Susan Combs
Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

Lower Colorado River Authority

Water & Wastewater Facilities
3700 Lake Austin Blvd.
Austin, Texas 78703

Prepared by:

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SECO
State Energy Conservation Office

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Local Governments Energy Management Program

Lower Colorado River Authority
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1.0 EXECUTIVE SUMMARY

The Lower Colorado River Authority, now referred to as the LCRA, requested that Texas Energy Engineering Services, Inc. (TEESI) perform a Preliminary Energy Assessment (PEA) of several of their Water and Wastewater facilities. This report documents the preliminary analysis of facilities selected by the LCRA.

This service is provided at no cost to the LCRA 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 public entities for the purpose of planning, funding, and implementing energy saving measures, which will ultimately reduce the public entity's annual energy costs.

The annual cost savings, implementation cost estimate and simple payback for all utility cost reduction measures (UCRMs) identified in this preliminary analysis are summarized below. Individual projects are summarized in Section 7.0 of this report.

Implementation Cost Estimate:	$1,024,000
Annual Energy Cost Savings:	$334,100
Simple Payback:	3.1 years

Recommendations and information of interest to the LCRA is provided in this report regarding Energy Consumption and Performance (Section 3.0), Energy Accounting (Section 4.0), Energy Legislation Overview (Section 5.0), Recommended Maintenance & Operation Procedures (Section 6.0), Utility Cost Reduction Measures (Section 7.0), Facility Improvement Measures (Section 8.0), Energy Management Policy (Section 9.0), and Funding Options for Capital Energy Projects (Section 10.0). A follow-up visit to the LCRA 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 LCRA may require in planning, funding and implementing the recommendations of this report. The LCRA is encouraged to direct any questions or concerns to either of the following contact persons:

SECO / Mr. Stephen Ross	TEESI / Saleem Khan
(512) 463-1770	(512) 328-2533

2.0 FACILITY DESCRIPTIONS

This section provides a brief description of the Water and Wastewater facilities surveyed. The purpose of the onsite survey was to evaluate the major energy consuming equipment in each facility. The majority of these facilities' annual energy consumption is due to the processing and transportation of water and wastewater. Therefore, the focus of this preliminary assessment was to identify energy cost saving opportunities associated with the processing of water and wastewater. A general description of the facilities surveyed is provided below.

Lometa WTP

Water Processing Descriptions

The Lometa Water Treatment Plant (WTP) has a rated capacity of 1.0 MGD and currently operates at 0.4 MGD. Raw water is pumped approximately 10 miles from the Colorado River to an open reservoir located near the water treatment plant. From the reservoir, the water is conveyed by 3 – 15 HP constant speed vertical turbine pumps to and through the upflow clarifiers for initial treatment. Water from the clarifiers is then passed through sand and anthracite filters before going to storage in a 10,000-gallon clearwell. The high serve pump station then sends water through the distribution system by way of 3 – 60 HP high service centrifugal pumps to the 200,000 gallon Owens Tank and to the 500,000 gallon Kirby Tank.

Lometa WWTP

Water Processing Descriptions

The Lometa Wastewater Treatment Plant (WWTP) has a rated capacity of 0.10 MGD, and currently treats approximately 0.05 MGD. Flow is conveyed to the WWTP from two off-site lift stations and a gravity collection system. Flow enters the WWTP through a manually cleaned bar screen and grit chamber, then to the WWTP's main lift station whereby the raw wastewater is pumped to the oxidation ditch by 2 – 10 HP submersible pumps. Aeration and mixing of the oxidation ditch is accomplished by two rotating brushes using 2 – 15 HP motors. Flow then enters two (2) final clarifiers for solids removal and clarification before passing through the chlorine contact chamber for disinfection before being discharged to the creek. Settled sludge from clarifiers is returned to the oxidation ditch. Built-up solids are removed from the oxidation ditch to sludge drying beds. Dried sludge is then removed from the site in bulk to a land application site by use of 25 C.Y. rolloff containers.

Ridge Harbor WTP

Water Processing Descriptions

The Ridge Harbor Water Treatment Plant (WTP) has a rated capacity of 0.144 MGD. Its flow schematic begins with a submersible pump on a floating platform in Lake Travis which pumps raw water to two treatment units, then to a clearwell. The high service pump station pumps from the clearwell utilizing 3 – 15 HP High Service Pumps and utilizes a 5,000-gallon hydropneumatic tank for pressure maintenance.

Ridge Harbor WWTP

Water Processing Descriptions

The Ridge Harbor Wastewater Treatment Plant (WWTP) has a rated capacity of 0.108 MGD and currently operates at 0.016 MGD. The WWTP incorporates the activated sludge process with coarse bubble center plate aeration. The flow schematic begins with two offsite lift stations which pump to the aeration basin, followed by a final clarifier, disinfection, effluent storage, effluent irrigation pumps, pressure filtration, and effluent irrigation. Sludge processing utilizes an aerobic digester with onsite decanting and then hauling liquid sludge estimated at 2% solids to another WWTP for further processing. The two aeration blowers utilized are Metek centrifugal dual blowers using 15 HP motors.

Sunrise Beach WTP

Water Processing Descriptions

The Sunrise Beach Water Treatment Plant (WTP) has a rated capacity estimated at 0.432 MGD. Its raw water source is a well field which consists of 1 – 20 gpm well, 1 – 38 gpm well, 1 – 90 gpm well, and 2 – 350 gpm wells. The well water is disinfected and stored in a 20,000-gallon fiberglass reservoir. The High Service Pump Station consists of 3 – 50 HP pumps each rated at 340 gpm and pumps through a small diameter water transmission line sequence of 6" - 8" - 6" pipelines (about 3 miles) to a 110,000 gallon elevated water storage tank. The water distribution system has an inherent problem with water hammer due to the frequent cycle of the high service pumps. Pressure reducing valves (PRVs) have been installed at all connections into neighborhoods to reduce pressure spikes and clay valves have been installed at the high service pumps to control water hammering.

