Susan Combs
Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

Lakeway Municipal Utility District

1097 Lohmans Crossing
Lakeway, Texas 78734

Prepared by:

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SECO
State Energy Conservation Office

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Local Government Energy Management Program
Lakeway Municipal Utility District
1097 Lohmans Crossing
Lakeway, TX 78734
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1.0 EXECUTIVE SUMMARY

Lakeway Municipal Utility District, now referred to as the District, requested that Texas Energy Engineering Services, Inc. (TEESI) perform a Preliminary Energy Assessment (PEA) of their facilities. This report documents that analysis.

This service is provided at no cost to the District through the Local Government Energy Management and Technical Assistance Program as administered by the Texas Comptroller of Public Accounts, State Energy Conservation Office (SECO). This program promotes and encourages an active partnership between SECO and Texas local governments for the purpose of planning, funding, and implementing energy saving measures, which will ultimately reduce the District's annual energy costs.

The annual cost savings, implementation cost estimate and simple payback for all facility energy retrofit projects identified in this preliminary analysis are summarized below. Individual facility projects are summarized in Section 8.0 of this report.

Est. Implementation Cost Estimate:	$61,600
Est. Annual Energy Saving (MMBTU/Yr):	336
Est. Annual Greenhouse Gas Emissions Reduction (Metric Tons CO_2e/Yr):	65
Est. Annual Energy Cost Savings:	$8,800
Simple Payback (Yrs):	7.0

A follow-up visit to the District will be scheduled to address any questions pertaining to this report, or any other aspect of this program.

SECO is committed to providing whatever assistance the District may require in planning, funding and implementing the recommendations of this report. The District is encouraged to direct any questions or concerns to either of the following contact persons:

SECO / Mr. Stephen Ross
(512) 463-1770

TEESI / Saleem Khan
(512) 328-2533

2.0 FACILITY DESCRIPTIONS

This section provides a brief description of the facilities surveyed. The purpose of the onsite survey was to evaluate the major energy consuming equipment in each facility. A description of each facility is provided below.

Water Treatment Plant

W-3 Water Treatment Plant utilizes 4-150 GPM High Service (HS) pumps (2-with Soft Start and 2-with Variable Frequency Drives (VFDs)), two Backwash Pumps consisting of 1-25HP pump and 1-75 HP pump, a Surface Wash pump consisting of 1-5 HP pump, and a Non Potable Water (NPW) pump consisting of 1-10HP pump.

Wastewater Treatment Plants (WWTP)

S-4 Wastewater Treatment Plant is permitted for a flow of 0.810 MGD and currently has a 0.296 MGD average daily flow. Maximum recorded daily flow over the past two years has reached as high as 1.104 MGD. The WWTP uses an activated sludge process utilizing fine bubble aeration, final clarification, tertiary filtration and chlorination unit processes. Aeration is achieved by 3-100 HP blowers and 2-40 HP blowers. Returned Activated Sludge (RAS) is accomplished by utilizing 3-7.5 HP pumps. There are 3-125 HP Reuse pumps, 2-7.5 HP Non-Potable Water pumps and 2-2 HP Scum Pumps.

S-5 Wastewater Treatment Plant is permitted for a flow of 0.400 MGD and currently has a 0.131 MGD average daily flow. Maximum recorded daily flow over the past two years has reached as high as 0.326 MGD. The WWTP uses an activated sludge process utilizing coarse bubble aeration, final clarification, tertiary filtration and chlorination unit processes. Aeration is achieved by 3-100 HP blowers. There are 2-15 HP Non-Potable Water pumps and 2-5 HP Lift Station Pumps.

Treated Water Storage

I-6 Reuse Pond utilizes five (5) effluent irrigation pumps, two (2) 200-HP pumps, two (2) 75-HP pumps and one (1) 25-HP pumps. I-6 Lift Station utilizes two (2) 7.5-HP pumps

Wastewater Lift Station

LS-16 Wastewater Lift Station utilizes WG30 Hydromatic Submersible Pumps. Pumps are 5-HP rated.

District Office

Stories:	Single story
Area (estimated):	5,000 SF
Bldg. Components:	Brick building, pitched roof, slab on grade
Typical Lighting Fixtures:	T8 fluorescent fixtures with electronic ballasts
HVAC:	Split System Heat Pumps
Controls:	Programmable thermostats

Field Office

Stories:	Single story
Area (estimated):	3,000 SF
Bldg. Components:	Brick building, pitched roof, slab on grade
Typical Lighting Fixtures:	T8 fluorescent fixtures with electronic ballasts
HVAC:	Split System Heat Pumps
Controls:	Programmable thermostats

Maintenance Building

Stories:	Single story
Area (estimated):	2,500 SF
Bldg. Components:	Metal building, pitched metal roof, slab on grade
Typical Lighting Fixtures:	T12 fluorescent fixtures with magnetic ballasts
HVAC:	None

3.0 ENERGY CONSUMPTION AND PERFORMANCE

This section outlines energy consumption & performance for District buildings, water treatment plants and wastewater treatment plants.

BUILDINGS:

A site survey was conducted at several of the District's facilities. The buildings surveyed comprised a total gross area of approximately 10,500 square feet.

Annual electric invoices for the buildings surveyed were $6,153 for the 12-month period ending July 2011. A summary of annual utility costs is provided in **Appendix C**, Base Year Consumption History.

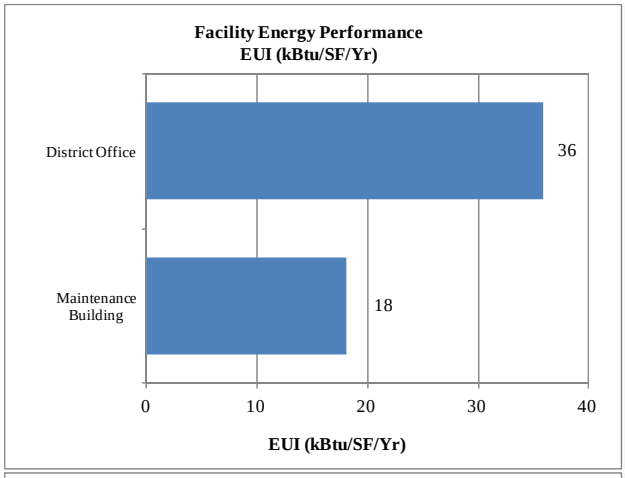
To help the District evaluate the overall energy performance of its facilities TEESI has calculated their Energy Utilization Index (EUI) and Energy Cost Index (ECI). The EUI represents a facility's annual energy usage per square foot; it is measured in thousands of BTU's per square foot per year (kBTU/SF/Year). Similarly, ECI is measured as cost per square foot per year ($/SF/Year). The EUI and ECI performance for selected facilities are listed below:

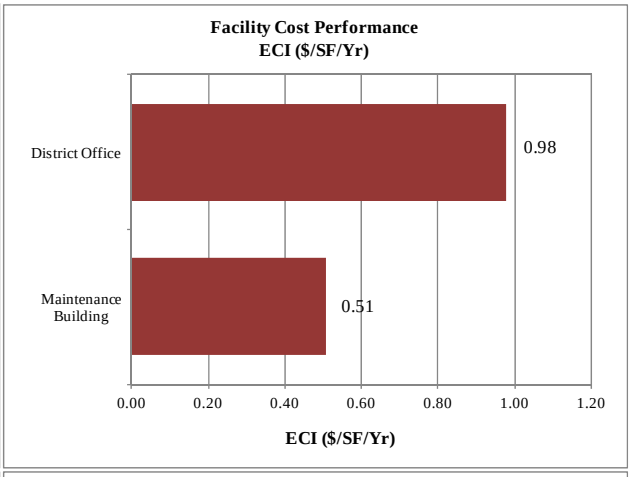
Energy Cost and Consumption Benchmarks									
		Electric				Total	EUI	ECI	
	Building	kWh/Yr	MMBTU/Yr	kWh/SF	$Cost/Yr	MMBTU/Yr	kBTU/SF/Yr	$/SF/Yr	SF
1	District Office	52,600	180	10.52	4,888	180	36	0.98	5,000
2	Field Office*	-	-	-	-	-	-	-	3,000
3	Maintenance Building	13,262	45	5.30	1,265	45	18	0.51	2,500
		kWh/Yr	MMBTU/Yr	kWh/SF	$Cost/Yr	MMBTU/Yr	kBTU/SF/Yr	$/SF/Yr	SF
		65,862	225	6.27	6,153	225	21	0.59	10,500

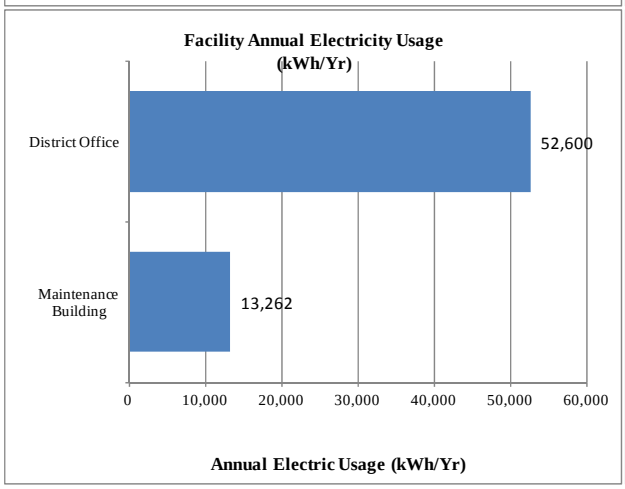
*Field Office is currently metered together with the S-4 Wastewater Treatment Plant.

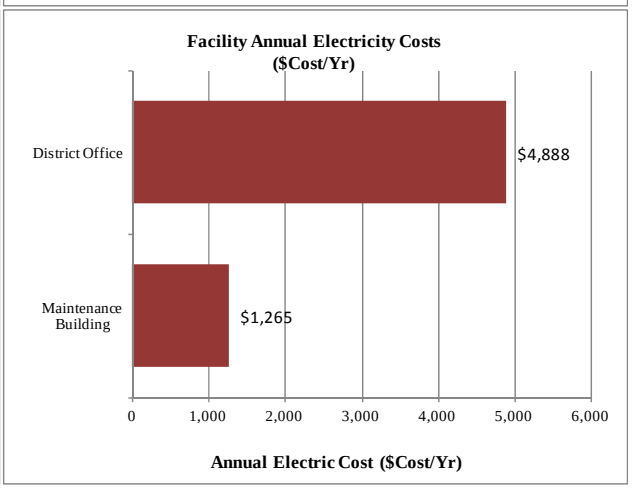
The EUI and ECI of each facility help the District evaluate its overall energy performance. In addition, the District's EUIs were compared to TEESI's database of local government facilities. **Appendix D** shows how the EUIs of these facilities compare to those of other local government facilities in Texas.

The following charts summarize the data presented in the previous table. See **Appendix C** for further detail.

