Texas Tech University Energy Savings Program
FY 2015 Update

The Texas Tech Energy Savings Program 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^2) to allow for comparisons of the various energy forms. Goals and energy use are therefore stated in kbtu/ft^2. Estimated savings are measured against energy consumption for the prior fiscal year.

Only 15 kbtu of cogeneration steam were produced this year. Per square foot, the number is unreportable and effectively renders zero in this report. While our energy analysis always accounts for free steam in our energy use index (EUI), the financial impact this year reduces our savings by $460,510 versus the previous year, and by $892,265 versus FY13. Hence, we show a dollar savings of only $4,966 for this year even though we achieved a record energy reduction.

For FY15, the campus consumed 152.17 kbtu/ft^2, a decrease of 8.82 kbtu/ft^2 (-5.5%) from the previous year. Our goal was to reduce energy use by only 2.5 kbtu/ft^2. Though we exceeded this goal significantly, the stated goal (150.5 kbtu/ft^2) had been miscalculated due an error in one sub-classification of gas readings. The error is methodological and goes back 15 years. Correcting it affects only the natural gas line and shifts our entire EUI curve up about 8 points, but does not affect any previously reported energy savings. To prepare this report, we adjusted the natural gas line for FY14 and FY15. We will follow this revised methodology in all future reports.

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

Table I: University Energy Use (kbtu/ft^2): September '14 – August '15

Utility	FY14 Actual	FY15 Actual	% Change from previous year	Estimated Savings
Electricity	55.17	54.12	Down 1.9%	$ 192,840
Natural Gas	93.23	98.05	Up 5.2%	$ (187,874)
Cogeneration Steam	12.59	0.00	Down 100%	NA
Total	160.99	152.17	Down 5.5%	$4,966

2. House Bill 3693, Regular Session, 2007

In compliance with House Bill 3693, Texas Tech University had set a goal to reduce total electrical consumption by 2.5% for FY15. Table II shows the kilowatt hours per square foot (kwh/ft^2) for the campus in Lubbock County.

For FY15, electrical consumption is 15.9706 kwh/ft^2 for the year and is down 0.5% compared to FY14 (16.0574 kwh/ft^2 for the year).

Table II: Campus Electricity Use (kwh/ft^2): September '14 – August '15 (Lubbock County)

Whole Campus Electricity Use in kwh/ft2	FY 14 Reference Data in kwh/ft^2	2.5% Reduction Goal in kwh/ft^2	FY 14 Actual Consumption in kwh/ft^2	Percent Increase/Decrease from previous year, by quarter
1st Quarter	4.0929	3.9905	3.9742	Down 2.9%
2nd Quarter	3.9027	3.8051	3.9882	Up 2.2%
3rd Quarter	3.9962	3.8963	3.8597	Down 3.4%
4th Quarter	4.0656	3.9640	4.1487	Up 2%
Yearly Total	16.0574	15.6560	15.9706	Down 0.5%

3. Fleet Fuel Management Plan (Vehicles)

Texas Tech University had determined to reduce its consumption of gasoline by 12,296 gallons for Fiscal Year 2015 (a 5% reduction).

In FY15, Texas Tech vehicles saved 13,694 gallons versus FY14. However, fleet size increased by 12 vehicles during the same period.

Table III: Historical University Vehicle Fleet Data September '14 – August '15

	FY14 Gallons Consumed	FY15 Goal (5% Decline)	FY15 Gallons Consumed	Percent Change
1st Quarter	66,916	63,570	61,090	Down 9.5%
2nd Quarter	51,950	49,352	46,942	Down 10.7%
3rd Quarter	63,842	60,650	57,380	Down 11.3%
4th Quarter	59,230	56,268	62,832	Up 5.7 %
Total	241,938	229,840	228,244	Down 6.0%

Table IV below compares the percent change of gas used to percent change in fleet size for FY 14 and FY 15. It indicates a 2.5% increase in fleet size (12 vehicles). Gas consumption has decreased 6.0% in fuel used for the year.

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

	FY 2013	FY 2014	FY 2015
Fleet Size	460	465	477
Fleet Size Change % from Previous Year		1.08%	2.5%
Gas Consumption Change % from Previous Year		0.14%	-6.0%

4. Water Conservation (Thousand Gallons)

For FY15, water consumption was 274,763 thousand gallons and is down 11.6 % compared to FY14 (310,862 thousand gallons).

Table V: University Water Use (Thousand Gallons):

Utility	FY14 Actual	FY15 Actual	% Change from previous year	Estimated Savings
Domestic water	285,865	257,513	Down 9.9%	$28,352
Irrigation water	24,997	17,250	Down 31%	$7,747
Yearly Total	310,862	274,763	Down 11.6%	$36,099

B. Energy Reduction Measures

1. Educational and General Space

a) Free Cooling Project at Central Heating and Cooling Plant #1 – The Water Side Economizer provided over 3,912,254 ton-hours of free cooling this fiscal year, an estimated savings of $94,446.

b) Audited Biology building fume hoods.

c) The eSight Energy Analysis System is up and running with 15 chilled water meters and 2 electrical meters. eSight has already identified energy savings through repair of several malfunctions. Operations Division is actively integrating other existing campus meters.

d) Installed antenna for exterior lighting controls software. This system is now in control of three parking lots.

e) Recently validated $249,600 in savings over the past two years since we implemented a web-based front end with a 3rd party performance contract for continuous analysis of the central heating and cooling plant systems.

f) Installed LED lights in three elevators this year for a total of 13 campus-wide.

g) Installed dedicated cooling unit for server room in the Math building. Estimated savings is $10,000 per year.

h) Identified improperly programmed cooling set-points at Rawls College of Business Administration which caused the air handlers to run 24/7. Estimated savings is $116,000.

i) Recommissioned air handling units and upgraded controls in the Science building.

j) Installed HVAC controls in the Creative Movement Studio building.

2. Auxiliary Space

a) Corrected a chilled water bypass malfunction at Chitwood Hall, a residence hall. Analysis validated a reduction in chilled water cost from about $100,000 annually to less than $9,000.

b) Tuned controls for air handlers and chilled water pumps at the Robert Ewalt Student Recreation Center. Savings are still being validated.

3. Energy Audits

In FY15, Texas Tech completed energy audits at Burkhart Center and the Student Recreation Center to collect data for continuing energy analysis. Findings in Student Recreation Center resulted in commitment of additional funds for the above tuning project.

C. Energy Reduction Plans and Feasibility Studies

Texas Tech is currently planning energy efficiency measures such as:

- HVAC recommissioning and controls upgrades at Student Union, Biology, Music, Library, and residence halls: Wall Hall, Gates Hall, and Chitwood Hall.
- Upgrading metering systems for electricity, heating, cooling, and domestic water, and integrating them into eSight energy analysis system.
- Provide dedicated cooling for Science 326 to reduce the load on the whole-building systems. Estimated savings of $17,000
- Provide dedicated cooling for Media and Communications 1217 to reduce the load on the whole-building systems. Estimated savings of $52,000.

D. Fuel Consumption Reduction Plans

The Central Warehouse dedicated a driver and delivery vehicle to serve the whole Operations Division, thereby minimizing the number of campus runs. Savings are being validated.

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.

E. Water Management Plan

Operations Division will develop a historical analysis of water efficiency and devise a long term water conservation strategy to include both domestic water and irrigation water. We are currently installing irrigation meters for this purpose. The new irrigation meters and existing domestic water meters will be integrated into the eSight energy analysis system.