West Travis County Regional WTP

Water Processing Descriptions

The West Travis County Regional Water Treatment Plant (WTP) has a rated capacity of 23.0 MGD and is currently operating at 9.0 MGD. This WTP utilizes 2 upflow solids contact units and 4 Trident Microfloc units. Its raw water pump station is approximately 2 miles away near the shoreline of Lake Travis.

The raw water pump station has 3 – 700 HP constant speed pumps and 2 – 700 HP VFD pumps. The raw water pumps convey water to the WTP units where it is treated and stored in a 90,000 clearwell. Then, 3 – 200 HP VFD transfer pumps pump this treated water to the high end of the plant to 2 – 1.5 MG clearwells. Here, the High Service Pump Station sends water into the transmission system and consists of 4 – 400 HP constant speed pumps and 2 – 250 HP constant speed pumps. The High Service Pump Station sends water to three separate pressure planes (P.P.) noted as 1400 ft. P.P., 1212 ft. P.P., and the 1,080 ft. P.P.

Camp Swift WWTP

Water Processing Descriptions

The Camp Swift Wastewater Treatment Plant (WWTP) utilizes two different types of treatment processes with influent flow being split between the two processes. The two processes are a membrane biological reactor process which has a rated capacity of 0.35 MGD, and an aerated lagoon process which has a rated capacity of 0.40 MGD, for a combined total rated capacity of 0.75 MGD. Currently, the WWTP is treating approximately 0.23 MGD. The WWTP receives its flow from two off-site wastewater lift stations. Lift Station #1 is located at Green Valley and has two submersible constant speed pumps, and Lift Station #4 has two submersible constant speed pumps.

Raw wastewater coming to the plant flows into an influent chamber where the flow is then split between the membrane biological reactor process and the aerated lagoon process. Aeration is supplied to the membrane biological reactor by 2 – 50 HP VFD controlled positive displacement blowers, and 1 – 25 HP constant speed positive displacement pre-aeration blower. Solids in the membrane biological reactor are separated from the liquid by filtration through membrane filters located within the aeration chambers. Treated filtered effluent from the membrane aeration chambers is removed by use of 4 – 5 HP Gorman-Rupp pumps, which also conveys the treated effluent to the ultraviolet (UV) disinfection channel for disinfection. Flow from the UV channel goes to the effluent pump station where two submersible constant speed pumps discharge treated effluent to a small creek located about ¼ mile from the wastewater treatment plant. Waste activated sludge (WAS) is removed from aeration chambers utilizing 1 – 5 HP pump. WAS is pumped to sludge drying beds which are at a higher elevation than aeration chambers for drying before being disposed by bulk hauloff using 25 C.Y. rolloff containers. Flow enters the aerated lagoon by gravity. Aeration is provided by 8 – 10 HP floating surface aerators. Effluent from the lagoon flows by gravity to the settling pond for clarification before it is disposed by effluent irrigation.

Camp Swift WWTP Effluent Irrigation Pump Station

The Camp Swift WWTP stores treated effluent in an effluent storage pond. An effluent irrigation pump station transfers this effluent for disposal onto agricultural fields using center pivot sprinkler irrigation systems. The effluent irrigation pump station utilizes 2 – 75 HP constant speed centrifugal pumps.

Elgin WWTP

Water Processing Descriptions

The Elgin Wastewater Treatment Plant (WWTP) has a rated capacity of 0.95 MGD and is currently treating approximately 0.60 MGD.

The WWTP flow schematic consists of a main lift station which has 2 – 15 HP constant speed wet pit/dry pit pumps. Raw sewage is pumped to a manually cleaned bar screen, then to the carrousel aeration for treatment. From the carrousel aeration flow enters the final clarifier. Return activated sludge is removed from the bottom of the final clarifier and returned to the carrousel aeration for further treatment. Treated effluent from the final clarifier passes through the chlorine contact chamber for disinfection before entering tertiary filters for final treatment before being discharged to surface waters.

Solids are removed from the system by wasting sludge from the carrousel aeration to the sludge thickener. Thickened sludge is then sent to a one (1) meter mobile belt filter press. Dewatered sludge from the belt filter press is then disposed of at a permitted waste disposal site.

Lake Pointe WWTP

Water Processing Descriptions

The Lake Pointe Wastewater Treatment Plant (WWTP) has a rated capacity of 0.67 MGD and currently treats about 0.53 MGD. The WWTP utilizes the activated sludge process with complete mix coarse bubble aeration. The flow schematic includes a submersible lift station, 2 complete mix aeration basins with final clarifiers, chlorination, tertiary filtration, and effluent irrigation. The aeration system incorporates 4 – 50 HP centrifugal blowers. The effluent irrigation system incorporates 3 – 60 HP vertical turbine pumps. Waste sludge is hauled in liquid form estimated at 2% solids to another WWTP for further processing.

