

October 30, 2018

Office of the Governor
1100 San Jacinto
Austin, Texas 78701

Mrs. Ursula Parks, Director
Legislative Budget Board (LBB)
Robert E. Johnson Bldg.- 5th Floor
Austin, Texas 78701

RE: TTUHSC El Paso – Annual Energy Report, FY2018

The Texas Tech University Health Sciences Center El Paso (TTUHSC El Paso) Annual Energy Report for FY2018 is being submitted in accordance with Governor's Executive Order # RP 49. TTUHSC El Paso Physical Plant and Support Services continues to promote energy conservation strategies by improving building system's efficiencies to reduce energy consumption.

A. Energy Consumption & Cost

In FY2018, TTUHSC El Paso consumed 109,822,996 kBtu in total energy (**Exhibit A**) that represented a reduction in energy utilization from the previous year. The energy utilization index (EUI) decreased by 4.2% compared to FY 2017. The energy cost index (ECI) decreased by 15.7% for the same year due to several energy savings initiatives implemented as well as new energy rates that were renegotiated with some of the utility suppliers. The median EUI and ECI indexes are 133 kBtu/gsf and \$2.39/gsf while the same indexes for TTUHSC El Paso in FY 2018 were of 160 kBtu/gsf and 2.23 /gsf, respectively (**Exhibit B**). The gross area (gsf) of the institution in FY2018 has remained the same when compared to FY2017. Heating Degree Days (HDD) for FY2018 increased by 14% as compared to FY2017; Cooling Degree Days (CDD) for FY2018 increased by 5% as compared to FY2017.

TTUHSC El Paso continues to experience sustained overall occupancy and program growth while the gross area of the physical plant remained unchanged for this fiscal year. **Exhibit A** shows the historical energy and water consumption data for fiscal years 1999 through 2018, and the energy benchmarking index values for comparison.

B. Energy Conservation Plan & Action

TTUHSCPEP maintains specific operating policies and procedures regarding the energy conservation program and utility review. These policies and procedures ensure that all TTUHSC El Paso's constituents are responsible for complying with the energy conservation initiatives implemented in TTUHSC El Paso by Physical Plant and Support Services/Engineering Services. **Exhibit G** provides a detailed description of the awareness plan that has been implemented for the Institution.

Physical Plant and Support Services/Engineering Services has implemented several energy conservation projects that have had positive results within feasible payback periods. **Exhibit D** shows a list of energy conservation projects that were completed during FY-18. TTUHSC El Paso has adopted an aggressive plan to reduce energy consumption by 2% from the median of the 3 previous fiscal years. The reduction goal is intended for fiscal years 2019 through 2020 and applies to electrical, water and gas utilities. This goal is set in anticipation to expected further growth in academics, healthcare (clinical), operations, and research. In regards to vehicle fuel consumption, TTUHSC El Paso goal is to increase efficiency by 1%. Energy consumption is expected to be reduced below the median value of the EUI of health related institutions in the state of Texas (133 kBtu/ft² as per CLEAResult, 2018). Texas SECO water conservation guidelines indicate efficiency benchmark range for schools and offices to be 26 to 93 Mgal/sf/year. TTUHSC El Paso recorded 32.9 Mgal/sf/year for FY-18 which is within the benchmark range. The energy and water benchmarks are

being incorporated into our new construction, renovations, and other conservation programs. TTUHSC El Paso is in compliance with the water efficiency standards outlined by applicable building codes and SECO water conservation guidelines.

C. Future Energy Reduction Plans

TTUHSC El Paso has established well-defined progressive initiatives to ensure the attainment of the goals described in the previous section for energy and water conservation. These initiatives are detailed in **Exhibit E** and the projects listed therein will be prioritized based on payback period and life-cycle cost-benefit analysis. For instance, old and inefficient air handling and terminal units are routinely being upgraded with new control systems. Also, mechanical equipment nearing the end of their expected service life is constantly being replaced with modern and more efficient equipment. The implementation of these projects will be dependent upon available funding. The successful application of these projects will form the basis of the energy plan for the subsequent fiscal years. The current plan considers reinvesting residual funding resulting from savings on energy reduction initiatives.