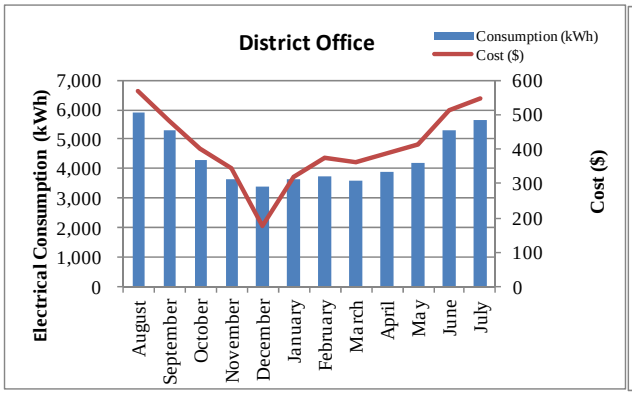


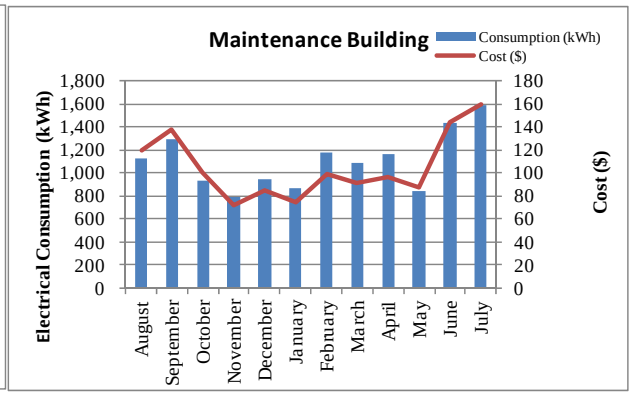






The following charts summarize each facility's monthly utility data. See **Appendix C** for further detail.





WASTEWATER TREATMENT PLANTS:

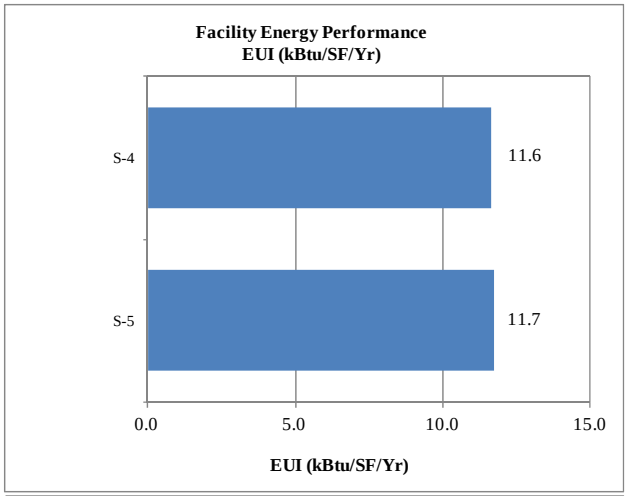
A site survey was also conducted at several of the District's wastewater facilities. To help the District evaluate the overall energy performance of its wastewater treatment plant, TEESI has calculated its Energy Utilization Index (EUI) and Energy Cost Index (ECI). The EUI was calculated based on the facility's annual energy usage per annual average effluent flow; it is measured as thousand BTUs per gallons per day per year (kBTU/GPD/Year). Similarly, ECI is measured as cost per million gallons per day per year ($/MGD/Year). The EUI and ECI performance for the wastewater treatment plant is listed below.

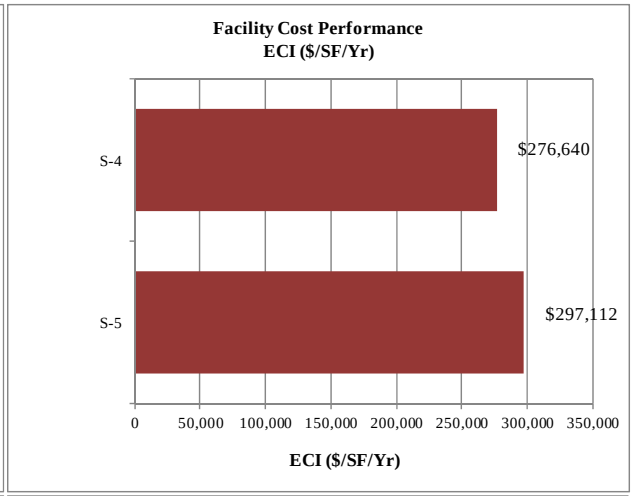
WWTP - Energy Cost and Consumption Benchmarks

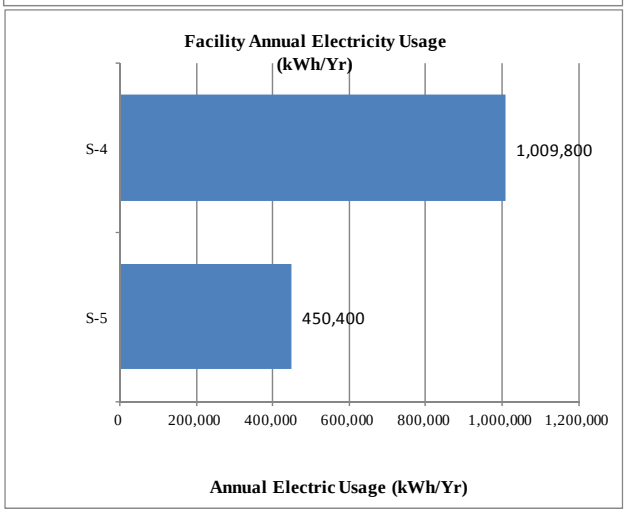
		Electric[1]			Design Capacity (MGD)	Average Effluent Flow (MGD)	EUI[3]	ECI[4]
	WWTP	kWh/Yr	kBtu/Yr[2]	$Cost/Yr			kBtu/GPD/Yr	$/MGD/Yr
1	S-4	1,009,800	3,445,438	$81,885	0.810	0.296	11.6	$276,640
2	S-5	450,400	1,536,765	$38,922	0.400	0.131	11.7	$297,112
		1,460,200	4,982,202	120,807	-	-	-	-

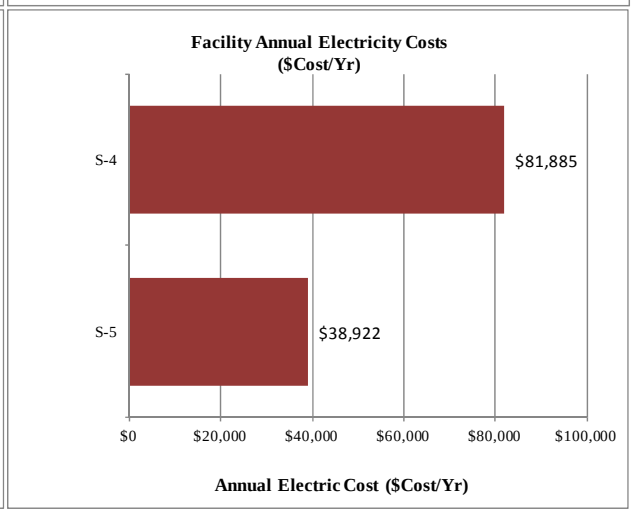
1. Electric consumption for WWTP is based on electric meter serving the main processing facility and does not account for other usage (i.e. lift stations, irrigation, etc.) which may be metered separately.
2. Electric consumption conversion based on 3.412 kBtu/kWh.
3. Energy Use Index (EUI) calculated based annual kBtu divided by the Average Effluent Flow in gallons per day (GPD).
4. Energy Cost Index (ECI) calculated based on annual energy cost divided by the Average Effluent Flow in million gallons per day (MGD).

The following charts summarize the data presented in the previous table. See **Appendix C** for further detail.

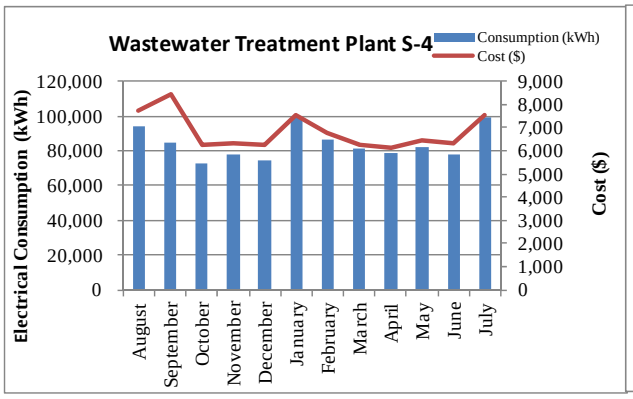


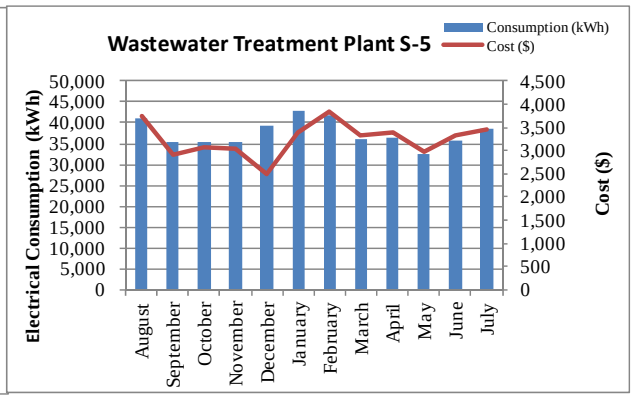






Below are the monthly usage and cost profiles for the WWTP facilities listed above.





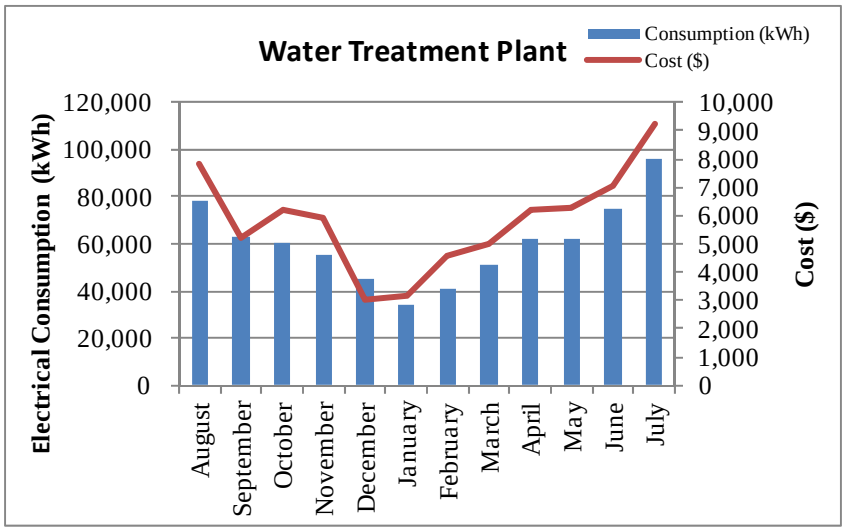
WATER TREATMENT PLANT:

The following table shows the electric consumption and cost for the water treatment plant.

WTP - Energy Cost and Consumption		
Electric[1]		
kWh/Yr	kBtu/Yr[2]	$Cost/Yr
723,850	2,469,776	$69,734

1. Electric consumption includes meter serving main processing facility and does not account for other usage (such as w ater booster pump stations).
2. Electric consumption conversion based on 3.412 kBtu/kWh.