Windmill Ranch WWTP

Water Processing Descriptions

The Windmill Ranch Wastewater Treatment Plant has a rated capacity of 0.25 MGD flow and currently treats approximately 0.1 MGD. The Influent Lift Station consists of 2 – 30 HP submersible pumps which pump the incoming wastewater through a rotating fine screen which is powered by a 5 HP constant speed motor. Flow from the rotating fine screen goes into the flow equalization basin where the incoming wastewater is combined with return activated sludge from the membrane aeration chambers. Located in the flow equalization basin are 3 – 5 HP submersible constant speed pumps. These pumps convey the combined wastewater liquid to the membrane aeration chambers for treatment. Solids in the membrane aeration chambers are separated from the liquid by filtration through membrane filters. Treated and filtered effluent from the membrane aeration chamber is removed by use of 3 – 5 HP pumps, which is then sent to an ultraviolet light disinfection channel for disinfection. Flow from the ultraviolet light disinfection channel flows to the effluent pump station where the treated effluent is pumped by 2 – 5 HP effluent pumps to irrigation fields located near the wastewater plant. Waste sludge is removed from the plant in liquid form by tank trucks to another wastewater treatment plant for further processing. Also, there is 1 – 1 HP waste pump for on-site wastewater removal.

3.0 ENERGY CONSUMPTION AND PERFORMANCE

A site survey was conducted at several of the LCRA's facilities. Annual electric invoices summarized in this report were for the 12-month period ending June 2010. A summary of annual utility costs is provided in **Appendix B**, Base Year Consumption History.

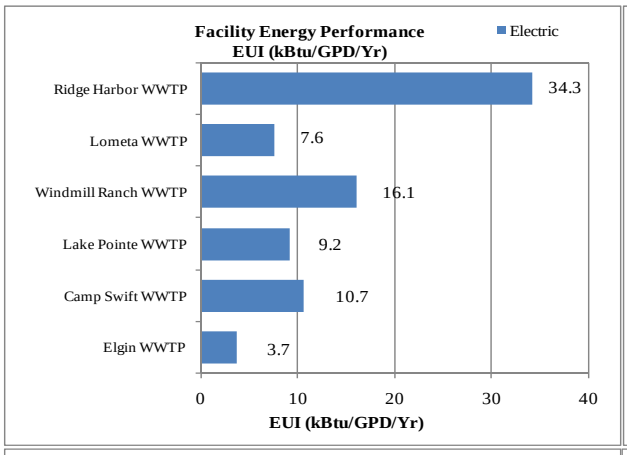
To help the LCRA evaluate the overall energy performance of its facilities TEESI has calculated their Energy Utilization Index (EUI) and Energy Cost Index (ECI) several of its Water and Wastewater Treatment Facilities. The EUI was calculated based on the facility's annual energy usage per annual average effluent flow; it is measured as thousand BTU's 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 plants are listed below, and a comparison graph is on the following page:

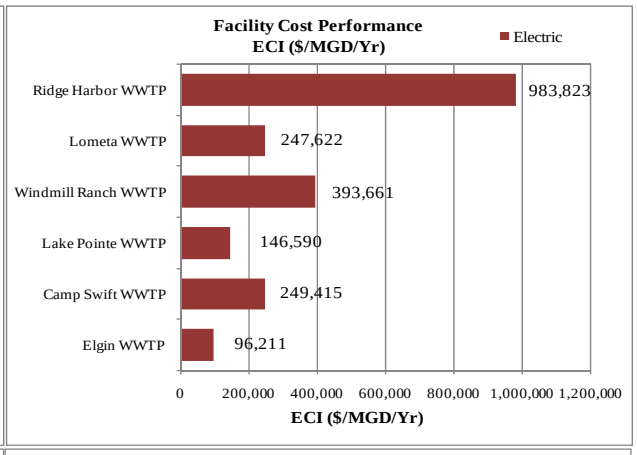
TABLE 1 – WWTP ENERGY CONSUMPTION AND PERFORMANCE

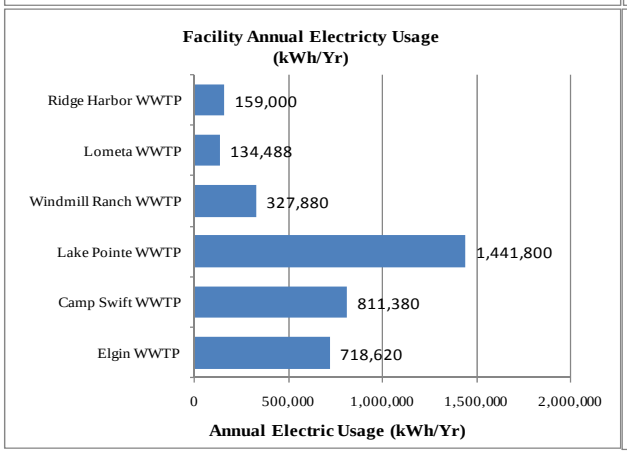
WWTP - Energy Cost and Consumption Benchmarks

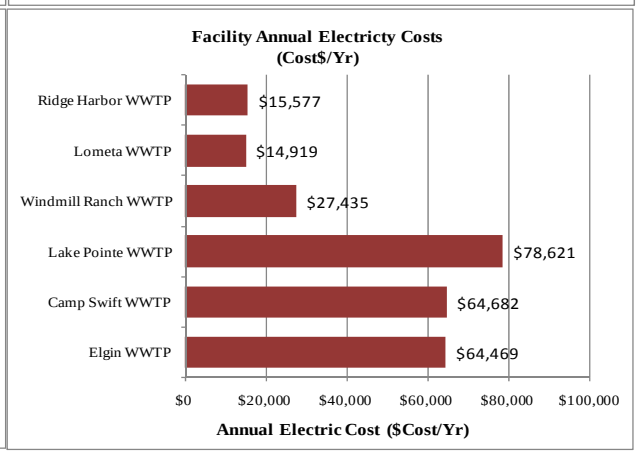
		Electric[1]			Design Capacity (MGD)	Average Effluent Flow[3] (MGD)	EUI[4]	ECI[5]
	WWTP	kWh/Yr	kBtu/Yr[2]	$Cost/Yr			kBtu/GPD/Yr	$/MGD/Yr
1	Elgin WWTP	718,620	2,451,931	$64,469	0.950	0.670	3.7	$96,211
2	Camp Swift WWTP	811,380	2,768,429	$64,682	0.700	0.259	10.7	$249,415
3	Lake Pointe WWTP	1,441,800	4,919,422	$78,621	0.525	0.536	9.2	$146,590
4	Windmill Ranch WWTP	327,880	1,118,727	$27,435	0.250	0.070	16.1	$393,661
5	Lometa WWTP	134,488	458,873	$14,919	0.100	0.060	7.6	$247,622
6	Ridge Harbor WWTP	159,000	542,508	$15,577	0.018	0.016	34.3	$983,823
		3,593,168	12,259,889	$265,704	-	-	-	-

