

## Texas Tech University Energy Savings Program FY 2014 Update

The Texas Tech Energy Savings Update is being submitted in accordance with Governor's Executive Order RP-49, Energy Conservation by State Agencies and Health and Safety Code, § 388.005(f).

### A. Energy Goals

#### 1. University Energy Use

Energy units are converted to thousands of BTUs per square foot (kbtu/ft<sup>2</sup>) to allow for comparisons of the various energy forms. Goals and energy use are therefore stated in kbtu/ft<sup>2</sup>. Estimated savings are measured against energy consumption for the prior fiscal year.

Through FY14, the campus consumed 153.04 kbtu/ft<sup>2</sup>, a decrease of 3.66 kbtu/ft<sup>2</sup> (-2.3%) compared to the previous year.

Cogeneration steam, provided *at no cost* to the university by a local utility company, is tabulated in the balance of university energy use, but no dollar savings are reported on the cogeneration line since they would be realized as a reduction of natural gas use. During FY14, free cogeneration steam saved the University \$445,121. However, this number is down from \$847,589 in FY13 because the cogeneration plant was down the second half of FY14. For this reason, we experienced a net increase in energy costs for FY14 of \$93,300, even though total energy use has declined by 2.3%.

In Table I, the campus energy use is broken down by utility type.

**Table I: University Energy Use (kbtu/ft<sup>2</sup>):** **September '13 – August '14**

Utility	FY13 Actual	FY14 Actual	% Change from previous year	Estimated (Costs) / Savings
Electricity	56.96	55.17	Down 3.2%	\$292,044
Natural Gas	72.90	85.28	Up 17%	\$(385,344)
Cogeneration Steam	26.83	12.59	Down 53.1%	NA
<b>Total</b>	<b>156.70</b>	<b>153.04</b>	<b>Down 2.3%</b>	<b>(\$93,300)</b>

#### 2. House Bill 3693, Regular Session, 2007

In compliance with House Bill 3693, Texas Tech University has set a goal to reduce total electrical consumption by 2.5% for FY14. Table II shows the kilowatt hours per square foot (kwh/ft<sup>2</sup>) for the campus in Lubbock County.

For FY14, electrical consumption is 16.0574 kwh/ft<sup>2</sup> for the year and is down 5.1% compared to FY13 (16.9290 kwh/ft<sup>2</sup> for the year).

**Table II: Campus Electricity Use (kwh/ft<sup>2</sup>):** **September '13 – August '14**  
(Lubbock County)

Whole Campus Electricity Use in kwh/ft <sup>2</sup>	FY 13 Reference Data in kwh/ft <sup>2</sup>	2.5% Reduction Goal in kwh/ft <sup>2</sup>	FY 14 Actual Consumption in kwh/ft <sup>2</sup>	Percent Increase/Decrease from previous year, by quarter
1 <sup>st</sup> Quarter	4.4623	4.3508	4.0929	Down 8.3%
2 <sup>nd</sup> Quarter	4.0933	3.9910	3.9027	Down 4.7%
3 <sup>rd</sup> Quarter	4.1403	4.0368	3.9962	Down 3.5%
4 <sup>th</sup> Quarter	4.2331	4.1273	4.0656	Down 4%
Yearly Total	16.9290	16.5059	16.0574	Down 5.1%

### 3. Fleet Fuel Management Plan (Vehicles)

Texas Tech University set a goal to reduce its consumption of gasoline by 12,225 gallons for Fiscal Year 2014 (a 5% reduction).

In FY14, Texas Tech vehicles consumed 300 more gallons than in FY13. However, fleet size increased by 5 vehicles during that same time period.

**Table III: University Fleet Gas Consumption** **September '13 – August '14**

	FY13 Gallons Consumed	FY14 Goal (5% Decline)	FY14 Gallons Consumed	Percent Change
1 <sup>st</sup> Quarter	60,885	57,841	66,916	Up 9.9%
2 <sup>nd</sup> Quarter	50,410	47,890	51,950	Up 3.1%
3 <sup>rd</sup> Quarter	66,792	63,452	63,842	Down 4.4%
4 <sup>th</sup> Quarter	63,515	60,339	59,230	Down 6.7%
Total	241,602	229,522	241,938	Up 0.14%

Table IV below compares the percent change of gas used to percent change in fleet size for FY 13 and FY 14. It illustrates that a 1.08% increase in fleet size (5 vehicles) is responsible for only a 0.14% increase in fuel used for the year (300 gallons).