Below is the monthly usage and cost profile for the WTP facility listed above.



4.0 ENERGY STAR PORTFOLIO MANAGER

The District's energy baseline can be developed using ENERGY STAR's Portfolio Manager. One of the primary reasons for using ENERGY STAR Portfolio Manager is its ability to normalize the District's baseline according to several key factors (i.e. Weather, Square Feet, Hours of Operation, etc.). It is also a free online resource available to all registered users, and is a user-friendly web-based tool.

ENERGY STAR is a joint program of the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Energy (DOE). ENERGY STAR has developed Portfolio Manager, an innovative online energy management tool, designed to help organizations track and assess energy and water consumption of their facilities. Portfolio Manager helps organizations set investment priorities, identify under-performing facilities, verify efficiency improvements, and receive EPA recognition for superior energy performance.

Portfolio Manger is also an energy performance benchmarking tool. Portfolio Manager rates a facility's energy performance on a scale of 1–100 relative to similar facilities nationwide. The rating system based on a statistically representative model utilizing a national survey conducted by the Department of Energy's Energy Information Administration. This national survey, known as the Commercial Building Energy Consumption Survey (CBECS), conducted every four years gathers data on building characteristics and energy use from thousands of buildings across the United States. A rating of 50 indicates that the facility, from an energy consumption standpoint, performs better than 50% of all similar facilities nationwide, while a rating of 75 indicates that the facility performs better than 75% of all similar facilities nationwide.

In addition, Portfolio Manager is used to generate a Statement of Energy Performance (SEP) for each facility, summarizing key energy information such as site and source energy intensity, greenhouse gas emission, energy reduction targets and energy cost. The Statement of Energy Performance is required for applying for ENERGY STAR Recognition from EPA/DOE, and can help in satisfying LEED for Existing Buildings (LEED-EB) requirements. For example, one of the requirements to receive ENERGY STAR Recognition is to achieve a minimum CBECS rating of **75**. A requirement to receive LEED-EB certification is an ENERGY STAR rating of **69**.

At this time, some of the District's facilities are not able to receive an ENERGY STAR rating (water treatment plants cannot receive a rating, wastewater treatment plants must have an average influent flow greater than 0.6 MGD and offices must be at least 5,000 square feet). However, Portfolio Manager can still serve as a valuable tool for the District in tracking utility consumption and setting targets for performance of the District's facilities, including the water and wastewater treatment plants.

Portfolio Manager is an effective tool for online tracking of a facility's energy performance. TEESI has entered the baseline energy consumption data in ENERGY STAR Portfolio Manager for the WWTPs, WTP, and District Office.

To develop the District's baseline, 12 months of utility consumption, cost data, and Building Space Use information will be required. The table below is a sample of the Building Space Use data required by Portfolio Manager to generate the Energy Performance Rating. These inputs are critical and can significantly influence how Portfolio Manager computes the ENERGY STAR Rating. Many of these key inputs may vary over time and could influence the rating. **If an ENERGY STAR Label is pursued, these key inputs will need to be verified and certified by a qualified professional. Verification of this information is required when submitting the Statement of Energy Performance for ENERGY STAR's review.**

ENERGY STAR Portfolio Manager Example Space Use Data

Facility Type: Office

- 12 Months of Utility Data
- Gross Floor Area
- Weekly Operating Hours
- Workers on Main Shift
- Percent Cooled
- Percent Heated
- # of PCs

The ENERGY STAR rating for the District Office is listed in the table below, with some default values used for space use data. It is recommended the District update these to correct values in order to achieve an appropriate ENERGY STAR rating. The target for facilities is a rating of 75 to qualify for ENERGY STAR.

Facility Name	Current Rating (1-100)	Total Floor Space (Sq. Ft.)
District Office	76	5,000

5.0 ENERGY ACCOUNTING

UTILITY PROVIDERS AND AVERAGE UTILITY RATES

Austin Energy provides electric service to the S-4 WWTP, Field Office and Maintenance Building. Pedernales Electric Coop (PEC) provides electric service to the S-5 WWTP, W-3 WTP and District Office. Below is a table summarizing the utility provider and their average utility rates.

Utilty Provider	Facilities	Rate Type	Demand Charge ($/kW)	Energy Charge ($/kWh)	Delivery Charge ($/kWh)	Service Charge (Monthly)	Average Rate[2] ($/kWh)
Austin Energy[1]	WWTP (S-4)	E06 - General Service - Demand	$14.03 Summer (May - Oct.) $12.65 Winter (Nov. - Apr.)	$0.018 + Fuel Cost Adjustment	-	-	$0.0813
	Maintenance Bldg. (M-1)	E02 - General Service - Non-Demand	-	$0.0644 Summer (May - Oct.) $0.0464 Winter (Nov. - Apr.) + Fuel Cost Adjustment	-	$6	$0.0950
Pedernales	WWTP (S-5)	Large Power	$4.00	$0.07208 + Fuel Cost Adjustment	$0.01048	$150	$0.0866
	WTP (W-3)						$0.0961
	District Office (D.O.)	Small Power	-	$0.07208 + Fuel Cost Adjustment	$0.02488	$37.50	$0.0922

1. Based on current Austin Energy utility rates. Austin Energy rates expected to change in 2012.
2. Based on an annual overall usage and cost.

ELECTRICAL DEMAND CHARGES

Electric utility charges typically include both energy use charges and power demand charges. The energy use charge is to cover the cost of fuel and other factors related to the cumulative amount of energy delivered during the billing period. The power demand charge is intended to recover the utility's cost of owning and maintaining generation, transmission and distribution system capacity to meet the power demand during its peak 15-minute interval (typically) in a month or even in the whole year.

Sometimes the power demanded for a 15-minute interval is much higher than needed for the typical day, week, month or even year. Adjustments to controls or operating procedures can often reduce the peak demand with minimal cost. The District should request of the utility provider a trend log of kW and power factor at 15-minute intervals for a summer day and a winter day (a week or month would be even better). This information may disclose unnecessary peaks in the electrical demand profile that can be eliminated by adjusting controls or operating procedures.

In some cases, utility providers offer incentives such as curtailable service rates and time-of-use rates to customers willing and able to reduce their demand when the utility is approaching its demand limit or is historically likely to do so. The District has standby generators that need to be exercised periodically, and that can be used to lower the facility peak load during times when the demand reduction would be rewarded by the utility provider. The District should consult with the electric utility provider about the possibility of an agreement that would benefit both.

Austin Energy currently bills customers that are on the *General Service – Demand* rate for low power factor. This is presently reflected on the billed demand portion of the utility bill. If the power factor during the peak interval is less than 85 percent, the billed demand is multiplied by

85 percent, then divided by the lower power factor. This would result in increased cost for the facility. In 2012, Austin Energy plans to increase the power factor minimum to 90 percent.

Power factor measurements at the District's facilities were not readily available. The District should request records of facility power factors from the utility provider. Information needed that is not available from the utility provider can be determined by an engineer or electrician using recording instruments. The following information would be useful in determining any potential cost benefits from improving power factor:

1. Peak demand (metered kW) and the coincident power factor for each month of the year; or at the very least, for a winter month and a summer month.
2. An inventory of all large motors with their operating power factors. If the motors serve variable loads, the power factors should be recorded at maximum and minimum motor load. If the load range exceeds 25% of the motor rating, intermediate points should be recorded.
3. A log of kW and power factor at 15-minute intervals for a summer day and a winter day. (A week or month would be even better. This data was also recommended above for evaluation of peak demand reduction.)

With this data, an electrical engineer or power industry specialist can evaluate the potential for reducing electrical power demand charges by demand management and/or power factor correction strategies.

One method of improving power factor is installing power factor correction capacitors just downstream of the electrical meters. Capacitor banks vary in cost with the size required, which is dependent on the facility's electrical demand and the amount of power factor correction elected. If the power factor varies, it is usually cost-effective and sometimes mandatory to manage the extent of correction by switching capacitors in an out of the system. If the source of low power factor is a few large motors that always have the same low power factors, it may be most cost effective to connect the capacitors to the system between the motor starter and the load, so that the correction is only applied to the system while the offending motors are enabled.

The S-4 WWTP is currently billed on Austin Energy's general service – demand rate schedule. For example purposes, if the WWTP maintained an 85% power factor, currently, Austin Energy would not bill for power factor. However, once Austin Energy's rates change in 2012, the new power factor minimum will be 90%. If the S-4 WWTP continues to have a power factor of 85%, the additional cost (using the electrical demand data from last year) could be near $3,000. A capacitor bank for this size of a facility would cost up to $2,500 (including material cost only, excluding any professional services). In a WWTP with aeration blowers, however, power factor can be expected to vary seasonally, so this analysis should not be substituted for an in-depth power factor analysis. In addition, this power factor evaluation would need to be revisited once Austin Energy implements new utility rates.

If a ratchet clause exists in the utility rate schedule, the minimum demand charge for a certain time period (typically winter months) would be set by a previous peak demand (typically from summer months). In this case, correcting the power factor to 90% in the lowest season would probably not be cost-effective, while correcting it to 90% in the highest season would probably be very cost effective. The optimal solution will be between those extremes.

MONITORING AND TRACKING

Currently, the District does not have an energy tracking software or spreadsheet in place. An effective energy tracking system is an essential tool by which an energy management program's activities are monitored. The system should be centralized and available for all engaged staff members to use in verifying progress toward established targets and milestones.

The District should consider consolidating the tracking and recording of all the District's utility accounts (i.e., Electricity, Natural Gas, Propane, Water, etc.) into an electronic spreadsheet similar to the chart shown on the following page. Along with total utility costs ($), utility consumption should be recorded as well (i.e., kWh, MCF, gallons, etc.). The District can use this data to track utility consumption patterns and budget utility expenses. **Preferably, the District should also consider an electronic database such as ENERGY STAR Portfolio Manager, which will provide a means of storing and tracking utility information. For more information on ENERGY STAR Portfolio Manager, please see Section 4.0.** Having this historical data improves the District's awareness of their energy performance and will help in tracking their energy reduction goals.

The steps below are essential for an effective energy management tracking system:

1. Perform regular updates. An effective system requires current and comprehensive data. Monthly updates should be strongly encouraged.

2. Conduct periodic reviews. Such reviews should focus on progress made, problems encountered, and potential rewards.

3. Identify necessary corrective actions. This step is essential for identifying if a specific activity is not meeting its expected performance and is in need of review.