1. Electric consumption is based on electric meters serving the main WWTP 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 STAR Portfolio Manager requires the Influent flow (MGD) to calculate a performance rating. For this analysis Effluent flow was considered to be sufficient for benchmarking purposes.
4. Energy Use Index (EUI) calculated based annual kBtu divided by the Average Effluent Flow in gallons per day (GPD).
5. Energy Cost Index (ECI) calculated based on annual energy cost divided by the Average Effluent Flow in million gallons per day (MGD).

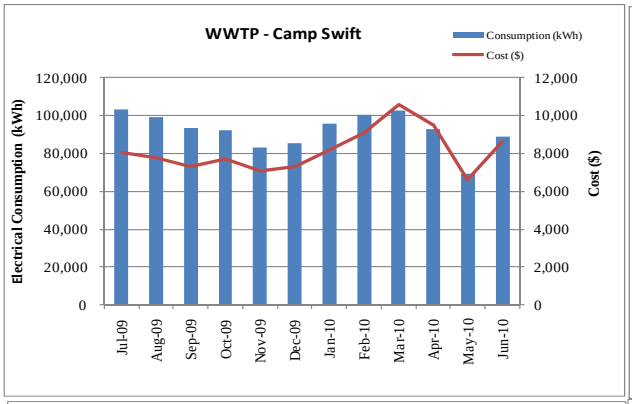

Facility Energy Performance
EUI (kBtu/GPD/Yr)
Electric
Ridge Harbor WWTP
Lometa WWTP
Windmill Ranch WWTP
Lake Pointe WWTP
Camp Swift WWTP
Elgin WWTP
34.3
7.6
16.1
9.2
10.7
3.7
0
10
20
30
40
EUI (kBtu/GPD/Yr)

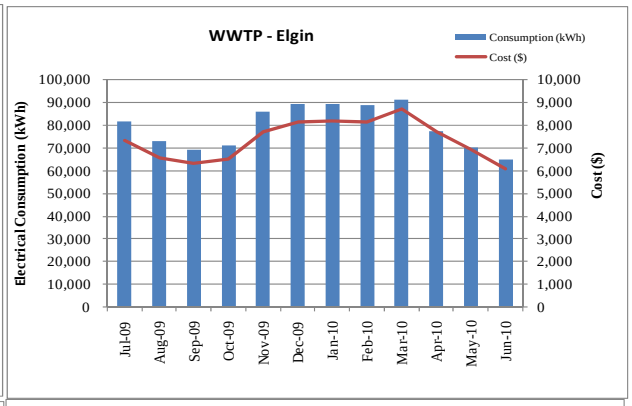

Facility Cost Performance
ECI ($/MGD/Yr)
Electric
Ridge Harbor WWTP
Lometa WWTP
Windmill Ranch WWTP
Lake Pointe WWTP
Camp Swift WWTP
Elgin WWTP
983,823
247,622
393,661
146,590
249,415
96,211
0
200,000
400,000
600,000
800,000
1,000,000
1,200,000
ECI ($/MGD/Yr)

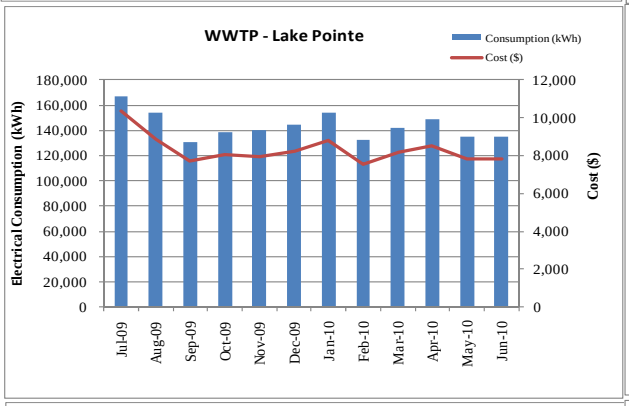

Facility Annual Electricty Usage
(kWh/Yr)
Ridge Harbor WWTP
Lometa WWTP
Windmill Ranch WWTP
Lake Pointe WWTP
Camp Swift WWTP
Elgin WWTP
159,000
134,488
327,880
1,441,800
811,380
718,620
0
500,000
1,000,000
1,500,000
2,000,000
Annual Electric Usage (kWh/Yr)