**Table IV: Fleet Size and Percent Change in Gas Used vs. Percent Change in Fleet Size**

	FY 2012	FY 2013	FY 2014
Fleet Size	461	460	465
Fleet Size Change % from Previous Year		-0.22%	1.08%
Gas Consumption Change % from Previous Year		-1.20%	0.14%

## **B. Energy Reduction Measures**

### **1. Educational and General Space**

- a) Free Cooling Project at Central Heating and Cooling Plant #1 – The Water Side Economizer was upgraded with additional plates this fall and has provided over 4,870,312 ton-hours of free cooling this fiscal year, an estimated savings of \$134,975.
- b) Recommissioned air handling units in five buildings: Electrical Engineering, Mechanical Engineering, Civil Engineering, Industrial Engineering, and Human Sciences.
- c) Continued installing BTU meters on chilled water systems in thirteen buildings.
- d) Tuned air handling units in Holden Hall.
- e) Replaced thirty three pedestrian lamps northwest of Murray Hall with LED lamps.
- f) Installing lighting controls in the new Petroleum Engineering building.
- g) Installed lighting controls in the Civil Engineering building.
- h) Implemented a web-based front end with a 3rd party performance contract for continuous analysis of the utility plant control systems to optimize energy performance of Central Heating and Cooling Plants #1 and #2.
- i) Installed LED lights in ten elevators.
- j) Installed Variable Frequency Drives (VFDs) on three cooling tower pumps at Central Heating and Cooling Plant #1, saving \$155,602 annually with a ROI of 0.7 year.
- k) Installed VFDs on two cooling tower pumps at Central Heating and Cooling Plant #2, saving \$217,970 annually with a ROI of 1.1 years.

### **2. Auxiliary Space**

- a) Audited Housing facilities and prepared scope of work for retuning air handlers which would save over \$400,000 if implemented.
- b) Audited the Robert Ewalt Student Recreation Center, prepared a scope of work, and retuned air handlers for an annual savings of \$120,000.
- c) Audited building Reese 555 at the director's request. Optimized air handler schedules. Identified an installation flaw in the floor tiles of a high performance

computing data center and designed a correction. Projected savings of \$67,000 annual will be harvested at no cost to the university.

### **3. Energy Audits**

In FY14, Texas Tech completed six detailed energy audits at Foreign Language, Chemical Engineering, Livermore College of Engineering, United Spirit Arena, Wiggins, and Reese Building 555.

## **C. Energy Reduction Plans and Feasibility Studies**

Texas Tech is currently planning energy conservation measures such as:

- HVAC recommissioning and controls upgrades: Library, Biology, Administration, Science, Math, Animal Science, Architecture, Drane Hall and Foreign Language.
- Upgrading and integrating metering systems for electricity, heating, cooling and water.
- Retrofitting some AHUs to “Texas Multi-Zone” design.
- Lighting audits and control upgrades for Chemistry, Library, Animal Science, Media and Communications, Biology, Architecture, Education, Music, Administration, Science, Drane Hall, Reese 555, English/Philosophy, and United Spirit Arena.
- Provide dedicated cooling for certain laboratories and server rooms to reduce the load on the whole-building systems: Science 326, Math 08, and Media and Communications 1217.
- Infra-red analysis of building envelopes.
- Perform 12 energy audits each year to include both E&G and Auxiliary facilities.

Responses will be based on feasibility, available funding and favorable payback.

## **D. Fuel Consumption Reduction Plans**

The Vehicle Fleet Management office will network with vehicle custodians to exchange information on vehicle efficiency and solicit additional best practices and other preferred initiatives for the university vehicle fleet.

The Vehicle Fleet Office will facilitate an analysis of fleet usage within the Operations Division and recommend best practices for future purchases.