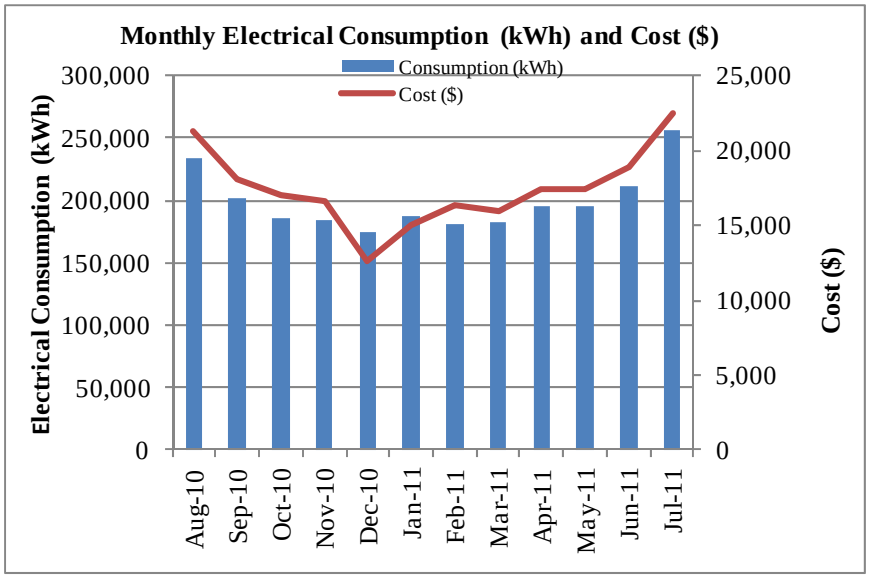
In addition, having this historical utility data would facilitate **House** and **Senate Bill(s)** reporting requirements. Please see Section 6.0 for additional information regarding these requirements.

Furthermore, on the next page is a sample format the District can customize to help summarize their overall utility usage and costs.

The data presented on the next page is a summation of the data provided by the District. This data on the next page includes only selected utility accounts and is for reference purposes only and does not represent the District's total utility data. See **Appendix C** for further detail regarding each utility account represented in the table below.

Lakeway MUD - Sample Utility Input Form

MONTH	ELECTRICITY		
	KWH	COST $	Avg. Rate $/KWH
Aug-10	234,141	21,320	$0.0911
Sep-10	201,092	18,133	$0.0902
Oct-10	185,481	17,062	$0.0920
Nov-10	183,600	16,673	$0.0908
Dec-10	173,922	12,630	$0.0726
Jan-11	188,013	15,076	$0.0802
Feb-11	181,492	16,402	$0.0904
Mar-11	182,791	16,010	$0.0876
Apr-11	195,365	17,399	$0.0891
May-11	195,095	17,452	$0.0895
Jun-11	211,337	18,833	$0.0891
Jul-11	256,783	22,477	$0.0875
Total	2,389,112	$209,467	$0.0877



6.0 ENERGY LEGISLATION OVERVIEW

In 2007, the 80th Texas Legislature passed Senate Bill 12 (**SB12**) which among other things extended the timeline set by Senate Bill 5 (**SB5**). SB5, commonly referred to as the Texas Emissions Reduction Plan, was adopted in 2001 by the 77th Texas Legislature to comply with the federal Clean Air Act standards. Also in 2007, the 80th Texas Legislature passed House Bill 3693 (**HB3693**) which amended provisions of several codes relating primarily to energy efficiency.

Following are key requirements established by the above energy legislation:

Establish a goal of reducing electric consumption by five percent (5%) each state fiscal year for six (6) years, beginning on September 1, 2007.

Record electric, water, and natural gas utility services (consumption and cost) in an electronic repository. The recorded information shall be on a publicly accessible Internet Web site with an interface designed for ease of navigation if available, or at another publicly accessible location.

Energ-efficient light bulbs for buildings, requires an institution to purchase commercially available light bulbs using the lowest wattages for the required illumination levels.

Installation of energy saving devices in Vending Machines with non-perishable food products.

A summary description of SB 12 and HB 3693 is available in Appendix A. Further detail regarding each bill can be found in the Texas Legislature website (http://www.capitol.state.tx.us/Home.aspx).

7.0 RECOMMENDED MAINTENANCE & OPERATING PROCEDURES

M&O Recommendations – Processing Buildings/Facilities

The following are general design and maintenance and operations recommendations that may improve energy performance for water systems and wastewater treatment facilities.

UTILIZE HIGH EFFICIENCY PUMPS AND MOTORS
When replacing pumping units, procure high efficiency pumps and motors. Energy savings could account for 10-15% difference when compared to existing units.

EVALUATE PIPE SIZING WITHIN SERVICE AREA TO REDUCE FRICTION LOSSES
Performing a water distribution system analysis can recommend the most efficient piping size for the service area. Constructing non-restrictive piping would reduce system head requirements and save power.

ADD VARIABLE FREQUENCY DRIVE (VFD) CAPABILITY TO HIGH SERVICE PUMP STATIONS
A VFD controlled pump station could serve as an alternative system pressure control to enable elevated storage to be taken out of service for painting or repairs.

ADD VFD OR "SOFT-START" TO PUMPING UNITS 50 HP AND GREATER
A soft-start feature would reduce start-up amperage surcharge saving money when rate structures take start-up amperage draw into account.

CONTROL DISSOLVED OXYGEN LEVEL IN WWTP
Reducing aeration to maintain dissolved oxygen levels of 2.0 mg/l or less could reduce power draw. Variable Frequency Drive, dual speed motors, or simply operating fewer units to maintain minimum dissolved oxygen levels will save power.

M&O Recommendations - Buildings

Sound Maintenance and Operation procedures significantly improve annual utility costs, equipment life, and occupant comfort. Generally, maintenance and operation procedural improvements can be made with existing staff and budgetary levels. Even though the majority of the District's energy consumption is due to water processing activities, the following Building M&O recommendations may lead to cost effective energy savings. Below are typical maintenance and operations procedures that have energy savings benefits.

PUBLICIZE ENERGY CONSERVATION
Promote energy awareness at regular staff meetings, on bulletin boards, and through organizational publications. Publicize energy cost reports showing uptrends and downtrends.

MANAGE SMALL ELECTRICAL EQUIPMENT LOADS
Small electrical equipment loads consists of small appliances/devices such as portable heaters, microwaves, small refrigerators, coffee makers, stereos, cell phone chargers, desk lamps, etc. The District should establish a goal to reduce the number of small appliances and to limit their usage. For example, the use of small space heaters should be discouraged; hence, all space

heating should be accomplished by the District's main heating system. In addition, many small devices such as radios, printers, and phone chargers can consume energy while not in use. To limit this "stand-by" power usage these devices should be unplugged or plugged into a power strip that can act as a central "turn off" point while not in use. With an effective energy awareness campaign to encourage participation, managing small electrical loads can achieve considerable energy savings.

ESTABLISH HVAC UNIT SERVICE SCHEDULES

Document schedules and review requirements for replacing filters, cleaning condensers, and cleaning evaporators. Include particulars such as filter sizes, crew scheduling, contract availability if needed, etc. Replace filters with standard efficiency pleated units. Generally, appropriate service frequencies are as follows -- filters: monthly; condensers: annually; evaporators: 5 years.

PRE-IDENTIFY PREMIUM EFFICIENCY MOTOR (PEM) REPLACEMENTS

Pre-identify supply sources and PEM stock numbers for all replaceable motors so that as failures occur, replacement with PEM units can take place on a routine basis. As funding allows, pre-stock PEM replacements according to anticipated demand, i.e., motors in service more than 10 years, motors in stressful or critical service, and at least one motor of each size and type that are in service at numerous locations.

IMPROVE CONTROL OF INTERIOR & EXTERIOR LIGHTING

Establish procedures to monitor use of lighting at times and places of possible/probable unnecessary use: Offices at lunchtime, maintenance shops, closets, exterior and parking lots during daylight hours, etc. Encouraging staff (i.e. Custodial, maintenance) to participate in the District's efforts to limit unnecessary lighting use would help improve this effort.

Example 1 – Exterior Lights: The picture below is of exterior lights on during daylight hours at the District Office. Exterior lighting is typically controlled using light sensing photocells, timeclocks or manual switching. Photocells tend to fail in the "On" state, so someone should check regularly to see that the lights are not on during the day. Timeclocks are more reliable, and those with astronomical control or that operate in series with photocells also provide dusk-to-dawn operation that is seasonally corrected. Timeclocks also offer the option of turning off the lights in the middle of the night. If a manual switch controls the exterior lighting, the latter two control options should be considered since manual switching requires diligence, which is often not maintainable.

TYPICAL EQUIPMENT MAINTENANCE CHECKLISTS

Effective operation and maintenance of equipment is one of the most cost effective ways to achieve reliability, safety, and efficiency. Failing to maintain equipment can cause significant energy waste and severely decrease the life of equipment. Substantial savings can result from good operation and maintenance procedures. In addition, such procedures require little time and cost to implement. Examples of typical maintenance checklists for common equipment are provided in **Appendix E**. These checklists from the Federal Energy Management Program (FEMP), a branch of the Department of Energy (DOE), are based on industry standards and should supplement, not replace those provided by the manufacturer.

CONTROL OUTSIDE AIR INFILTRATION

Conduct periodic inspections of door and window weather-stripping, and schedule repairs when needed. Additionally, make sure doors and windows are closed during operation of HVAC systems (heating or cooling). Unintended outside air contributes to higher energy consumption and increases occupant discomfort.

REPLACE INCANDESCENT LAMPS WITH COMPACT FLUORESCENTS

Replace existing incandescent lamps with compact fluorescent lamps as they burn out. Compact fluorescents use 50 to 75 percent less wattage for the same light output, with ten times the operating life of incandescents.

ENERGY STAR POWER MANAGEMENT

ENERGY STAR Power Management Program promotes placing monitors and computers (CPU, hard drive, etc.) into a low-power "sleep mode" after a period of inactivity. The estimated annual savings can range from $25 to $75 per computer. ENERGY STAR recommends setting computers to enter system standby or hibernate after 30 to 60 minutes of inactivity. Simply touching the mouse or keyboard "wakes" the computer and monitor in seconds. Activating sleep features saves energy, money, and helps protect the environment.

INSTALL ENERGY SAVING DEVICES ON VENDING MACHINES

Install energy saving devices on vending machines with non-perishable food items to reduce the equipment power usage. These devices shut the vending machines down during unoccupied periods. There are several commercially available devices that can be easily installed on existing vending machines. These devices typical have a motion sensor which powers down the equipment after periods of inactivity. For example if the motion sensor does not sense activity within 15 minutes the device will shutdown the vending machine and turn on once motion is sensed. These devices range in price from $100 to $250 and have a typical annual savings of $20 to $150 per vending machine.

HAIL GUARDS ON CONDENSING UNITS AND PACKAGED ROOFTOP UNITS

When an HVAC unit is replaced the District should ensure the new unit be specified with hail guards. The hail guards protect the condensing unit's heat exchanger coils from hail damage. Damage to the condensing unit heat exchangers reduces the efficiency of the units. It is recommended if any existing unit(s) have damaged condensing coil fins the condensing fins should be straightened using a fin comb.

8.0 UTILITY COST REDUCTION MEASURES (UCRMs)

Utility Cost Reduction Measures (UCRMs) identified during the preliminary analysis are detailed below. Project cost estimates include complete design and construction management services.

