

October 15, 2017

Office of the Governor
1100 San Jacinto
Austin, Texas 78701

Mrs. Ursula Parks, Director
Legislative Budget Board (LBB)
Robert E. Johnson Bldg. – 5th Floor
1501 North Congress
Austin, Texas 78701

RE: Annual Energy Report, FY2017

The Texas Tech University Health Sciences Center (TTUHSC) Annual Energy Report for FY2017 is being submitted in accordance with Governor's Executive Order # RP 49. TTUHSC Physical Plant continues to promote energy conservation measures and strategies and seeks new ideas to reduce consumption and improve building system efficiencies.

A. Energy Consumption & Cost

In FY2017, the institution consumed 473,651,710 kBtu. FY2017 energy utilization index (EUI) is 215 kBtu/gsf, which decreased by 3.5% compared to FY2016. FY2017 energy cost index (ECI) is \$2.77/gsf, which increased by 3.25% compared to FY2016. The gross area (gsf) of the institution in FY2017 has increased by 3.25% as compared to FY2016. Heating Degree Days (HDD) for FY2017 has decreased by 10% as compared to FY2016, and Cooling Degree Days (CDD) for FY2017 has decreased by 10% as compared to FY2016.

TTUHSC continues to undergo capital and system improvements, increase in overall occupancy and steady program growth, which are generally expected to increase the overall energy consumption. Attached Exhibit 'A' shows FY2017 energy consumption and cost breakdowns. It includes FY2016 energy consumption, cost, and energy equivalents to facilitate comparison between annual totals. Exhibit 'B' shows a benchmarking report for comparison of energy index (EUI & ECI) values of TTUHSC from FY2012 to FY2017, with the median index value range of health related institutions in Texas.





B. Energy Conservation Plan & Action

TTUHSC Engineering Services Department maintains specific operating policies and procedures relating to the energy conservation program and utility review. Operating policies and procedures make the responsibility of energy conservation the obligation of every employee.

TTUHSC Engineering Services has identified several projects for potential consideration in reducing the campus energy consumption. Projects were prioritized based on a variety of factors including life-cycle (age), return on investment, and available resources. Projects that were implemented in the past were listed in the previous annual reports. Below is a partial list and status of projects that were completed in FY2017 or are currently being designed and/or implemented.

1. Replacement of air handling units (AHUs) which are inefficient and beyond their expected service life. Three projects were completed in the Lubbock HSC building. The new AHUs have direct digital controls (DDC), pressure independent valves, steam heating, and fanwall type systems.
2. Four air handling units in the Lubbock HSC building are being refurbished/retrofitted with direct digital controls (DDC), pressure independent valves, steam heating, and fanwall type systems, and are expected to be completed in FY2018.
3. Completed the installation of (27) 350W LED outdoor parking lot fixtures, and more than 2,000 LED T8 tubes at various indoor locations. LED retrofits reduce electricity consumption, improve lighting quality, and provide better illumination.
4. Planned replacement of chillers with HCFC refrigerants (R-22) to comply with evolving federal regulations. One of the chillers in Amarillo was replaced in FY2017 and two chillers in Odessa are in the plan to be replaced with new chillers with zero (0) Ozone Depletion Potential (ODP) refrigerants in FY2018.
5. We procure electricity thru existing contracts for the buildings in Lubbock, Permian Basin and Abilene campuses. XCEL Energy provides electricity to serve buildings at the Amarillo campus. ATMOS provides natural gas to all our campuses.
6. Verification of equipment performance, building automation system logic, air flow properties of buildings in Amarillo and Abilene locations. We optimize control parameters to reduce energy consumption and improve equipment performance.
7. Texas A&M Energy Systems Laboratory will conduct an initial assessment and simulation analysis of the Lubbock HSC building to identify energy savings opportunities.





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8. Provide technical support for operational troubleshooting, and building renovations/alterations projects.
9. Provide project support for the design and construction of new buildings at Odessa and Lubbock campuses, to ensure compliance with applicable engineering principles, practices, and codes/ standards.
10. The pneumatic control systems for the air handling units at the Library building were replaced with DDC systems. The overall project payback period was essentially one year.
11. Installation of occupancy sensors for automatic lighting control. Project is being implemented through new construction and renovation projects.
12. Replacement of inefficient equipment motors with premium efficiency motors. Motors are being replaced at the end of their service life.
13. TTUHSC Physical Plant's policy is to use F28T8 lamps for office/laboratory/classroom and other such areas, and F25T8 lamps for hallways/restrooms and other areas which need less illumination. This is being done to comply with the lighting power density requirements of the state energy code. Project is being implemented through maintenance and facility renovations.
14. Provide project support for selection/specification of LED lighting in all our new buildings, which are in design phase. New energy efficient LED lights are being tested for performance and reliability.

C. Future Energy Reduction Plans

TTUHSC Engineering Services is involved in continuous improvement of mechanical and electrical systems. Old, inefficient, and pneumatically controlled air handling units and terminal units are being replaced/ or refurbished with newer units and DDC systems. Chillers, Boilers, Pumps, Motors, which are nearing the end of expected service life, are being replaced with modern efficient equipment. A comprehensive list of energy reduction projects is included in the 'Energy & Water Management Plan'.

D. Fuel Consumption Reduction Plans

TTUHSC continues to emphasize fuel conservation awareness with strategies such as group travel, and regular preventive maintenance to gain economies. FY2017 total fuel consumption has increased by 12.5% as compared to FY2016. TTUHSC has several remote regional campuses in West Texas, which require employees to drive to those locations frequently.





