

October 10, 2017

Mr. Dub Taylor  
Director  
State Energy Conservation Office  
111 East 17<sup>th</sup> Street, #314  
Austin, Texas 78774

RE: TTUHSCEP - Energy and Water Management Plan

For over 20 years our institution has complied with the state mandated reporting requirements per 4 Texas Gov. Code §447.009 (c) and (e), 34 Texas Admin. Code §19.14 and § 19.16, Governor's Executive Order #RP 49, and SECO directives. Our institution has energy utilization and cost index (EUI & ECI) values less than the median EUI and ECI values of similar health related institutions in the state of Texas. We are in compliance with the water efficiency standards outlined by applicable building codes and SECO water conservation guidelines. Attached 'EXHIBIT-I' shows the historical energy and water consumption data for fiscal years 1999 through 2017, and the energy benchmarking index values for comparison.

Energy Consumption Index and Energy Utilization Index were reduced this Fiscal Year by a large margin. Energy conservation efforts were implemented and better energy conservation monitoring led to better results when compared with previous fiscal years. Several Energy Conservation Initiatives were implemented throughout the campus which aided in reducing energy consumption.

Other factors such as programmatic changes, weather fluctuations, increase in research space and energy density contributed to changes in energy consumption. TTUHSCEP continues to emphasize fuel conservation awareness with strategies such as group travel and regular preventive maintenance to best achieve savings.

The institution implemented several energy conservation projects that had positive results and solid payback periods. 'EXHIBIT-II' shows a list of energy conservation projects that were completed during the period of FY-17. Anticipating further growth in academics, healthcare (clinical), operations, and research during fiscal years 2018 through 2020, our institution adopts a plan with a goal to reduce energy consumption by 2% from an average of the 3 past fiscal years, this includes Electrical, Water and Gas utilities. For Vehicle fuel consumption, the institution's goal is to increase efficiency by 1%. Energy consumption will be below the median value of the EUI of health related institutions in the state of Texas (288.7 kBtu/ft<sup>2</sup> as per CLEAResult, 2016). Texas SECO water conservation guidelines indicate efficiency benchmark range for schools and offices to be 26 to 93 Gal/sf/year. The energy and water benchmark goals will be incorporated into our new construction, renovations, and other conservation programs.

To attain the above mentioned goal, our institution has a progressive plan to implement energy and water conservation projects as detailed in the attached 'EXHIBIT-III'. Projects will be prioritized based on considerations such as acceptable payback period, and/ or life-cycle cost- benefit analysis. The implementation of these projects will be dependent on available funding. The successful application of these projects will form the basis of the energy plan for the subsequent fiscal years. The current plan identifies potential financing strategies available to implement these projects.

TTUHSCEP also continues to emphasize fuel conservation awareness with strategies such as group travel and regular preventive maintenance. "EXHIBIT-IV" compares the last few fiscal years in regards to Gasoline Consumption. Energy efficiency has slowly but steadily increased over the past fiscal years.


TTUHSCEP maintains specific Operating Policies and Procedures relating to the Energy Conservation Program and Utility Review. This policy makes the responsibility of Energy Conservation the obligation of every employee and Department with support from Engineering Services. ATTACHMENT I lists the Awareness Plan in detail, and the designated contact person at the institution.

Your consideration of our efforts and this information is appreciated.

Sincerely,



Jose G. Dominguez, P.E.  
Sr. Director, Engineering Services



Leopoldo Pereyra, P.E.  
Managing Director  
Physical Plant and Support Services

Enclosed: EXHIBTS I, II, III & IV.