During the course of this past Fiscal Year 2018, Texas Tech Health Sciences Center El Paso's Physical Plant department met with personnel from CleaResult, Austin, to perform an Energy Benchmark for the campus. This resulted in a more clear representation of where the university stands in comparison with other health related universities in the area, the progress made since the last benchmark (2012) and also, it allowed to redefine the goals and focus points to continue to reduce energy consumption throughout the campus.

D. Fuel Consumption Reduction Plans

TTUHSCPEP also continues to emphasize fuel conservation awareness with strategies such as group travel and regular preventive maintenance. The table in **Exhibit F** compares the last four fiscal years of gasoline consumption and shows that energy efficiency has remained relatively flat with slight increases in efficiency over the last two fiscal years.

Your consideration of our efforts and this information is appreciated.

Sincerely,



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



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

Enclosed: **Exhibits A, B, C, D, E, F and G.**

Xc:

Frank Stout,
Chief Operating Officer, TTUHSC El Paso

Exhibit A
Historical energy and Water Consumption
Data
FY1999 — FY2018

Fiscal Year	Energy Consumption in KBtu	Total Area (gsf)	EUI (KBtu/gsf/yr.)	Water Consumption (Mgal/sf/yr.)
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)
FY'18	109,822,996	692,427	159.945 ¹	22.342 (33)

****NOTE:**

gsf: Gross Square Feet

Mgal: Thousands of gallons

kBTU: Thousands of BTU's

¹For the calculation of EUI, please note that Gas is not recorded for all of the buildings. Building 3527- Mesa Psychiatric Center has a contract for the Electric Utility under Texas Tech Health Sciences Center El Paso. Gas and Water utilities reside under the responsibility of a different entity. Hence, EUI for Electric utility uses a gross area of 692,427 ft², but for gas 678,593 ft² is considered.

Exhibit B
Historic Energy Utilization and Cost Indexes

Institution	Energy Utilization Index (EUI) in kBtu/gsf	Energy Cost Index (ECI) in \$/gsf
Texas Tech Univ Health Sciences Center El Paso (FY-18)	<u>160</u>	\$2.23
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)	<u>171</u>	\$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)	133	\$2.39
TTUHSCEP Energy Management Plan Target	<u>≤ 130</u>	< \$2.34

N.B.:

1. EUI can increase significantly with more research and clinic space, occupancy density, year of construction; building plug loads etc.
2. CLEAResult, 4301 Westbank Drive, Austin, TX 78746, provided the median EUI and ECI of HRIs in Texas for year 2017.

****NOTE:**

gsf: Gross Square Feet

kBTU: Thousands of BTU's

Exhibit C
Energy Consumption, Cost and Distribution

ANNUAL ENERGY CONSUMPTION AND COST				
Energy Type	Consumption		Cost (\$)	
	FY2018	FY2017	FY2018	FY2017
Electricity (kWh)	18,858,502	19,892,216	\$1,321,397.31	\$1,480,218.06
Natural Gas (CCF)	442,365	464,501	\$227,553.53	\$267,643.61
Total Energy (Kbtu)	109,822,996	115,625,708	\$1,548,950.84	\$1,747,861.67