REPLACE EXISTING T8 FLUORESCENT LAMPS WITH LOWER WATTAGE LAMPS

Low-wattage T8 fluorescent lamps are available in 30, 28 and 25-watt versions. It is recommended replacing existing 32-watt T8 Fluorescent lamps with lower wattage lamps (where applicable). Changing to a lower wattage T8 Lamp is a relatively straightforward process however, lower wattage T8 lamps do have limitations and are only suitable for certain applications. Lower wattage T8 lamps have reduced lighting levels therefore, it is important to ensure recommended lighting levels are maintained. Lighting levels should be verified prior to and after lamp replacement. In addition, compatibility with existing ballasts, local codes and other requirements must be verified prior to retrofitting. Nevertheless, if suitable for the application, switching to lower wattage T8 lamps will have sustainable energy savings with minimal impact. For example, replacing a 32-watt T8 lamp with a 28-watt T8 lamp will approximately have a 12% lighting energy reduction with only a lighting level drop near 4%.

The estimated costs and savings noted below are based on replacement of existing 32-watt T8 lamps and does not account for ballast replacements (if existing are incompatible) or reduced lamps (if existing lighting levels are above recommended levels). Estimates are based on a preliminary walkthrough of the facilities. A detailed lighting analysis will be required to determine exact cost, quantities and configuration to maximize the energy savings and lighting performance.

LOW WATTAGE T8 FLUORESCENT LIGHTING RETROFIT				
Building	**Estimated Implementation Cost**	**Estimated Annual Savings ($/yr)**	**Estimated Annual MMBTU Savings (MMBTU/yr)**	**Simple Payback (years)**
District Office	$1,200	$200	7	6.0
Field Office	$700	$100	4	7.0
TOTAL	**$1,900**	**$300**	**11**	**6.3**

INSTALL OCCUPANCY SENSORS FOR INDOOR LIGHTING CONTROL

It is recommended the District consider installing occupancy sensors to improve control of interior lighting. Occupancy sensors will help ensure lights are only on when the space is occupied. The following table below provides an estimated cost and energy savings for the installation of these types of sensors. Please note this estimation is based on a preliminary assessment exact sensor location, technology (Infrared, Ultrasonic, and Dual Technology) and quantity can be determined during a detailed energy assessment or design phase. In general, enclosed areas with intermittent use, are typically good candidates for occupancy sensors (i.e. hallways, administration offices, break rooms, etc.).

MOTION SENSOR INSTALLATION				
Building	**Estimated Implementation Cost**	**Estimated Annual Savings ($/yr)**	**Estimated Annual MMBTU Savings (MMBTU/yr)**	**Simple Payback (years)**
District Office	$1,300	$200	7	6.5
Field Office	$900	$100	4	9.0
TOTAL	**$2,200**	**$300**	**11**	**7.3**

INSTALL NETWORKED THERMOSTATS

Install web-based networked thermostats to provide improved control of the air-conditioning systems throughout the facilities listed in the table below. Installing web-based networked thermostats will allow for multiple schedule routines and allow remote scheduling. The thermostats would be connected to the District's network and can be controlled and monitored from a central location.

NETWORKED THEMOSTATS				
Building	**Estimated Implementation Cost**	**Estimated Annual Savings ($/yr)**	**Estimated Annual MMBTU Savings (MMBTU/yr)**	**Simple Payback (years)**
District Office	$1,500	$200	7	7.5
Field Office	$1,000	$100	4	10.0
TOTAL	**$2,500**	**$300**	**11**	**8.3**

REPLACE COARSE BUBBLE DIFFUSERS WITH FINE BUBBLE DIFFUSERS

The S-5 WWTP utilizes coarse bubble diffusers and has a timer controlled system to operate the 100 HP Blowers approximately 50% of the time. This control scenario alternates the 3-100 HP blowers with a single blower in operation at 10–15 minute intervals. Even though utilizing coarse bubble diffusers in this manner is energy efficient at the current average daily flow of 0.131 MGD, replacing the coarse bubble with fine bubble diffusers and operating the fine bubble aeration full time would be even more energy efficient. In addition, fine bubble aeration will become more cost effective as flows increase.

REPLACE COARSE WITH FINE BUBBLE AERATION				
Building	**Estimated Implementation Cost**	**Estimated Annual Savings ($/yr)**	**Estimated Annual MMBTU Savings (MMBTU/yr)**	**Simple Payback (years)**
Wastewater Treatment Plant S-5	$55,000	$7,900	332	7.0
TOTAL	**$55,000**	**$7,900**	**332**	**7.0**

The following table summarizes the implementation costs, annual savings and simple payback for the above projects:

SUMMARY OF ENERGY COST REDUCTION MEASURES				
Project Description	**Estimated Implementation Cost**	**Estimated Annual Savings ($/yr)**	**Estimated Annual MMBTU Savings (MMBTU/yr)**	**Simple Payback (years)**
REPLACE COARSE WITH FINE BUBBLE AERATION	$55,000	$7,900	332	7.0
LOW WATTAGE T8 FLUORESCENT LIGHTING RETROFIT	$1,900	$300	11	6.3
MOTION SENSOR INSTALLATION	$2,200	$300	11	7.3
NETWORKED THEMOSTATS	$2,500	$300	11	8.3
TOTAL:	**$61,600**	**$8,800**	**366**	**7.0**

The above projects implementation costs and annual savings are estimated based on a preliminary examination of the facilities. Furthermore, maintenance cost savings are not included in this preliminary energy assessment. Final costs will be determined from detailed building assessments, engineering calculations, and contractor estimates.

Project design (drawings and specifications), if authorized, would normally be accomplished by professional engineers. Project acquisition (competitive bidding) would be in accordance with District requirements, and construction management would be provided by the engineering group who prepared the drawings and specifications.

9.0 ENERGY MANAGEMENT POLICY

Lakeway MUD is committed to improving their energy performance and this is evident by the request to perform a Preliminary Energy Assessment. In order to ensure and sustain long-term energy efficient practices a comprehensive Energy Management Policy should be adopted by the District.

An energy management plan adopted by the governing board sends a strong signal that energy management is an institutional priority. At a minimum, the energy management plan should address the following:

- Establish an energy steering committee to review energy cost and consumption on a regular basis.
- Outline energy cost reduction measures and implementation strategies.
- Assign energy manager duties to existing staff positions, with defined roles and responsibilities.
- Establish acceptable equipment operating parameters and schedules, such as HVAC space heating and cooling set points, availability and duration of overrides, etc.
- Promote awareness of energy conservation by publishing goals and progress of energy conservation measures.
- Establishment of a tracking method for utility cost and consumption.

10.0 FUNDING OPTIONS FOR CAPITAL ENERGY PROJECTS

Institutional organizations have traditionally tapped bond money, maintenance dollars, or federal grants to fund energy-efficient equipment change outs or additions such as energy-efficient lighting systems, high efficiency air conditioning units, and computerized energy management control systems. Today, a broader range of funding options are available. A number of these are listed below.

Texas LoanSTAR Program

The LoanSTAR (Saving Taxes and Resources) Program, which is administered by the State Energy Conservation Office, finances energy-efficient building retrofits at a low interest rate (typically 3 percent). The program's revolving loan mechanism allows borrowers to repay loans through the stream of cost savings realized from the projects. Projects financed by LoanSTAR must have an average simple payback of ten years or less and must be analyzed in an Energy Assessment Report by a Professional Engineer. Upon final loan execution, the District proceeds to implement funded projects through the traditional bid/specification process. Contact: Eddy Trevino (512/463-1876).

Internal Financing

Improvements can be paid for by direct allocations of revenues from an organization's currently available operating or capital funds (bond programs). The use of internal financing normally requires the inclusion and approval of energy-efficiency projects within an organization's annual operating and capital budget-setting process. Often, small projects with high rate of return can be scheduled for implementation during the budget year for which they are approved. Large projects can be scheduled for implementation over the full time period during which the capital budget is in place. Budget constraints, competition among alternative investments, and the need for higher rates of return can significantly limit the number of internally financed energy-efficiency improvements.

Private Lending Institutions or Leasing Corporations

Banks, leasing corporations, and other private lenders have become increasingly interested in the energy efficiency market. The financing vehicle frequently used by these entities is a municipal lease. Structured like a simple loan, a municipal leasing agreement is usually a lease-purchase arrangement. Ownership of the financed equipment passes to the District at the beginning of the lease, and the lessor retains a security interest in the purchase until the loan is paid off. A typical lease covers the total cost of the equipment and may include installation costs. At the end of the contract period the lessee pays a nominal amount, usually a dollar, for title to the equipment.

Performance Contracting with an Energy Service Company

Through this arrangement, an energy service company (ESCO) uses third party financing to implement a comprehensive package of energy management retrofits for a facility. This turnkey service includes an initial assessment by the contractor to determine the energy-saving potential for a facility, design work for identified projects, purchase and installation of equipment, and overall project management. The ESCO guarantees that the cost savings generated by the projects will, at a minimum, cover the annual payment due to the ESCO over the term of the contract.

Utility Sponsored Energy Efficiency Incentive Programs

Many of the State's utilities offer energy efficiency incentive programs to offset a portion of the upfront cost associated with energy efficiency measures. The program requirements and incentives range from utility to utility. For example, CenterPoint Energy provides incentives for efficiency measures such as installation of high efficiency equipment, lighting upgrades, and building commissioning. These energy efficiency programs' incentives typically cover $0.06/kWh and $175/kW of verifiable energy and demand reductions, respectively. For further information, contact your utility provider to determine what programs are available in your area.

APPENDICES

APPENDIX A

ENERGY LEGISLATION
(SB12 AND HB3693)

How to comply with SB12 & HB 3693

What you need to know about Texas Senate Bill 12

The passage of Senate Bill 12 (SB12) by the 80th Texas Legislature signified the continuance of Senate Bill 5 (SB5), the 77th Texas Legislature's sweeping approach in 2001 to clean air and encourage energy efficiency in Texas. SB12 was enacted on September 1, 2007 and was crafted to continue to assist the state and its political jurisdictions to conform to the standards set forth in the Federal Clean Air Act. The bill contains energy-efficiency strategies intended to decrease energy consumption while improving air quality.

All political subdivisions in the 41 non-attainment or near non-attainment counties in Texas are required to:

*1) Adopt a goal to reduce electric consumption by 5 percent each year for six years, beginning September 1, 2007**

2) Implement all cost-effective energy-efficiency measures to reduce electric consumption by existing facilities. (Cost effectiveness is interpreted by this legislation to provide a 20 year return on investment.)

3) Report annually to the State Energy Conservation Office (SECO) on the entity's progress, efforts and consumption data.

*Note: The recommended baseline data for those reporting entities will consist of the jurisdiction's 2006 energy consumption for its facilities and based on the State Fiscal Year (September 1, 2006 to August 31, 2007).

What you need to know about Texas House Bill 3693

The passage of House Bill 3693 (HB3693) by the 80th Texas Legislature is intended to provide additional provisions for energy-efficiency in Texas. Adopted with an effective date of September 1, 2007, HB 3693 is an additional mechanism by which the state can encourage energy-efficiency through various means for School DISTRICTs, State Facilities and Political Jurisdictions in Texas.

HB 3693 includes the following state-wide mandates that apply differently according to the nature and origin of the entity:

Record, Report and Display Consumption Data
All Political Subdivisions, School DISTRICTs and State-Funded Institutes of Higher Education, are mandated to record and report the entity's metered resource consumption usage data for electricity, natural gas and water on a publically accessible internet page.
Note: The format, content and display of this information are determined by the entity or subdivision providing this information.