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Fuel (gasoline/propane/diesel) Data:

FY17 Consumption	FY17 Cost	FY16 Consumption	FY16 Cost
31,321 Gallons	\$ 64,867	27,851 Gallons	\$ 52,087

The total miles driven in FY2017 has increased by 9% as compared to FY2016.

Your consideration of this update and information is appreciated.

Sincerely,

Gregory Lovett

Gregory D. Lovett, P.E.
Interim Assistant Vice President Physical Plant & Support Services

Attachment: EXHIBITs 'A' & 'B'

XC: Penny Harkey, Vice President and Chief Financial Officer
TTUHSC Finance & Administration

Director, State Energy Conservation Office
111 E. 17th Street, Suite 1118, Austin, Texas 78774

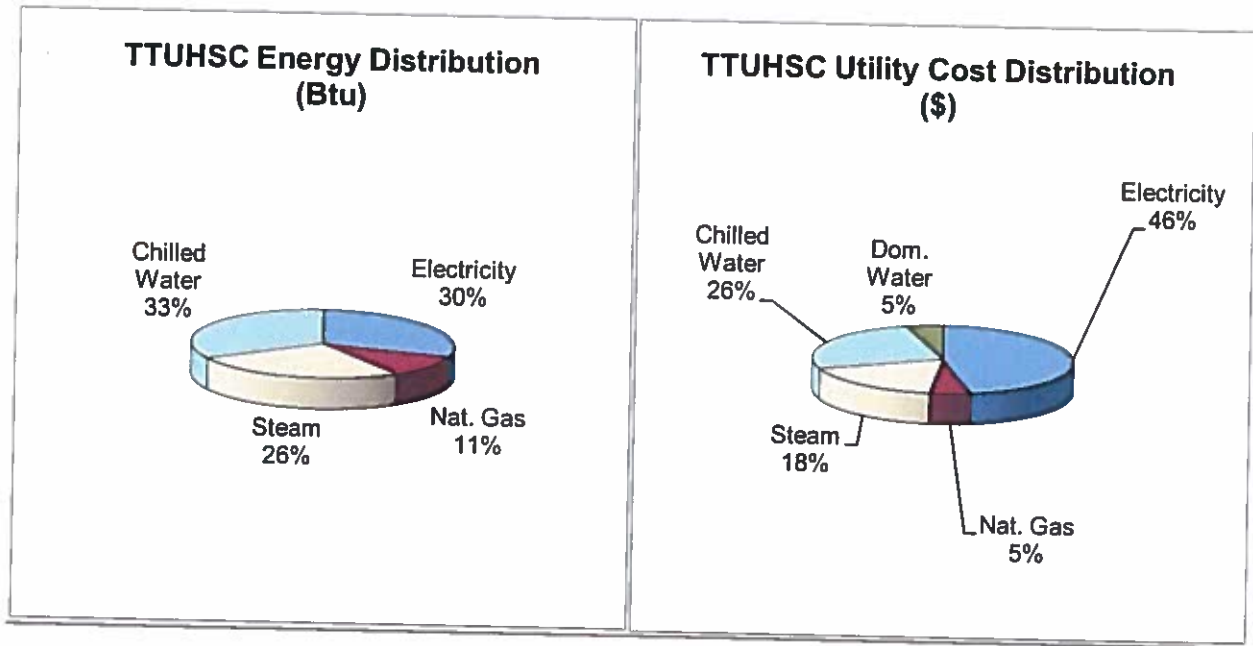




EXHIBIT 'A'

ANNUAL ENERGY CONSUMPTION AND COST				
ENERGY	CONSUMPTION		COST	
TYPE	FY 2017	FY 2016	FY 2017	FY 2016
ELECTRICITY, kWh	43,308,534	42,283,154	\$ 2,974,940	\$ 2,647,121
NATURAL GAS*, ccf	520,003	471,288	\$ 327,562	\$ 244,503
STEAM, Mlb	115,464	120,542	\$ 1,139,418	\$ 1,187,305
CHILLED WATER, Ton-hr	13,341,958	13,810,371	\$ 1,663,418	\$ 1,655,247
TOTAL ENERGY (kBtu), COST (\$)	473,651,710	475,788,294	\$ 6,105,338	\$ 5,734,176

Note*: Natural Gas is used to produce the Thermal Energies of Steam and Chilled Water



Note: The annual water consumption intensity for the institution is 24 Gal/sf, which is within the limits of SECO (State Energy Conservation Office) water conservation guidelines.





EXHIBIT 'B'
(ENERGY BENCHMARKING REPORT)

Institution	Energy Utilization Index (EUI) in kBtu/gsf	Energy Cost Index (ECI) in \$/gsf
Texas Tech Univ Health Sciences Center (FY-17)	215	\$2.77
Texas Tech Univ Health Sciences Center (FY-16)	223	\$2.68
Texas Tech Univ Health Sciences Center (FY-15)	225	\$2.97
Texas Tech Univ Health Sciences Center (FY-14)	236	\$3.06
Texas Tech Univ Health Sciences Center (FY-13)	236	\$2.83
Texas Tech Univ Health Sciences Center (FY-12)	252	\$2.90
Health Related Institutions in Texas (Median)	289	\$3.90
TTUHSC Energy Management Plan Target	< 240	< \$3.20

Notes:

1. EUI can increase significantly with more research and hospital space type, occupancy density, year of construction, heating and cooling degree days, building plug loads etc.
2. ECI can vary significantly with the local utility cost.
3. CLEAResult, 4301 Westbank Drive, Austin, TX 78746, provided the median EUI and ECI of HRIs in Texas for years 2011 & 2012.