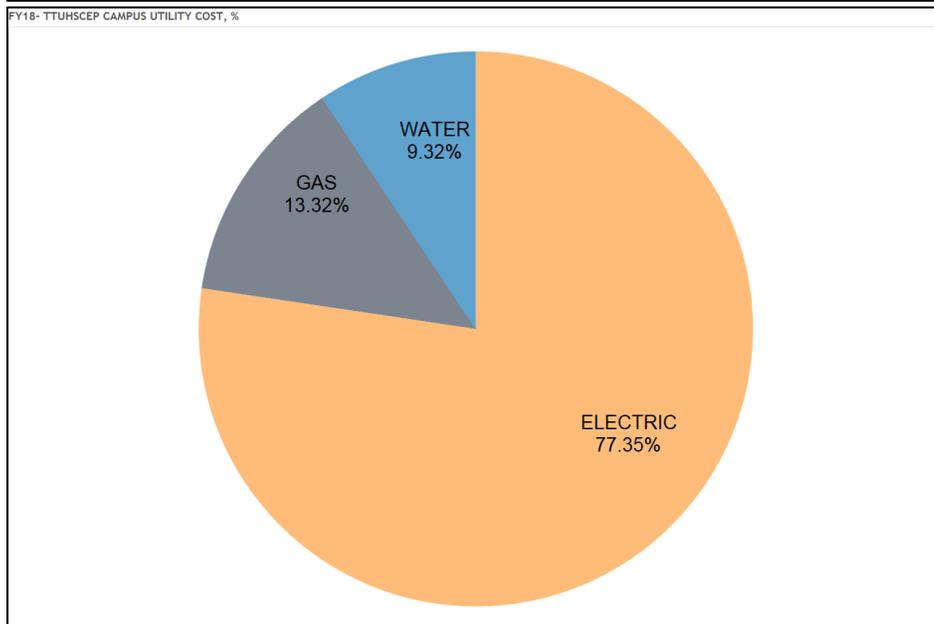
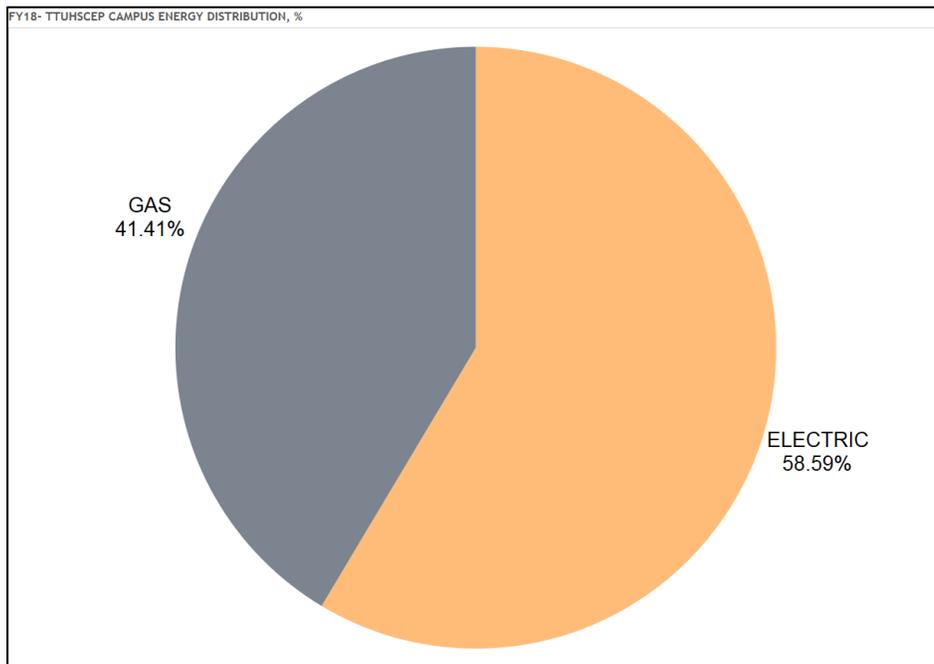