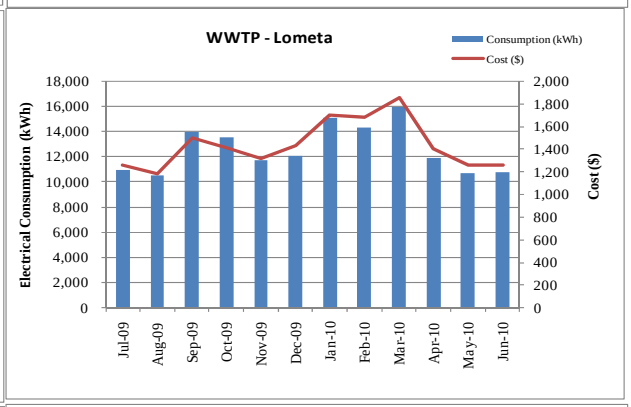

Facility Annual Electricty Costs
(Cost$/Yr)
Ridge Harbor WWTP
Lometa WWTP
Windmill Ranch WWTP
Lake Pointe WWTP
Camp Swift WWTP
Elgin WWTP
$15,577
$14,919
$27,435
$78,621
$64,682
$64,469
$0
$20,000
$40,000
$60,000
$80,000
$100,000
Annual Electric Cost ($Cost/Yr)

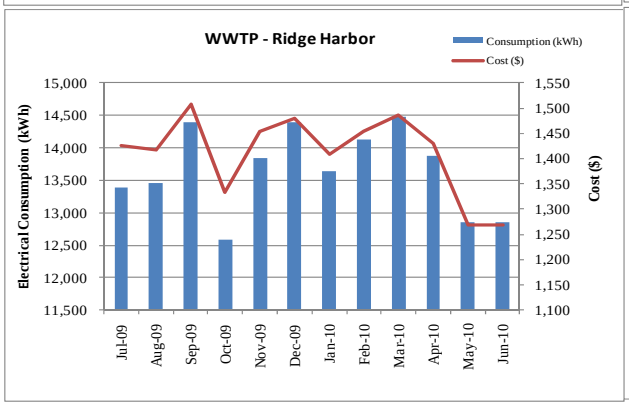
Below are the monthly usage and cost profiles for the WWTP facilities listed above.

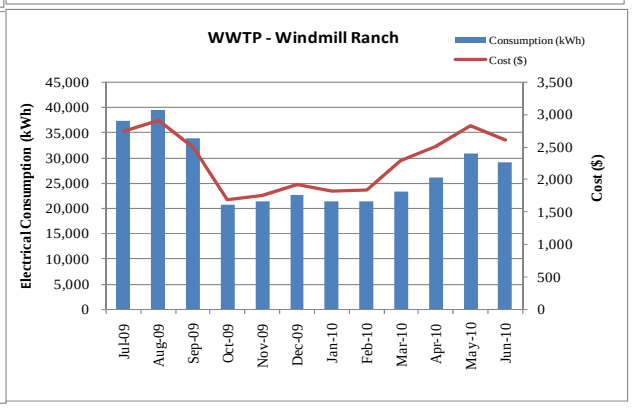










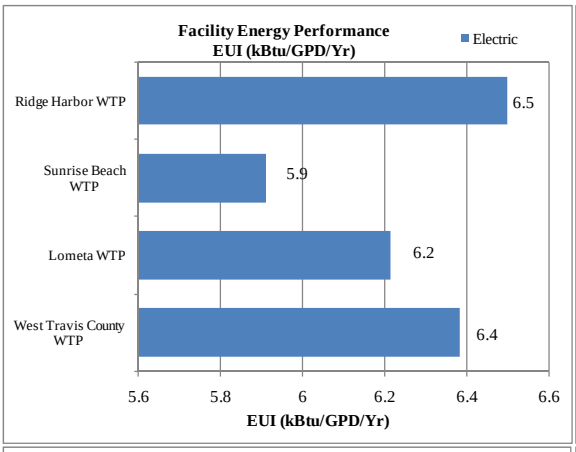


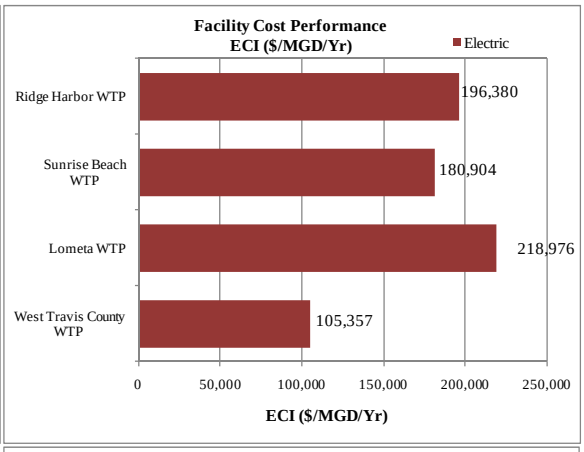
The EUI and ECI performance for the water treatment plants are listed below:

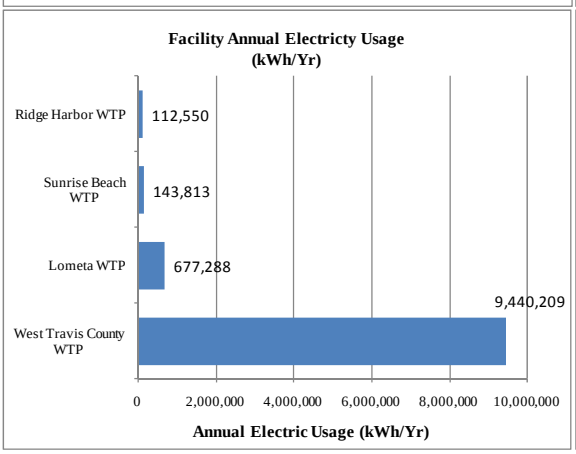
TABLE 2 – WTP ENERGY CONSUMPTION AND PERFORMANCE