Xc:  
Frank Stout,  
Chief Operating Officer, TTUHSCEP

**EXHIBIT-I**  
**Historical energy and Water Consumption**  
**Data**  
**FY1999 — FY2017**

<b>Fiscal Year</b>	<b>Energy Consumption in KBtu</b>	<b>Total Area (gsf)</b>	<b>EUI (KBtu/gsf/yr.)</b>	<b>Water Consumption in Mgal (Gal/sf/yr.)</b>
FY'99	23,132,538	201,570	114.762	2,984 (15)
FY'00	22,096,416	201,570	109.622	2,650 (13)
FY'01	22,914,552	201,570	113.680	2,622 (13)
FY'02	19,519,373	208,794	93.486	2,365 (12)
FY'03	20,669,328	218,909	94.420	2,577 (12)
FY'04	23,203,760	218,909	105.997	3,012 (14)
FY'05	29,169,808	262,207	111.247	3,703 (14)
FY'06	49,790,235	325,619	152.909	9,662 (30)
FY'07	72,858,419	357,325	203.900	12,117 (34)
FY'08	96,332,454	476,814	202.034	13,279 (28)
FY'09	123,763,444	476,814	259.563	16,104 (34)
FY'10	139,080,128	484,467	287.079	16,343 (34)
FY'11	129,600,586	488,557	265.272	17,887 (37)
FY'12	136,912,562	495,555	276.281	21,637 (44)
FY'13	131,883,525	508,547	259.334	19,711(39)
FY'14	119,655,209	578,247	206.928	16,920 (29)
FY'15	128,544,571	621,242	206.915	17,488(28)
FY'16	116,045,449	678,593	171.009	17,872 (26)
FY'17	115,625,708	692,427	166.986	19,904 (29)

**\*\*NOTE:**

gsf: Gross Square Feet

Mgal: Thousands of gallons

kBTU: Thousands of BTU's



(Energy Benchmarking Report)

Institution	Energy Utilization Index (EUI) in kBtu/gsf	Energy Cost Index (ECI) in \$/gsf
Texas Tech Univ Health Sciences Center El Paso (FY-17)	<u>167</u>	\$2.58
Texas Tech Univ Health Sciences Center El Paso (FY-16)	171	\$2.46
Texas Tech Univ Health Sciences Center El Paso (FY-15)	<u>207</u>	\$2.97
Texas Tech Univ Health Sciences Center El Paso (FY-14)	207	\$2.99
Texas Tech Univ Health Sciences Center El Paso (FY-13)	259	\$3.34
Texas Tech Univ Health Sciences Center El Paso (FY-12)	276	\$3.83
Texas Tech Univ Health Sciences Center El Paso (FY-11)	265	\$3.48
Texas Tech Univ Health Sciences Center El Paso (FY-10)	287	\$3.71
Health Related Institutions in Texas (Median)	289	\$5.22
TTUHSCEP Energy Management Plan Target	<u>&lt; 178</u>	< \$3.37

N.B.:

1. EUI can increase significantly with more research and hospital space, occupancy density, year of construction; building plug loads etc.
2. ECI can vary significantly with the local utility cost. Recent increases in rates have impacted this year's ECI increasing it by 4% when compared to FY'16.
3. CLEAR result, 4301 Westbank Drive, Austin, TX 78746, provided the median EUI and ECI of HRIs in Texas for year 2016.