Energy Efficient Light Bulbs
All School DISTRICTs and State-Funded Institutes of Higher Education shall purchase and use energy-efficient light bulbs in education and housing facilities.

Who must comply?
The provisions in this bill will apply to entities including: Cities and Counties; School DISTRICTs; Institutes of Higher Education; State Facilities and Buildings.

How do you define energy-efficiency measures?

Energy-efficiency measures are defined as any facility modifications or changes in operations that reduce energy consumption. Energy-efficiency is a strategy that has the potential to conserve resources, save money** and better the quality of our air. They provide immediate savings and add minimal costs to your project budget.

Examples of energy-efficiency measures include:

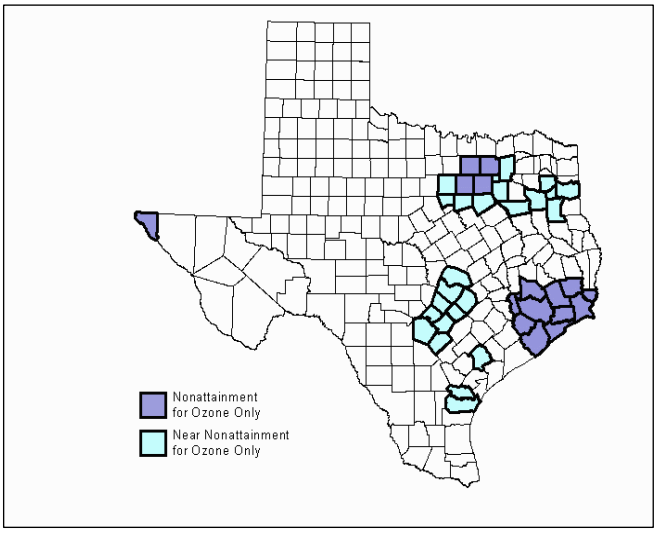
• installation of insulation and high-efficiency windows and doors • modifications or replacement of HVAC systems, lighting fixtures and electrical systems • installation of automatic energy control systems • installation of energy recovery systems or renewable energy generation equipment • building commissioning • development of energy efficient procurement specifications • employee awareness campaigns

***SECO's Preliminary Energy Assessment (PEA) program is an excellent resource for uncovering those energy-efficiency measures that can benefit your organization.*

What counties are affected?

All political jurisdictions located in the following Non-attainment and affected counties:

Bastrop Bexar Brazoria Caldwell Chambers Collin
Comal Dallas Denton El Paso Ellis Fort Bend
Galveston Gregg Guadalupe Hardin Harris Harrison
Hays Henderson Hood Hunt Jefferson Johnson
Kaufman Liberty Montgomery Nueces Orange Parker
Rockwall Rusk San Patricio Smith Tarrant Travis
Upshur Victoria Waller Williamson Wilson



What assistance is available for affected areas?

The Texas Energy Partnership is a partner with Energy Star©, who partners across the nation with the goal of improving building performance, reducing air emissions through reduced energy demand, and enhancing the quality of life through energy-efficiency and renewable energy technologies.

To assist jurisdictions, the Texas Energy Partnership will:

- Present workshops and training seminars in partnership with private industry on a range of topics that include energy services, financing, building technologies and energy performance rating and benchmarking

- Prepare information packages – containing flyers, documents and national lab reports about energy services, management tools and national, state and industry resources that will help communities throughout the region

- Launch an electronic newsletter to provide continuous updates and develop additional information packages as needed

Please contact Stephen Ross at 512-463-1770 for more information.

SECO Program Contact Information

LoanSTAR;
Preliminary Energy Assessments:
Eddy Trevino - 512-463-1876
Eddy.Trevino@cpa.state.tx.us

Schools & Local Govt Partnership Program:
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Engineering (Codes / Standards):
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Alternate Fuels / Transportation:
Venita Porter - 512-463-1779
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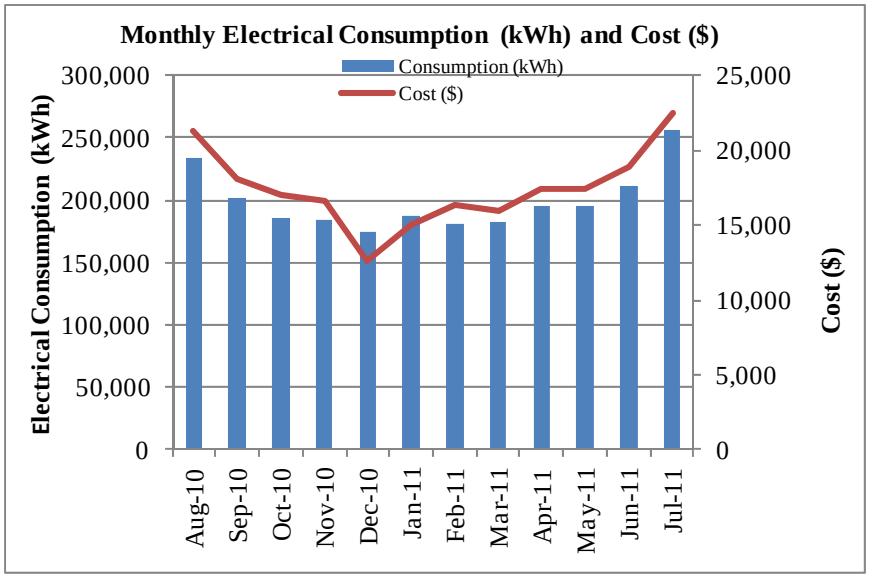
APPENDIX B

SAMPLE UTILITY DATA REPORTING FORM

Lakeway MUD - Sample Utility Input Form

MONTH	ELECTRICITY		
	KWH	COST $	Avg. Rate $/KWH
Aug-10	234,141	21,320	$0.0911
Sep-10	201,092	18,133	$0.0902
Oct-10	185,481	17,062	$0.0920
Nov-10	183,600	16,673	$0.0908
Dec-10	173,922	12,630	$0.0726
Jan-11	188,013	15,076	$0.0802
Feb-11	181,492	16,402	$0.0904
Mar-11	182,791	16,010	$0.0876
Apr-11	195,365	17,399	$0.0891
May-11	195,095	17,452	$0.0895
Jun-11	211,337	18,833	$0.0891
Jul-11	256,783	22,477	$0.0875
Total	2,389,112	$209,467	$0.0877



APPENDIX C

BASE YEAR CONSUMPTION HISTORY

Energy Cost and Consumption Benchmarks									
		Electric				Total	EUI	ECI	
	Building	kWh/Yr	MMBTU/Yr	kWh/SF	$Cost/Yr	MMBTU/Yr	kBTU/SF/Yr	$/SF/Yr	SF
1	District Office	52,600	180	10.52	4,888	180	36	0.98	5,000
2	Field Office*	-	-	-	-	-	-	-	3,000
3	Maintenance Building	13,262	45	5.30	1,265	45	18	0.51	2,500
		kWh/Yr	MMBTU/Yr	kWh/SF	$Cost/Yr	MMBTU/Yr	kBTU/SF/Yr	$/SF/Yr	SF
		65,862	225	6.27	6,153	225	21	0.59	10,500

*Field Office is currently metered together with the S-4 Wastewater Treatment Plant.

WWTP - Energy Cost and Consumption Benchmarks								
		Electric[1]			Design Capacity (MGD)	Average Effluent Flow (MGD)	EUI[3]	ECI[4]
	WWTP	kWh/Yr	kBtu/Yr[2]	$Cost/Yr			kBtu/GPD/Yr	$/MGD/Yr
1	S-4	1,009,800	3,445,438	$81,885	0.810	0.296	11.6	$276,640
2	S-5	450,400	1,536,765	$38,922	0.400	0.131	11.7	$297,112
		1,460,200	4,982,202	120,807	-	-	-	-

1. Electric consumption for WWTP is based on electric meter serving the main processing facility and does not account for other usage (i.e. lift stations, irrigation, etc.) which may be metered separately.
2. Electric consumption conversion based on 3.412 kBtu/kWh.
3. Energy Use Index (EUI) calculated based annual kBtu divided by the Average Effluent Flow in gallons per day (GPD).
4. Energy Cost Index (ECI) calculated based on annual energy cost divided by the Average Effluent Flow in million gallons per day (MGD).

WTP - Energy Cost and Consumption		
Electric[1]		
kWh/Yr	kBtu/Yr[2]	$Cost/Yr
723,850	2,469,776	$69,734

1. Electric consumption includes meter serving main processing facility and does not account for other usage (such as water booster pump stations).
2. Electric consumption conversion based on 3.412 kBtu/kWh.

ACCOUNT# 0109-2642-00 (W-3 A/B/C) 1890-7588-00 1327-7595-00 Electric
Gas

Entity: Lakeway MUD

BUILDING: Water Treatment Plant

FLOOR AREA: N/A estimated

		ELECTRICAL					NATURAL GAS / FUEL	
			DEMAND			TOTAL ALL		
		CONSUMPTION	METERED	CHARGED	COST OF	ELECTRIC	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND ($)	COSTS ($)	MCF	COSTS ($)
August	2010	78,000		391		7,858	0	0
September	2010	63,350		75		5,201	0	0
October	2010	60,050		394		6,199	0	0
November	2010	55,200		402		5,885	0	0
December	2010	45,550		252		3,024	0	0
January	2011	34,150		161		3,151	0	0
February	2011	40,650		267		4,551	0	0
March	2011	51,300		195		5,033	0	0
April	2011	62,550		274		6,203	0	0
May	2011	62,150		306		6,296	0	0
June	2011	75,200		253		7,076	0	0
July	2011	95,700		408		9,256	0	0
TOTAL		723,850				69,734	0.0	0

Annual Total Energy Cost = 69,734 $/year

Energy Use Index:

Total site BTU's/Yr ÷ Total Area (SF) = N/A kBTU/SF/year

Total KWH/yr x 0.003413 = 2,470.50 MMBTU/year
Total MCF/yr x 1.03 = 0.00 MMBTU/year
Total Other x_____ = 0.0 MMBTU/year
Total Site MMBTU's/yr = 2,471 MMBTU/year

Energy Cost Index:

Total Energy Cost/Yr ÷ Total Area (SF) = N/A $/SF/year

Electric Utility: Pedernales Electric Coop, Inc.

Gas Utility: _____

Entity: Lakeway MUD

ACCOUNT# 0428192-9 (S-4) Electric

Gas

BUILDING: Wastewater Treatment Plant S-4

FLOOR AREA: N/A estimated

		ELECTRICAL					NATURAL GAS / FUEL	
			DEMAND			TOTAL ALL		
		CONSUMPTION	METERED	CHARGED	COST OF	ELECTRIC	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND ($)	COSTS ($)	MCF	COSTS ($)
August	2010	94,200		184		7,718	0	0
September	2010	85,000		270		8,423	0	0
October	2010	73,200		160		6,236	0	0
November	2010	77,600		162		6,324	0	0
December	2010	74,800		168		6,249	0	0
January	2011	99,200		206		7,527	0	0
February	2011	86,200		196		6,760	0	0
March	2011	81,000		176		6,246	0	0
April	2011	78,800		176		6,139	0	0
May	2011	82,600		168		6,453	0	0
June	2011	78,200		172		6,295	0	0
July	2011	99,000		186		7,515	0	0
TOTAL		1,009,800				81,885	0.0	0

* Natural Gas service not included in this summary.

