



October 1, 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
1501 North Congress
Austin, Texas 78701

RE: Annual Energy Report, FY2018

The Texas Tech University Health Sciences Center (TTUHSC) Annual Energy Report for FY2018 is being submitted in accordance with Governor's Executive Order # RP49. TTUHSC Facilities & Safety Services 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 FY2018, the institution consumed 471,006,151 kBtu. FY2018 energy utilization index (EUI) is 212 kBtu/gsf, which decreased by 1.5% compared to FY2017. FY2018 energy cost index (ECI) is \$2.71/gsf, which decreased by 2.24% compared to FY2017. The gross area (gsf) of the institution in FY2018 has increased by 1% as compared to FY2017. In FY2018, the weighted average Heating Degree Days (HDD) and Cooling Degree Days (CDD) were 2,987 and 2,474, as compared to 2,512 and 2,005 respectively in FY2017.

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 FY2018 energy consumption and cost breakdowns. It includes FY2017 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 FY2014 to FY2018, with the target values of the energy management plan, and the average values of health related institutions in Texas.





B. Energy Conservation Plan & Action

TTUHSC Facilities maintain 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 Facilities 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. Below is a partial list and status of projects that were completed in FY2018, or are currently being designed and/or implemented.

1. HSC Facilities completed projects to refurbish four air handling units in the Lubbock HSC building with direct digital controls (DDC), chilled water coils with pressure independent valves, steam heating, and fanwall type systems.
2. HSC Facilities completed projects to retrofit four air handling units in the Lubbock HSC building, with JCI direct digital controls (DDC).
3. HSC Facilities personnel have completed the installation of 64 LED fixtures on the outdoor parking lot poles, and a significant number of 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. Two chillers in the Odessa Clinic building are being replaced with new chillers with zero (0) Ozone Depletion Potential (ODP) refrigerants. The project is expected to be completed by the end of December' 2018.
5. TTUHSC procures electricity thru the utility 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. Utility contracts provide cost guarantee, irrespective of market fluctuations.
6. HSC Facilities prepared 'Energy Guidelines' for all new construction and renovation projects. It's in the process of being integrated to the TTUHSC Design Standards.
7. Texas A&M Energy Systems Laboratory conducted energy assessment and simulation studies of the HVAC systems and energy consumption of the Lubbock HSC building. They provided a report showing potential energy savings by replacing air terminal boxes with new DDC controlled variable volume boxes. Accordingly, TTUHSC Facilities has plan to replace or retrofit terminal units on a continuous basis.





8. TTUHSC Facilities 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. All new construction projects are designed to have energy efficient HVAC systems, LED lighting with controls, variable drive screw or scroll chillers, condensing boilers, and building automation system.
9. The pneumatic control systems for the air handling units in the Library building were replaced with the DDC systems. The DDC controls reduced energy consumption for the second consecutive year.
10. HSC Facilities monitor energy consumption on a monthly basis to identify deficiencies. Several defective equipment and controls were identified and corrected.
11. All TTUHSC buildings use integrated building automation system and control to monitor, schedule mechanical and electrical equipment operations.
12. It's the HSC Facilities operating practice to use premium efficient motors to replace existing motors at the end of their service life.
13. TTUHSC Facilities plan to use dimmable LED troffers for office/laboratory/classroom and other such areas, and LED T8 lamps for hallways/restrooms and other areas which are not continuously occupied. This is being done to reduce energy consumption, improve lighting quality, and better illumination. This is being implemented through maintenance activities, and facility renovations.

C. Future Energy Reduction Plans

TTUHSC Facilities is involved in continuous performance 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 newer 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. TTUHSC has several remote regional campuses in Texas, which require employees to drive to those locations frequently.





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Fuel (gasoline/propane/diesel) Data:

FY18 Consumption	FY18 Cost	FY17 Consumption	FY17 Cost
34,881 Gallons	\$ 86,880	31,321 Gallons	\$ 64,867

The total miles driven in FY2018 has increased by 14% as compared to FY2017.

Your consideration of this update and information is appreciated.