**\*\*NOTE:**

gsf: Gross Square Feet

kBTU: Thousands of BTU's



**EXHIBIT — II**  
**Energy Conservation Efforts, FY-17**

1. Lighting – Change out to LED Fixtures: Several buildings have been continuously retrofitted to LED fixtures. Some of these buildings and areas that have been retrofitted are the following:
  - a. Building 3000- Academic Services Building:
    - i. Delia Gallo Library Renovation. - As part of a Construction project to remodel the offices of the above mentioned Library, the lighting fixtures were retrofitted to LED, which also included lighting controls by Lutron.
  - b. Building 3001- Clinical Science Building:
    - i. Corridors in the 2<sup>nd</sup> floor have been upgraded to LED
  - c. Building 3006- Medical Education Building:
    - i. Exterior Lighting for the building has been upgraded to LED.
  - d. Building 3010- School of Nursing:
    - i. The entire building is being retrofitted as funds become available. So far, the first floor is 90% complete. Second and Third floors will be completed before the end of Fiscal Year 2018.
2. A control retrofit was performed for the Air Handlers in building 3006- Medical Education building. This will allow better monitoring of the system as well as taking advantage of energy conservation control modes like “Economizer Mode”. A total of 12 out of 14 Air Handlers have been successfully retrofitted.
3. The Heating System for building 3006- Medical Education Building was upgraded with controls in order to incorporate it to our current EMS. Before, the system was running as a “stand-alone” system. Now, it can be monitored, scheduled and modified remotely.
4. Control Optimization for Fan Coil Units in building 3001- Clinical Science Building, in order to implement occupied/ un-occupied schedules and reduce energy waste. Schedules were implemented towards the end of the 1<sup>st</sup> quarter of FY’17 and resulted in substantial Energy Savings.
5. Outside Air Handlers (4) located in building 3001- Clinical Science building were programmed with a schedule which allowed them to automatically shut down during non-operating hours. This along with the Fan Coil schedules resulted in approximately 8% Electric Energy reduction for this Fiscal Year when compared to the previous year.
6. Replaced boiler burners with modulating ones in building 3008- CSB Central Plant, which serves building 3001- Clinical Science Building. This was finished towards the end of the 1<sup>st</sup> quarter of FY’17 and allowed the plant to operate by load requirement in stages, in lieu of full load per boiler. This modification along with scheduling of Fan Coils and Air Handlers resulted in 30% Gas Energy Savings for this Fiscal Year when compared to the previous year.
7. A Fan Coil Schedule was implemented in building 3000- Academic Services building, which allowed to change the temperature setpoints of each room higher during summer and lower during winter, during non-operational hours. This allowed to maintain the Energy consumption lower than the previous fiscal year after it was implemented. This includes both Electricity and Water.



8. A Terminal Unit Schedule was implemented in building 3005- Medical Science Building, which allowed to change the temperature setpoints of offices higher during summer and lower during winter, during non-operational hours. This also made it possible to shut down one Air Handler, which serves the majority of the offices, during non-operational hours.
9. All new construction and existing building renovations meet applicable energy code.



**EXHIBIT — III**  
**Energy Conservation Projects and Finance Strategies**

TTUHSCEP has identified the following projects for potential consideration in reducing the campus energy consumption. TTUHSCEP Engineering Services has performed cost benefit analysis of all the identified energy conservation projects. Currently, these projects are in various stages such as in planning, design, or implementation. The implementation schedule will be established according to the availability of funds and building resources.

**Projects:**

Evaluate and secure funding for the following projects.

1. The new lighting standard for the campus is to implement LED light fixtures.
2. Continue insulation replacement project to identify and replace damaged, missing, or inadequate insulation.
3. Re-commissioning of the existing facilities to ensure they are performing as designed.
4. Evaluation of the existing energy management control systems and control sequences to optimize building system performance.
5. Improvements to the building envelopes.
6. Installation of Lighting Controls, more specifically in corridors, where lighting schedules will be implemented to reduce Energy consumption.
7. Implementation of Electric Sub metering to better identify energy deficiencies and future projects.
8. Implementation of a campus-wide smart irrigation system.
9. Implementation of “Smart” thermostats in remote buildings.
10. A steam condensate recovery system for the MSBI central plant which will reduce both water and gas consumption.
11. Installation of pressure independent control valves for chilled water flow control for the air handlers in the bigger buildings.
12. Installation of low water flow controls for the toilets, sinks, and urinals.
13. Reutilize the captured condensate water from air handling and fan coil equipment.
14. Boiler control sequencing to the Medical Education Building.
15. Chilled Water control sequencing for the School of Nursing.
16. Continue to retrofit automatic controls for HVAC Equipment as necessary.
17. Energy Management System continuous upgrades to allow better monitoring and control of Mechanical Equipment and Lighting.
18. There is an ongoing Feasibility study concerning the Fire Tube Steam Boilers located in our Medical Science Building. The study, which is expected to be finished before the 1<sup>st</sup> quarter of FY’18, and will allow us to set a plan to make the steam plant more efficient. Some of the possible options are:
  - a. An energy recovery system for the MSBI. This would recover energy from boiler flue and building exhaust system.
  - b. Replacing the bigger 450 HP Steam boiler with smaller, more efficient one.
  - c. Separating Steam and Hydronic Systems, and adding a hydronic boiler for those systems not requiring steam.
  - d. Adding packaged systems to existing sterilizers to change the steam generation from gas to electric for these type of appliances.