Annual Total Energy Cost = 81,885 $/year

Energy Use Index:

Total site BTU's/Yr ÷ Total Area (SF) = N/A kBTU/SF/year

Total KWH/yr x 0.003413 = 3,446.45 MMBTU/year

Total MCF/yr x 1.03 = 0.00 MMBTU/year

Total Other x_____ = 0.0 MMBTU/year

Total Site MMBTU's/yr = 3,446 MMBTU/year

Energy Cost Index:

Total Energy Cost/Yr ÷ Total Area (SF) = N/A $/SF/year

Electric Utility: City of Austin Energy

Gas Utility: _____

Entity: Lakeway MUD

ACCOUNT# 1452-5147-00 (S-5) Electric

Gas

BUILDING: Wastewater Treatment Plant S-5

FLOOR AREA: N/A estimated

		ELECTRICAL					NATURAL GAS / FUEL	
			DEMAND			TOTAL ALL		
		CONSUMPTION	METERED	CHARGED	COST OF	ELECTRIC	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND ($)	COSTS ($)	MCF	COSTS ($)
August	2010	41,000		120		3,729	0	0
September	2010	35,400		75		2,912	0	0
October	2010	35,200		116		3,063	0	0
November	2010	35,200		109		3,035	0	0
December	2010	39,400		120		2,490	0	0
January	2011	43,000		135		3,382	0	0
February	2011	41,800		131		3,831	0	0
March	2011	36,000		113		3,322	0	0
April	2011	36,600		118		3,386	0	0
May	2011	32,600		92		2,982	0	0
June	2011	35,600		121		3,325	0	0
July	2011	38,600		99		3,465	0	0
TOTAL		450,400				38,922	0.0	0

Annual Total Energy Cost = 38,922 $/year

Total KWH/yr x 0.003413 = 1,537.22 MMBTU/year

Total MCF/yr x 1.03 = 0.00 MMBTU/year

Total Other x_____ = 0.0 MMBTU/year

Total Site MMBTU's/yr = 1,537 MMBTU/year

Energy Use Index:

Total site BTU's/Yr ÷ Total Area (SF) = N/A kBTU/SF/year

Energy Cost Index:

Total Energy Cost/Yr ÷ Total Area (SF) = N/A $/SF/year

Electric Utility: Pedernales Electric Coop, Inc.

Gas Utility: _____

Entity: Lakeway MUD

ACCOUNT# 0045-2755-00 (D.O.) Electric

Gas

BUILDING: District Office

FLOOR AREA: 5,000 estimated

		ELECTRICAL					NATURAL GAS / FUEL	
			DEMAND			TOTAL ALL		
		CONSUMPTION	METERED	CHARGED	COST OF	ELECTRIC	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND ($)	COSTS ($)	MCF	COSTS ($)
August	2010	5,920		0		570	0	0
September	2010	5,320		0		484	0	0
October	2010	4,320		0		400	0	0
November	2010	3,640		0		343	0	0
December	2010	3,400		0		177	0	0
January	2011	3,640		0		318	0	0
February	2011	3,760		0		376	0	0
March	2011	3,600		0		361	0	0
April	2011	3,880		0		387	0	0
May	2011	4,200		0		415	0	0
June	2011	5,280		0		512	0	0
July	2011	5,640		0		545	0	0
TOTAL		52,600		0		4,888	0.0	0

Annual Total Energy Cost = 4,888 $/year

Total KWH/yr x 0.003413 = 179.52 MMBTU/year

Total MCF/yr x 1.03 = 0.00 MMBTU/year

Total Other x_____ = 0.0 MMBTU/year

Total Site MMBTU's/yr = 180 MMBTU/year

Energy Use Index:

Total site BTU's/Yr ÷ Total Area (SF) = 36 kBTU/SF/year

Energy Cost Index:

Total Energy Cost/Yr ÷ Total Area (SF) = 0.98 $/SF/year

Electric Utility: Pedernales Electric Coop, Inc.

Gas Utility: _____

Entity: Lakeway MUD

ACCOUNT# 0428193-7 (M-1) Electric

Gas

BUILDING: Maintenance Building

FLOOR AREA: 2,500 estimated

		ELECTRICAL					NATURAL GAS / FUEL	
			DEMAND			TOTAL ALL		
		CONSUMPTION	METERED	CHARGED	COST OF	ELECTRIC	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND ($)	COSTS ($)	MCF	COSTS ($)
August	2010	1,121		0		119	0	0
September	2010	1,297		0		137	0	0
October	2010	936		0		100	0	0
November	2010	785		0		72	0	0
December	2010	947		0		85	0	0
January	2011	873		0		74	0	0
February	2011	1,182		0		98	0	0
March	2011	1,091		0		91	0	0
April	2011	1,160		0		97	0	0
May	2011	845		0		87	0	0
June	2011	1,432		0		144	0	0
July	2011	1,593		0		159	0	0
TOTAL		13,262		0		1,265	0.0	0

Annual Total Energy Cost = 1,265 $/year

Total KWH/yr x 0.003413 = 45.26 MMBTU/year

Total MCF/yr x 1.03 = 0.00 MMBTU/year

Total Other x_____ = 0.0 MMBTU/year

Total Site MMBTU's/yr = 45 MMBTU/year

Energy Use Index:

Total site BTU's/Yr ÷ Total Area (SF) = 18 kBTU/SF/year

Energy Cost Index:

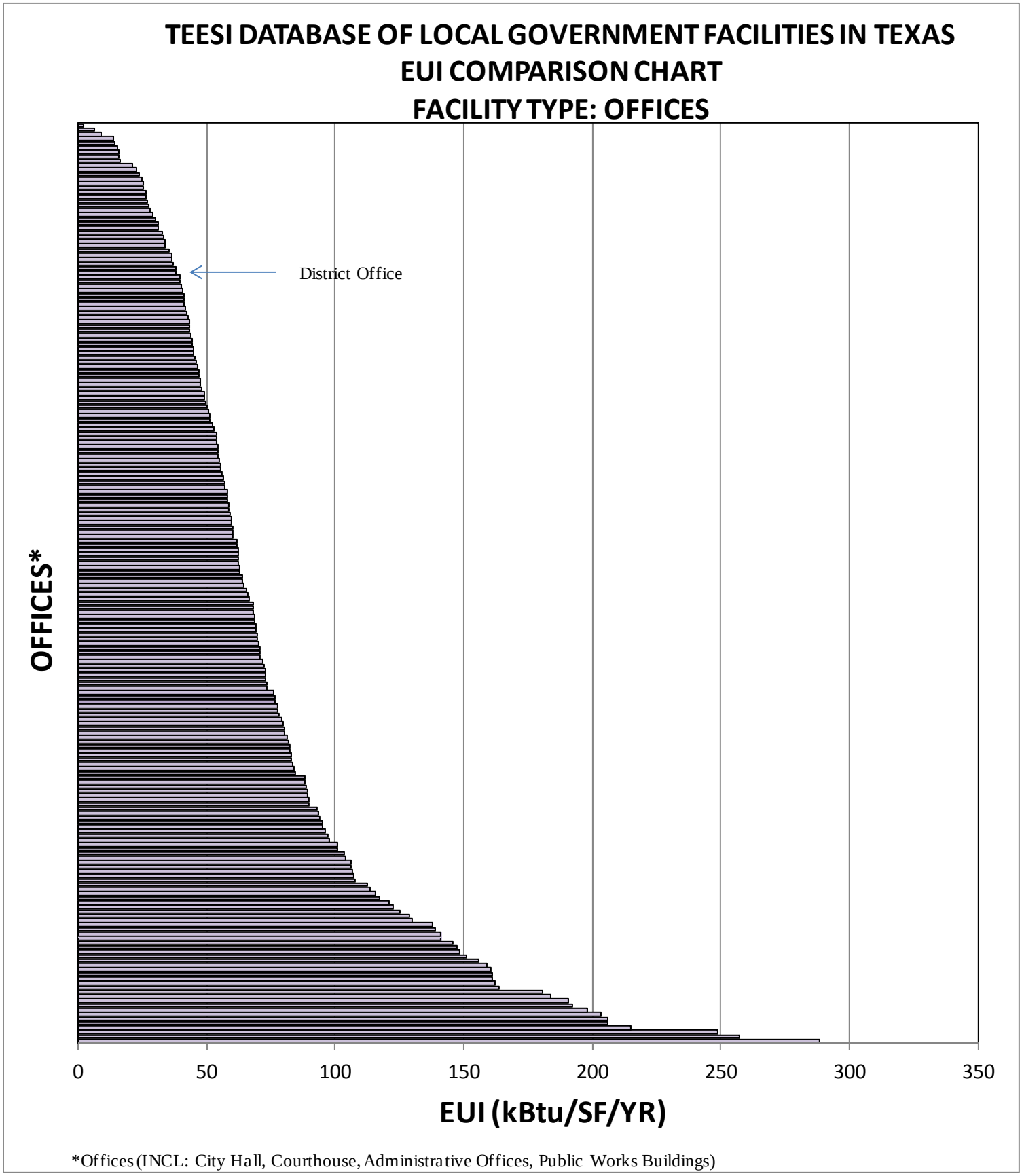
Total Energy Cost/Yr ÷ Total Area (SF) = 0.51 $/SF/year