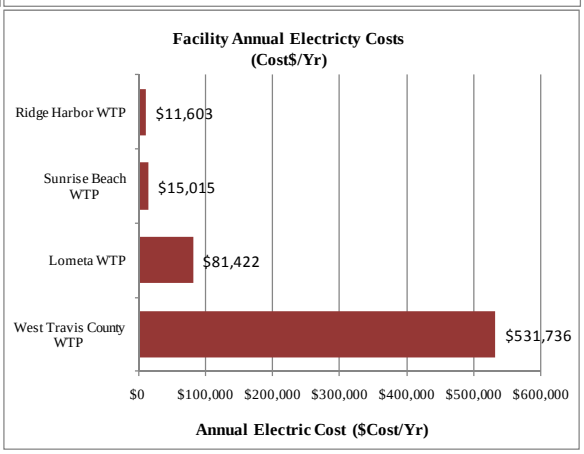
WTP- Energy Cost and Consumption Benchmarks								
		Electric[1]			Design Capacity (MGD)	Average Flow[3] (MGD)	EUI[4]	ECI[5]
	WWTP	kWh/Yr	kBtu/Yr[2]	$Cost/Yr			kBtu/GPD/Yr	$/MGD/Yr
1	West Travis County WTP	9,440,209	32,209,993	$531,736	20.000	5.05	6.4	$105,357
2	Lometa WTP	677,288	2,310,907	$81,422	1.000	0.37	6.2	$218,976
3	Sunrise Beach WTP	143,813	490,690	$15,015	0.470	0.08	5.9	$180,904
4	Ridge Harbor WTP	112,550	384,021	$11,603	0.144	0.06	6.5	$196,380
		10,373,860	35,395,610	$639,776	-	-	-	-

1. Electric consumption includes several utility accounts, see Appendix B for detail (includes booster pumps, treatment, etc.).
2. Electric consumption conversion based on 3.412 kBtu/kWH.
3. Average flow based on 12 month average Influent Flow.
4. Energy Use Index (EUI) calculated based annual kBtu divided by the Average Effluent Flow in gallons per day (GPD).
5. Energy Cost Index (ECI) calculated based on annual energy cost divided by the Average Effluent Flow in million gallons per day (MGD).

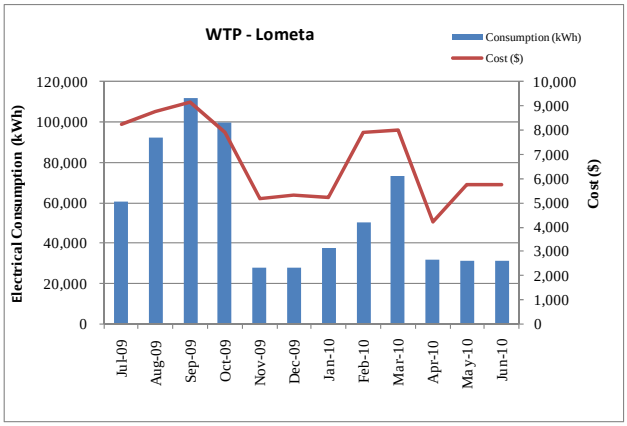


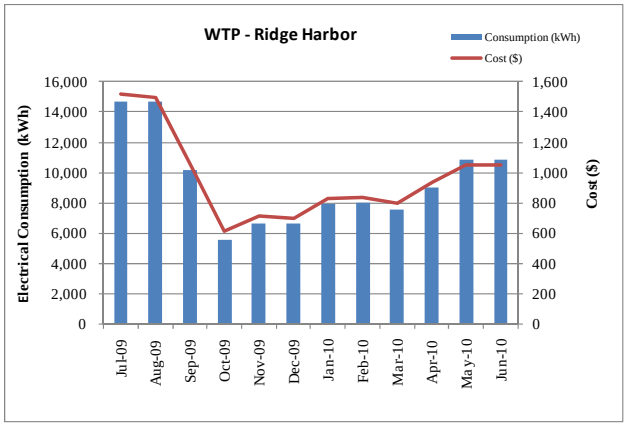


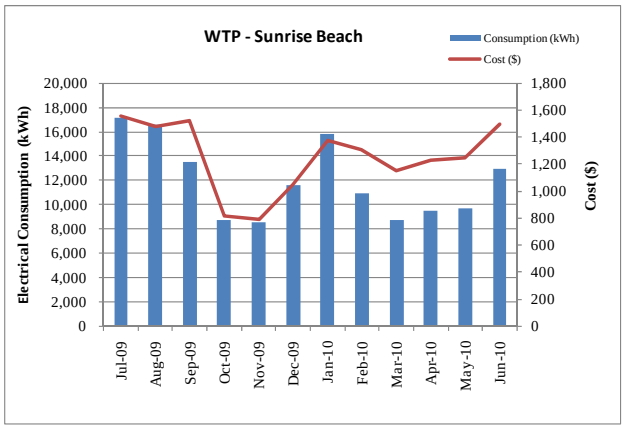


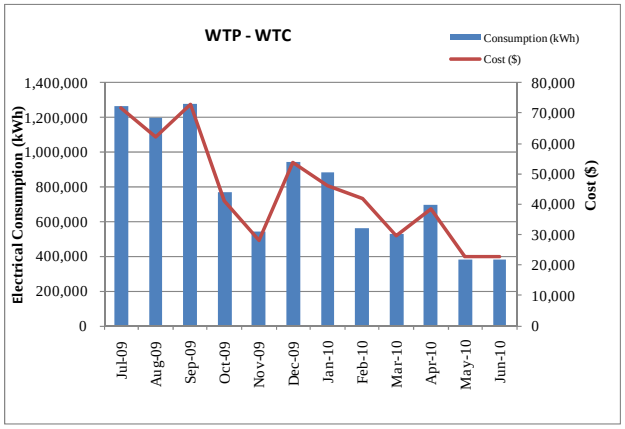


Below are the monthly usage and cost profiles for the WTP facilities listed above.