Exhibit D
Energy Conservation Efforts, FY-18

1. Lighting – Retrofit 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 3001- Clinical Science Building:
 - i. Corridors in the Basement, 1st & 3rd floor have been retrofitted to LED
 - b. Building 3010- School of Nursing:
 - i. All the linear lighting fixtures for all 3 floors have been retrofitted to LED.
 - c. Building 3005- Medical Science Building
 - i. Lighting Occupancy controls have been installed for Laboratory areas throughout the building. This includes 1st, 2nd, 3rd, and 4th floor Laboratories of a 4-story building.
 - ii. Exterior Lighting was retrofitted in to new, more efficient LED Lighting.
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 14 out of 14 Air Handlers have been successfully retrofitted.
3. The Cooling System for building 3006- Medical Education Building was upgraded with new isolation valves for the chillers in order to stage the chillers so that they operate only when required. Before all three chillers had to be operated at the same time due to the lack of isolation capabilities to each chiller.
4. The Cooling System for building 3000- Academic & Education Center building was upgraded with new isolation valves for the chillers in order to stage the chillers so that they operate only when required. Before all three chillers had to be operated at the same time due to the lack of isolation capabilities to each chiller. During this project, the primary chilled water pumps were also retrofitted to provide better system stability and extend their useful life.
5. Control Optimization for Fan Coil Units and VAV boxes in building 3001- Clinical Science Building, in order to implement occupied/ un-occupied schedules and reduce energy waste. Schedules have been implemented as these units are retrofitted, resulting in substantial Energy Savings. A total of 185 out of 373 Fan Coils & VAV boxes have been retrofitted, of which 44 were completed this past Fiscal Year 2018.
6. Control Optimization for terminal units in building 3006- Medical Education Building, in order to implement occupied/ un-occupied schedules and reduce energy waste. Schedules have been implemented as these units are retrofitted, resulting in substantial Energy Savings. A total of 34 out of 242 terminal units have been retrofitted.
7. Rooftop Replacement for building 3003- Administrative Support Building was retrofitted with 5 new rooftop units which are more efficient and also, have new controls which allow for better “Economizer Mode” operation.
8. A Demand Limiting strategy was implemented in building 3005- Medical Science Building, which allows to control the building’s electric demand during peak hours and thus helps in reducing the “ratchet” from El Paso Electric Co.(utility provider), which will be used in FY19 for demand charges purposes.

9. With the implementation of the Demand Limiting strategy in building 3005- MSBI, a reduction in electric consumption has also been achieved. Electric Sub-metering was implemented in the main switchgear, and in each chiller (3) in order to achieve this goal.
10. Installed a steam condensate recovery system for building 3005- Medical Science Building to reduce both water and gas consumption.
11. Implemented Smart Thermostats (Nest and Ecobee) for remote buildings to have better control of the HVAC Systems.
12. Performed an optimization of the Boiler's control sequencing for building 3006- Medical Education Building.
13. Performed an optimization of the Chiller's control sequencing for building 3010- School of Nursing Building.
14. All new construction and existing building renovations meet applicable energy code.

Exhibit E
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. Continue the re-commissioning of 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 and areas with high occupancy variation like laboratories and classrooms where lighting schedules can be implemented to reduce Energy consumption.
7. Implementation of a heat load mapping system to have better control of each zone of each building and thus have better control of the lighting and HVAC systems.
8. Continue the implementation of Electric Sub metering throughout the campus to better identify energy deficiencies and future projects.
9. Implementation of a campus-wide smart irrigation system.
10. Continue with the implementation of “Smart” thermostats in remote buildings.
11. Installation of pressure independent control valves for chilled water flow control for the air handlers in major 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. Continue to retrofit automatic controls for HVAC Equipment as necessary.
15. Implementation of modulating burners for the boilers at building 3000- Academic & Education Center building.
16. Energy Management System continuous upgrades to allow better monitoring and control of Mechanical Equipment and Lighting.
17. Installation of a Run-around-loop heat recovery system in building 3005- Medical Science Building I in the main Air handlers and Exhaust systems.
18. Installation of Variable Frequency Drives for the Laboratory Exhaust Fans in building 3005- Medical Science Building I.
19. Continue with the controls retrofit of Fan Coils in building 3001- Clinical Science Building.
20. Continue with the controls retrofit of Fan Coils in building 3006- Medical Education Building.

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 F
Gasoline consumption for TTUHSCEP

FISCAL YEAR	GASOLINE CONSUMPTION (GALONS)	GASOLINE COST (\$)	MILES DRIVEN (MILES)	FUEL EFFICIENCY (MILES/GALON)
FY'18	14,751	\$39,087	154,479	10.47
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

Exhibit G
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.