

## Texas Tech University Energy Savings Program October 2010 Update

The Texas Tech Energy Savings Update is being submitted in accordance with Governor's Executive Order RP 49, Electric Conservation by State Agencies.

### A. Energy Goals

#### 1. Campus Energy Use (E&G)

Energy units are converted to thousands of BTUs per square foot (kbtu/sq ft) to allow for comparisons of the various energy forms. Goals and energy use are therefore stated in kbtu/sq ft. Estimated savings are based on energy consumption for the same time period from the previous year normalized to current energy costs and campus square footage.

For FY10 the campus consumed 175.21 kbtu/sq ft, a decrease of 3.9% compared to the same period for FY09.

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

**Table I: Campus (E&G) Energy Use (kbtu/sq ft): September '09 – August '10**

Utility	FY09 Actual	FY10 Actual	% Change from previous year	Estimated Savings
Electricity	49.11	48.27	Down 1.7%	\$ 91,300
Natural Gas	17.26	16.01	Down 7.2%	\$ 34,540
Steam	54.88	50.97	Down 7.1%	\$ 278,150
Chillwater	61.16	59.96	Down 2.0%	\$ 102,960
<b>Total</b>	<b>182.41</b>	<b>175.21</b>	<b>Down 3.9%</b>	<b>\$ 506,950</b>

Since RP 49 first went into effect for the State of Texas, Texas Tech University has reported the above Campus Energy Use data (Table I) for only E&G buildings. In complying with both RP 49 and HB 3693, and in order to maintain continuity with previous reporting practices, Texas Tech will continue to report E&G.

## 2. House Bill 3693

In compliance with House Bill 3693, Texas Tech University has set a goal to reduce total electrical consumption by 2.5% for FY10. Table II shows the kilowatt hours per square foot (kwh/sq ft) for the whole campus, i.e. both E&G buildings and Auxiliaries.

For FY10, cumulative electrical consumption is 15.5852 kwh/sq ft. This consumption is up 3.0% compared to FY09 (15.1357 kwh/sq ft).

Electricity use at Central Heating and Cooling Plant #1 is down 20% (from total plant use), due in large part to the Chilled Water Pump VFD Retrofit Project. While E&G electricity use is down 1.7%, Auxiliary use has increased 17% for the 4<sup>th</sup> quarter of FY 10, resulting in an increase of 3.0% for the campus as a whole.

**Table II: Whole Campus Electricity Use (kwh/sq ft): September '09 – August '10**

<b>Whole Campus Electricity Use in kwh/sq ft</b>	<b>FY 09 Reference Data in kwh/sq ft</b>	<b>2.5% Reduction Goal in kwh/sq ft</b>	<b>FY 10 Actual Consumption in kwh/sq ft</b>	<b>Percent Increase/Decrease from previous year, by quarter</b>
<b>1<sup>st</sup> Quarter</b>	3.8474	3.7513	3.8525	0.1%
<b>2<sup>nd</sup> Quarter</b>	3.6610	3.5695	3.6469	-0.4%
<b>3<sup>rd</sup> Quarter</b>	3.6430	3.5519	3.8654	6.1%
<b>4<sup>th</sup> Quarter</b>	3.9849	3.8853	4.2204	5.9%
<b>Yearly Total</b>	15.1357	14.7573	15.5852	3.0%

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

In FY06, Governor Perry’s Executive Order RP-49 required agencies to establish an energy conservation program by setting a percentage goal for reducing its consumption of electricity, gasoline and natural gas.

As a result of that order, Texas Tech University established the following goals related to vehicles:

- Reduce fuel consumption by 5% per year
- Maintain an average miles per gallon of 12.4

In the fourth quarter of FY10, Texas Tech vehicles averaged 11.4 miles per gallon. These figures represent an increase of 0.1 miles per gallon compared to the same quarter of the previous year, and a shortfall of 0.5 from our intended goal.