Electric Utility: City of Austin Energy

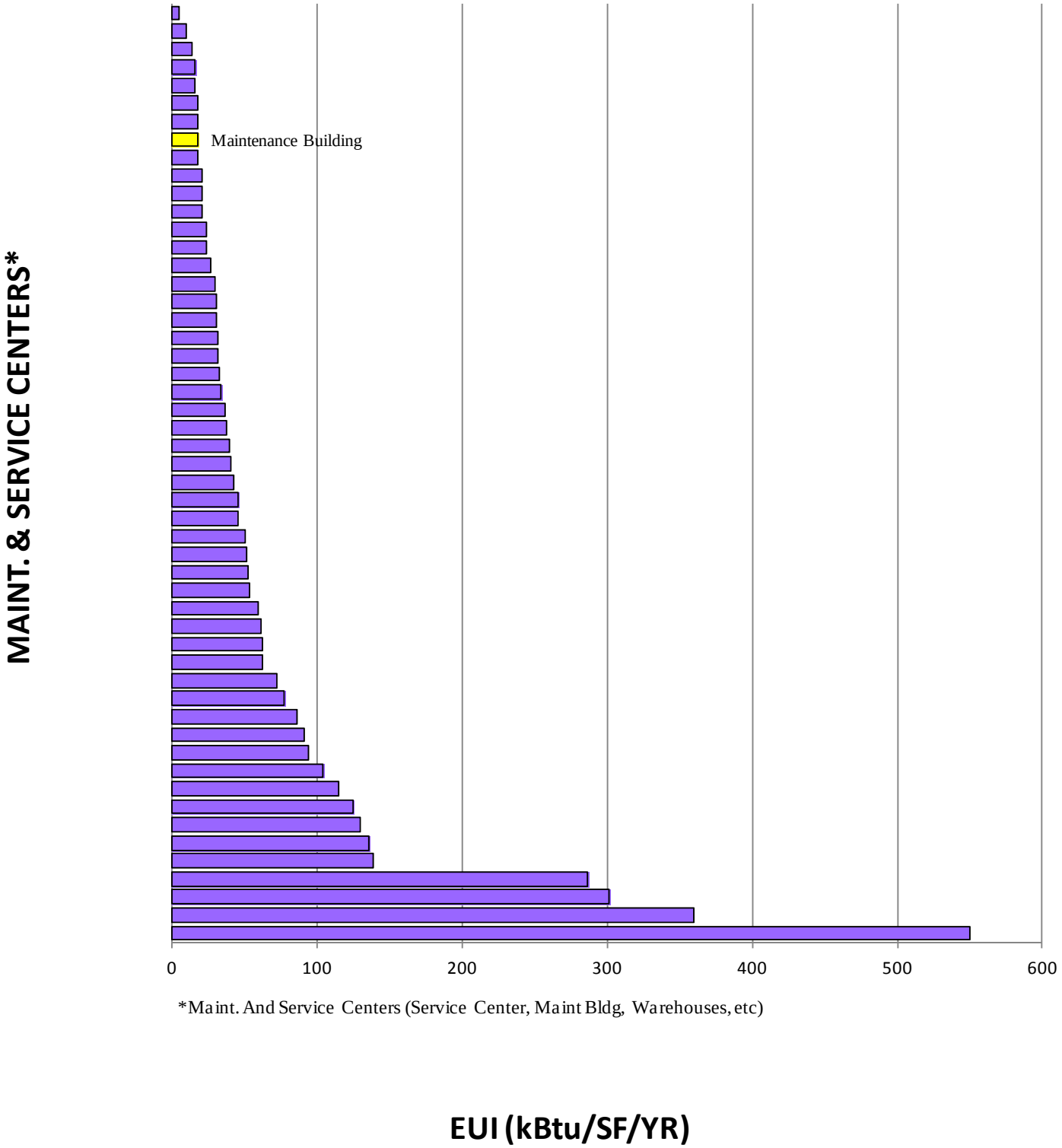
Gas Utility:

APPENDIX D

ENERGY PERFORMANCE COMPARISON CHARTS


TEESI DATABASE OF LOCAL GOVERNMENT FACILITIES IN TEXAS
EUI COMPARISON CHART
FACILITY TYPE: OFFICES
District Office
OFFICES*
0
50
100
150
200
250
300
350
EUI (kBtu/SF/YR)
*Offices (INCL: City Hall, Courthouse, Administrative Offices, Public Works Buildings)

TEESI DATABASE OF LOCAL GOVERNMENT FACILITIES IN TEXAS
EUI COMPARISON CHART
FACILITY TYPE: MAINT. & SERVICE CENTER



*Maint. And Service Centers (Service Center, Maint Bldg, Warehouses, etc)

APPENDIX E

TYPICAL EQUIPMENT MAINTENANCE CHECKLISTS

Pumps Checklist

Description	Comments	Maintenance Frequency			
		Daily	Weekly	Monthly	Annually
Pump use/sequencing	Turn off/sequence unnecessary pumps	X			
Overall visual inspection	Complete overall visual inspection to be sure all equipment is operating and safety systems are in place	X			
Check lubrication	Assure that all bearings are lubricated per the manufacture's recommendation			X	
Check packing	Check packing for wear and repack as necessary. Consider replacing packing with mechanical seals.			X	
Motor/pump alignment	Aligning the pump/motor coupling allows for efficient torque transfer to the pump			X	
Check mountings	Check and secure all pump mountings			X	
Check bearings	Inspect bearings and drive belts for wear. Adjust, repair, or replace as necessary.				X
Motor condition	Checking the condition of the motor through temperature or vibration analysis assures long life				X

Fans Checklist

Description	Comments	Maintenance Frequency			
		Daily	Weekly	Monthly	Annually
System use/sequencing	Turn off/sequence unnecessary equipment	X			
Overall visual inspection	Complete overall visual inspection to be sure all equipment is operating and safety systems are in place	X			
Observe belts	Verify proper belt tension and alignment			X	
Inspect pulley wheels	Clean and lubricate where required			X	
Inspect dampers	Confirm proper and complete closure control; outside air dampers should be airtight when closed			X	
Observe actuator/linkage control	Verify operation, clean, lubricate, adjust as needed			X	
Check fan blades	Validate proper rotation and clean when necessary			X	
Filters	Check for gaps, replace when dirty - monthly			X	
Check for air quality anomalies	Inspect for moisture/growth on walls, ceilings, carpets, and in/outside of duct-work. Check for musty smells and listen to complaints.			X	
Check wiring	Verify all electrical connections are tight				X
Inspect ductwork	Check and refasten loose connections, repair all leaks				X
Coils	Confirm that filters have kept clean, clean as necessary				X
Insulation	Inspect, repair, replace all compromised duct insulation				X

Electric Motors Checklist

Description	Comments	Maintenance Frequency			
		Daily	Weekly	Monthly	Annually
Motor use/sequencing	Turn off/sequence unnecessary motors	X			
Overall visual inspection	Complete overall visual inspection to be sure all equipment is operating and safety systems are in place	X			
Motor condition	Check the condition of the motor through temperature or vibration analysis and compare to baseline values		X		
Check lubrication	Assure that all bearings are lubricated per the manufacture's recommendation			X	
Check packing	Check packing for wear and repack as necessary. Consider replacing packing with mechanical seals.			X	
Motor alignment	Aligning the motor coupling allows for efficient torque transfer to the pump			X	
Check mountings	Check and secure all motor mountings			X	
Check terminal tightness	Tighten connection terminals as necessary			X	
Cleaning	Remove dust and dirt from motor to facilitate cooling			X	
Check bearings	Inspect bearings and drive belts for wear. Adjust, repair, or replace as necessary.				X
Motor condition	Checking the condition of the motor through temperature or vibration analysis assures long life				X
Check for balanced three-phase power	Unbalanced power can shorten the motor life through excessive heat build up				X
Check for over-voltage or under-voltage conditions	Over- or under-voltage situations can shorten the motor life through excessive heat build up				X

APPENDIX F

LOANSTAR INFORMATION

Texas LoanSTAR Program

FACTS ABOUT LoanSTAR

The State of Texas LoanSTAR (Saving Taxes and Resources) Program finances energy efficient facility up-grades for state agencies, public schools, institutions of higher education, local governments, municipalities, and hospitals. The program's revolving loan mechanism allows participants to borrow money and repay all project costs through the stream of **cost savings** produced.

ELIGIBLE PROJECTS

Up-grades financed through the program include, but are not limited to, (1) energy efficient lighting systems; (2) high efficiency heating, ventilation and air conditioning systems; (3) energy management systems; (4) boiler efficiency improvements; (5) energy recovery systems; (6) building shell improvements; and (7) load management projects. The prospective borrower hires a Professional Engineer to analyze the potential energy efficient projects that will be submitted for funding through the Loan STAR Program. All engineering costs are covered under the program.

PROGRAM REQUIREMENTS

Once the projects are analyzed and the prospective borrower agrees with the recommended projects, the engineer prepares an Energy Assessment Report (EAR) with the project descriptions and calculations. The EAR must be prepared according to the LoanSTAR Technical Guidelines. The EAR is reviewed and approved by the State Energy Conservation Office (SECO) technical staff before project financing is authorized. Projects financed by LoanSTAR must have an average simple payback of ten years or less. Borrowers do, however, have the option of buying down paybacks to meet the composite ten-year limit.

To ensure up-grade projects are designed and constructed according to the EAR, SECO performs a review of the design documents at the 50% and 100% completion phases. On-site construction monitoring is also performed at the 50% and 100% completion phases.

SAVINGS VERIFICATION

To ensure that the Borrower is achieving the estimated energy savings, monitoring and verification is required for all LoanSTAR funded projects. The level of monitoring and verifications may range from utility bill analysis to individual system or whole building metering depending on the size and type of retrofit projects. If whole building metering is required, metering and monitoring cost can be rolled into the loan.

For additional information regarding the
LoanSTAR program, please contact:

Eddy Trevino
SECO, LoanSTAR Program Manager
(512) 463-1876

APPENDIX G

REQUEST FOR ENERGY ASSISTANCE

State Energy Conservation Office

Local Governments and Municipalities

Preliminary Energy Assessment Service Agreement

Investing in our communities through improved energy efficiency in public buildings is a win-win opportunity for our communities and the state. Energy-efficient buildings reduce energy costs, increase available capital, spur economic growth, and improve working and living environments. The Preliminary Energy Assessment Service provides a viable strategy to achieve these goals.

Description of the Service

The State Energy Conservation Office (SECO) will analyze electric, gas and other utility data and work with Lakeway Municipal Utility District, hereinafter referred to as Partner, to identify energy cost-savings potential. To achieve this potential, SECO and Partner have agreed to work together to complete an energy assessment of mutually selected facilities.

SECO agrees to provide this service at no cost to the Partner with the understanding that the Partner is ready and willing to consider implementing the energy savings recommendations.

Principles of the Agreement

Specific responsibilities of the Partner and SECO in this agreement are listed below.

- ✓ Partner will select a contact person to work with SECO and its designated contractor to establish an Energy Policy and set realistic energy efficiency goals.
- ✓ SECO's contractor will go on site to provide walk through assessments of selected facilities. SECO will provide a report which identifies no cost/low cost recommendations, Capital Retrofit Projects, and potential sources of funding. Portions of this report may be posted on the SECO website.
- ✓ Partner will schedule a time for SECO's contractor to make a presentation of the assessment findings key decision makers.

Acceptance of Agreement

This agreement should be signed by your organization's chief executive officer or other upper management staff.

Signature: Earl D Foster

Date: July 13, 2011

Name (Mr./Ms./Dr.) Mr. Earl Foster

Title: General Manager

Organization: Lakeway Municipal Utility District

Phone: 512.261.6222 x 140

Street Address: 1097 Lohmans Crossing, Lakeway, TX 78734

Fax: 512.261.6681

Mailing Address: 1097 Lohmans Crossing, Lakeway, TX 78734

E-Mail: efoster@lakewaymud.org

County: Travis

Contact Information:

Name (Mr./Ms./Dr.): Ms. Christianne Castleberry, Castleberry Engineering

Title: District Engineer

Phone: 512.751.9272

Fax: 512.261.6681

E-Mail: c.castleberry@castleberryengineering.com

County: Travis

Please sign and mail or fax to: (A) Stephen Ross, **Local Governments and Municipalities** Program Administrator, State Energy Conservation Office, 111 E. 17th Street, Austin, Texas 78774. Phone: 512-463-1770. **Fax 512-475-2569. OR** (B) Saleem Khan, Texas Energy Engineering Services, Inc. 1301 Capital of TX HWY, B-325, Austin, TX 78746. **FAX 512-328-2533**