31/2010

15. UT M. D. ANDERSON CANCER CENTER

Energy Conservation Initiatives:

Patient Care and Prevention Facilities

- The following energy retro-commissioning activities are in progress at the Mays Clinic. \$737,000 of actual energy savings has been achieved versus prior year benchmark since the program actions started in March 2009. No capital cost has been required for implementation.
 - Unoccupied outside air reduction
 - Cold deck reheat reduction
 - Outside air pretreat temperature reset
 - Chilled water primary pump control
 - Hot deck temperature reset
 - Outside air pretreat fan static pressure trim and reset
- The following energy retro-commissioning activities are in progress in Patient Care and Prevention facilities North of Holcomb. Annual energy savings is estimated at \$650,000.
 - Old Clark chilled water primary reconfiguration and pump control
 - Main kitchen unoccupied ventilation reduction - complete
 - New Clark & LeMaistre chilled water primary pump control
 - Outside air pretreat temperature reset – LeMaistre
 - Surgery lighting unoccupied shutoff
 - Unoccupied temperature and airflow setbacks – LeMaistre
 - Preheat setpoint adjustments Lutheran, Old and New Clark
- Design of a heat recovery chiller to serve the Mays Clinic has been completed. This project has qualified for a subsidy from the CenterPoint Clean Air Technology Program. The project is currently on hold pending completion of retro-commissioning activities in the building that will likely downsize final chiller selection to better match final building hot water heating load.
- A project to upgrade the Alkek G8 infrastructure is in design. Energy saving 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



Research & Education Facilities

- A feasibility study to install a recool system in the Basic Science Research Building (BSRB) has been completed. Pilot phase for the first pair of floors to convert office to variable air volume and redirect air flow to lab areas is in progress with an estimated annual of savings of \$70,000.
- All major Research and Education exhaust fan systems have been programmed with a more efficient sequence of operation and exhaust discharge velocities have been reduce to current standards. Energy costs reduction for these projects totals \$100,000 per year.
- The Cancer Research Building radioisotope hoods are being re-commissioned to current velocity standards with estimated annual energy savings of \$63,000.
- BSRB north lab temperature stabilization project saves \$37,000 per year.
- 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 building energy audit currently in progress. .
 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:
 - Lower face velocity of chemical fume and radioisotope hoods
 - Close the sash campaign
 - Test and evaluate zone presence sensors
 - Evaluate automatic sash positioner installation
 - High performance fume hood evaluation program

Administrative Facilities and Campus Operations

- New energy efficient chillers are being installed in the Fannin Holcombe building with estimated energy savings of \$50,000 annually.
- Permanent shutdown and lockout of a basement exhaust system in the Fannin Holcombe building reduces energy cost by \$25,000 per year.