**Table III: Historical University Vehicle Fleet Data: September ‘09 – August ‘10**

	<b>FY09 MPG</b>	<b>5% Improvement Goal</b>	<b>FY10 MPG</b>	<b>Variance from Goal</b>
<b>1<sup>st</sup> Quarter</b>	11.6	12.2	12.5	+0.3
<b>2<sup>nd</sup> Quarter</b>	11.4	12.0	11.0	-1.0
<b>3<sup>rd</sup> Quarter</b>	12.0	12.6	11.9	-0.7
<b>4<sup>th</sup> Quarter</b>	11.3	11.9	11.4	-0.5
<b>Yearly Average</b>	11.6	12.2	11.7	-0.62

#### B. Current Energy Reduction Plans

##### 1. Campus Energy Use

###### a. E&G

- 1) VFD retrofit for Chilled Water Pumps at CHACP 1 -- \$125,178 with a 1.2 year payback. The new equipment was installed during the past year but came online at the beginning of this fiscal year. Texas Tech has now received enough data to validate the success of this project. We estimate the payback is already complete after only eight months.

- 2) VFD retrofits for campus chilled water pumps – One chillwater pump was identified to have a payback of less than 5 years. Project was completed in-house by Building Maintenance and Construction.
- 3) VFD retrofits for campus hot water pumps – Two hot water pumps were identified to have a payback of less than 5 years. Project was completed in-house by Building Maintenance and Construction.
- 4) Free Cooling Study at CHACP 1 – Texas Tech is evaluating the possibility of retrofitting at least one of our chillers at CHACP 1 to recover free cooling during cool weather. Texas Tech will pursue outside funding or opt to fund in-house depending on cost estimates and the results of this study. Initial calculations suggest a payback in less than three years.

**b. Auxiliaries**

Housing is studying applications for LED exterior lighting on campus.

**c. Energy Audits**

The university has a goal to perform a minimum of 2 detailed energy audits per month beginning with the largest consumers of energy.

This quarter, Texas Tech completed 6 detailed energy audits at Education, Southwest Collections, Ag Science, Music, Electrical Engineering and Chemical Engineering; and 1 energy management work order for various items to improve operating efficiencies.

**2. Fleet Management**

The Texas Tech University tactics to achieve this goal is:

- 1) Improve overall fuel efficiency of fleet vehicles by replacing older, inefficient vehicles with newer, more efficient vehicles.

Texas Tech University has acquired 173 new, more efficient vehicles, as well as increased our alternative utility vehicles by approximately 22% since the Governor's executive order.

**Our vehicle fleet has increased in size by 13% since FY04; however, our fuel usage has only increased by 1.5% in the same time frame.**

- 2) Continue the aggressive Preventive Maintenance program to maintain all vehicles at their peak efficiency.

Monthly notices are sent to all vehicle custodians advising when preventive maintenance services are needed.

- 3) Continue to utilize the State's Fleet Data Management System.

Texas Tech has upgraded to the State's new vehicle management system. Additionally we have conducted a 100% data variation/audit to ensure the vehicle information in the State's system is accurate and complete.

- 4) Educate personnel on the efficient use of University vehicles.

New initiatives will continue to be collected and shared with appropriate vehicle custodians and operators through the Vehicle Fleet Management quarterly newsletter.

- 5) Document agency best practices for operation and maintenance.

New initiatives will continue to be collected and shared with appropriate vehicle custodians and operators through the Vehicle Fleet Management quarterly newsletter.

### **C. Future Energy Reduction Plans**

Texas Tech is currently evaluating several energy reduction projects such as exterior LED lighting retrofits, smart ballasts on fluorescent lighting, building commissioning and re-commissioning procedures, HVAC controls upgrades, air-handler upgrades, Museum stack gas economizer, Museum chiller upgrades and adding economize mode to buildings where possible. The university will proceed

with engineering analysis and take action 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 creative initiatives for the university vehicle fleet.