Sincerely,

Harry F. Slife, Jr.

Harry F. Slife, Jr., PhD.
Vice President, Facilities & Safety Services

Attachment: EXHIBITs ‘A’ & ‘B’

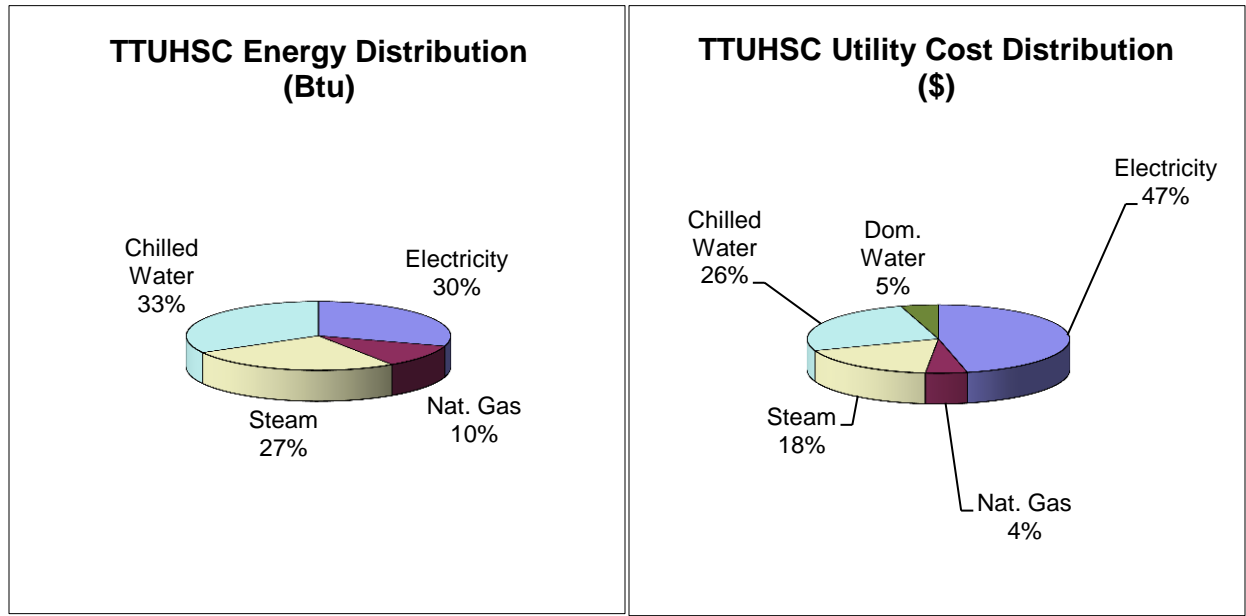
XC: Penny Harkey, Vice President and Chief Financial Officer
TTUHSC Finance & Administration



EXHIBIT ‘A’

ANNUAL ENERGY CONSUMPTION AND COST				
ENERGY	CONSUMPTION		COST	
TYPE	FY 2018	FY 2017	FY 2018	FY 2017
ELECTRICITY, kWh	43,573,547	43,308,534	\$ 2,962,574	\$ 2,974,940
NATURAL GAS, ccf	500,034	520,003	\$ 282,988	\$ 327,562
STEAM, Mlb	117,278	115,464	\$ 1,123,743	\$ 1,139,418
CHILLED WATER, Ton-hr	13,831,158	13,341,958	\$ 1,655,018	\$ 1,663,418
TOTAL ENERGY (kBtu), COST (\$)	471,006,151	473,651,710	\$ 6,024,323	\$ 6,105,338

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-18)	212	\$2.71
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
Health Related Institutions in Texas (FY-16/17 Avg.)*	262	< \$3.75
TTUHSC Energy Management Plan Target	< 250	< \$3.20

Notes:

1. EUI can increase significantly with more research and hospital space type, occupancy density, year of construction, weather etc.

2. ECI can vary significantly with the local utility cost.

* The average EUI of HRIs in Texas for years 2016 & 2017, is obtained from SECO/ Texas website.