4.0 ENERGY ACCOUNTING

UTILITY PROVIDERS

Hamilton Electric Co-Op and Lampasas Public Utilities provides electric service to the Lometa WTP and WWTP. CTEC provides electric service to Sunrise Beach WTP. PEC provides electric service to Ridge Harbor WTP and WWTP. Direct Energy provides electric service to Elgin WWTP. Bluebonnet Electric provides electric service to Camp Swift WWTP and Windmill Ranch WWTP. City of Austin provides electric service to Lake Pointe WWTP and West Travis County WTP.

UTILITY PROVIDER	FACILITY
Hamilton Electric Co-Op	Lometa WTP Lometa WWTP
Central Texas Electric Co-Op (CTEC)	Sunrise Beach WTP
Pedernales Electric Co-Op (PEC)	Ridge Harbor WTP Ridge Harbor WWTP
Direct Energy	Elgin WWTP
Bluebonnet Electric	Camp Swift WWTP Windmill Ranch WWTP
City of Austin	Lake Pointe WWTP West Travis County WTP

MONITORING AND TRACKING

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 LCRA currently is consolidating and recording all the LCRA's Water and Wastewater Treatment Facilities' utility accounts into an electronic spreadsheet. This practice should be continued and encouraged.

In addition, the LCRA should track the energy performance of each facility by comparing each water and wastewater processing facilities' annual average daily flow (MGD) to the total energy required to process and transport the water. Tables 1 and 2 found in Section 3 provides an example on how to benchmark these facilities.

Having this historical data improves the LCRA's awareness of their energy performance and will help in tracking their energy reduction goals. The LCRA can use this data to track utility consumption patterns and budget utility expenses.

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.

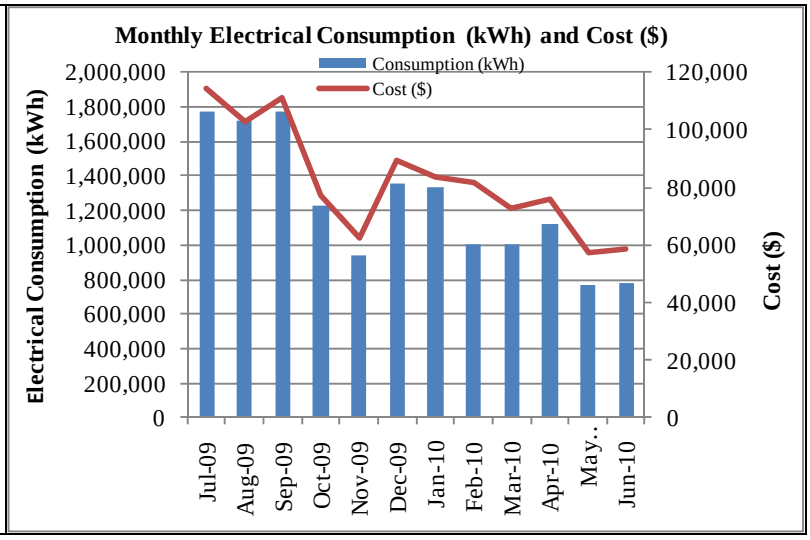
3. Identify necessary corrective actions. This step is essential for identifying if a specific activity is not meeting its expected performance and is in need of review.

In addition, having this historical utility data would facilitate **House** and **Senate Bill(s)** reporting requirements if applicable. Please see Section 5.0 for additional information regarding these requirements.

Furthermore, below is a sample format that LCRA can customize to help summarize their overall utility usage and costs. The data presented below is a summation of the data provided by the LCRA. This data below includes only selected utility account and is for reference purposes only and does not represent the LCRA's total utility data. See **Appendix B** for further detail regarding each utility account represented in the table below.

LCRA - Sample Utility Input Form

MONTH	ELECTRICITY		
	KWH	COST $	Avg. Rate $/KWH
Jul-09	1,774,283	114,282	$0.0644
Aug-09	1,714,263	102,585	$0.0598
Sep-09	1,771,247	111,470	$0.0629
Oct-09	1,229,288	77,197	$0.0628
Nov-09	940,146	62,201	$0.0662
Dec-09	1,360,503	89,503	$0.0658
Jan-10	1,331,858	83,579	$0.0628
Feb-10	1,003,248	81,742	$0.0815
Mar-10	1,008,136	72,860	$0.0723
Apr-10	1,119,685	75,991	$0.0679
May-10	764,389	57,543	$0.0753
Jun-10	780,217	58,650	$0.0752
Total	14,797,263	$987,603	$0.0667



ENERGY STAR PORTFOLIO MANAGER - BENCHMARKING

To help benchmarking water and wastewater facilities the LCRA should consider using ENERGY STAR Portfolio Manager. Portfolio Manager is a useful tool that managers of water treatment facilities can use to track energy use, energy costs, and associated carbon emissions.

ENERGY STAR Portfolio Manger is a web-based tool developed by the EPA and DOE. The ENERGY STAR benchmarking capability for wastewater treatment facilities in US EPA's Portfolio Manager provides a mechanism for a high-level assessment of a facility's relative energy efficiency. It offers the ability to compare the energy use of the LCRA plants with other peer plants using the EPA energy performance rating system. The following are the typical inputs required by ENERGY STAR Portfolio Manager for benchmarking purposes.