**Additional Tactics not requiring financing:**

1. Ensure that all renovations and new building construction meet or exceed the most current edition of energy conservation codes.
2. Review all utility tariffs and ensure that the most favorable terms are being realized by TTUHSCEP.
3. Keep abreast of new and proven technologies and apply these technologies where opportunities exist.
4. Monthly review of the energy consumption from TTUHSCEP facilities and the immediate investigation into any variances from plan to correct and prevent future inefficiencies.
5. Continuously develop and update the list of energy conservation projects.
6. Broaden the application of xeriscaping and utilization of reclaimed waste water.
7. Participate in the forums presented by the State Energy Conservation Office, AEE, and ASHRAE.
8. Maintain a process of educating, training, and communicating the policies, best practices and every day conservation practices for the occupants within the facilities TTUHSCEP owns, operates and leases.

**Finance Strategy**

Listed below are some of the available methods of financing energy savings projects.

1. Internal Funding
2. Rebates from Utility Providers
  - SCORE Program by El Paso Electric Company

Evaluate options to internally fund energy projects by leveraging funded projects and through re-investment of utility savings.



**EXHIBIT-IV**  
**Gasoline consumption for TTUHSCEP**

FISCAL YEAR	GASOLINE CONSUMPTION (GALONS)	GASOLINE COST (\$)	MILES DRIVEN (MILES)	FUEL EFFICIENCY (MILES/GALON)
FY'17	14,223	\$33,686	149,330	10.49
FY'16	14,188	\$29,468	152,668	10.76
FY'15	14,347	\$38,491	148,684	10.36
FY'14	13,903	\$46,655	138,216	9.94

\*Information provided by TTUHSCEP Department of Parking & Transportation Services Department

## ATTACHMENT I Employee Awareness Plan

TTUHSCEP is continuously on the lookout for means by which to communicate energy conservation practices to the personnel and patients that occupy the facilities. Avenues available to the institution are the announcement webpage for TTUHSCEP “The Scope”, memorandums, and emails.

The key elements of TTUHSCEP Utility Awareness Plan are to prevent waste and assure conservation of resources follow. These initiatives are broken down into two categories: Direct (effecting change in behavior) and Indirect (not designed to affect behavior, but will increase awareness):

### Direct Initiatives:

- Require all personnel to turn off lights, computers, printers, and any other office machine when labs and offices are unoccupied.
- Turn off lights in classrooms when classes are over.
- Do not allow idle classrooms to be used as study halls. Use the library or small study rooms instead.
- Allow vent hoods to be operated only when necessary.
- Do not allow comfort-heating appliances to be used to supplement the building heating system.
- Instruct custodians to turn off lights in hallways and offices after cleaning.
- Implement Control logics such as economizer operation using a combination of enthalpy and dry bulb temperature, discharge air reset inversely to return air temperature, chilled water return temperature control needs to be reviewed and incorporated.
  
- Identify equipment that can be switched OFF during nights and weekends for all facilities.
- Replace filters on air handling units frequently.
- Periodically check temperature and humidity sensors for proper operation. Install minimum air flow stops to ensure appropriate outside air at all times.
- Check ducts and pipes for missing or damaged insulation.
- Perform regular preventive maintenance on all major and high energy use equipment.

### Indirect Initiatives:

- Reduce the operating hours of Air Handling units and other main mechanical equipment.
- Reduce temperature of water used for domestic purposes to 125°F.
- Consolidate Laboratory Functions
- Install lighting Occupancy sensors
- Ensure Venetian Blinds and/or solar shades are fully extended and closed as appropriate to reduce heating and cooling losses.



TEXAS TECH UNIVERSITY  
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