ENERGY STAR Portfolio Manger – Water and Wastewater Benchmarking Inputs

WASTEWATER TREATMENT PLANT	WATER TREATMENT PLANT
Energy Data Total annual electricity Utility Provider Operational Data Average influent flow (MGD) Average influent BOD Average effluent BOD Plant design flow rate (MGD) Fixed Film trickle filtration (Y/N) Nutrient Removal (Y/N) Plant Location (Zipcode)	Energy Data Total annual electricity Utility Provider Operational Data Average influent flow (MGD) Plant Location (Zipcode)

More information regarding ENERGY STAR Portfolio Manager can be found by following the link below.

ENERGY STAR Portfolio Manager
http://www.energystar.gov/index.cfm?c=water.wastewater_drinking_water

5.0 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.

Energy-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).

6.0 RECOMMENDED MAINTENANCE & OPERATION PROCEDURES

This sections provides general maintenance and operations recommendations that may improve energy performance for the LCRA's water processing facilities.

M&O Recommendations - Processing Buildings/Facilities

1) 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.

2) 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.

3) 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.

4) CONTROL DISSOLVED OXYGEN LEVEL IN WWTP

Reducing aeration to maintain dissolved oxygen levels of 2.0 mg/l or less could reduce power draw. Adjusting air inlet control valves or utilizing Variable Frequency Drive or dual speed motors, or simply operating fewer units to maintain minimum dissolved oxygen levels will save power.

5) UTILIZE EFFICIENT AERATION METHOD IN WASTEWATER TREATMENT

Using efficient aeration methods in wastewater treatment can save 40-50% in power consumption. Coarse bubble aeration is generally the least efficient type of aeration used in wastewater treatment. More efficient methods include fine bubble aeration and mechanical surface aeration.

6) PUMP AND MOTOR TYPICAL MAINTENANCE CHECKLIST

Effective operation and maintenance of equipment, such as pumps and motors, is one of the most cost effective ways to achieve reliability, safety, and efficiency. Effectively maintaining such equipment can significantly reduce energy waste and improve 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. Pumps and motors are responsible for the majority of the energy consumed by water & wastewater treatment plants, and many measures taken for increased efficiency can be taken at no cost. Examples of typical maintenance checklists for common equipment are provided in **Appendix C**. 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.

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 LCRA'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.

T12 TO T8 FLUORESCENT LIGHTING REPLACEMENT

Several of the LCRA's Water and Wastewater buildings have a combination of T8 and T12 Fluorescent fixtures. It is recommended the LCRA replace the existing T12 fluorescent lamps and magnetic ballasts with high efficiency T-8 fluorescent lamps and electronic ballasts. Typical four-foot, two-lamp magnetic ballast fixtures require 80 watts, while electronic ballasts and T-8 lamps in the same fixture configuration require only 50 watts. Exact cost, quantities, and lamp types can be identified through a detailed energy audit. In addition, a detailed lighting design calculation will help ensure the appropriate lighting replacement is selected. For example, a detailed design calculation may identify areas that could operate with fewer lamps per fixtures or with low-wattage T8 lamps while still maintaining adequate lighting levels.

T-12 fixtures were found in the following buildings: Camp Swift WWTP, Elgin WWTP, Lometa WWTP

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%. A detailed lighting analysis will be required to determine exact cost, quantities and configuration to maximize the energy savings and lighting performance.

T-8 fixtures were found in the following buildings: Lometa WTP, Windmill Ranch WWTP, Camp Swift WWTP, and Elgin WWTP.

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 LCRA 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 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.

CONTROL OUTSIDE AIR INFILTRATION

Conduct periodic inspections of door and window weather-stripping, and schedule repairs when needed. Additionally, make sure doors and windows open to outside 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.

IMPROVE CONTROL OF INTERIOR & EXTERIOR LIGHTING

Establish procedures to monitor use of lighting at times and places of possible/probable unnecessary use: Offices and warehouse, maintenance shops, closets, and exterior lighting, etc. **Spaces with intermittent use may benefit with the installation of motion activated lighting controls.**

7.0 UTILITY COST REDUCTION MEASURES (UCRMS)

Utility Cost Reduction Measures (UCRMs) identified during the preliminary analysis are detailed below. The cost estimates outlined below represents all associated construction costs (labor and material) to implement the indentified measures, excluding any professional services fees (i.e. engineering, testing and surveying, etc.).

REPLACE COARSE BUBBLE DIFFUSERS WITH FINE BUBBLE DIFFUSERS

The Lake Pointe WWTP and Ridge Harbor WWTP both utilize the activated sludge process with coarse bubble aeration. Replacing the existing coarse bubble diffusers with fine bubble diffusers in the activated sludge treatment basins of these Wastewater Treatment Plants (WWTP) will save energy. This retrofit could save up to 40% of the total power consumption of the activated sludge process, and increase treatment efficiency.

REPLACE COARSE WITH FINE BUBBLE AERATION			
Facility	**Estimated Implementation Cost**	**Estimated Annual Savings ($/yr)**	**Simple Payback (years)**
WWTP - Lake Pointe	$100,000	$28,000	3.6
WWTP - Ridge Harbor	$30,000	$5,800	5.2
TOTAL	**$130,000**	**$33,800**	**3.8**

WWTP DISSOLVED OXYGEN

Monitoring dissolved oxygen in aeration basins can lead to significant energy savings. Aeration basins often are operated at dissolved oxygen levels of 3.0 – 4.0 mg/l. By operating at dissolved oxygen levels of 0.5 mg/l to 2.0 mg/l, treatment can be maintained and power savings can be achieved at a rate of about $1,000 per MGD treated per mg/l D.O. reduced. The facilities listed below would benefit with installation of D.O. monitoring equipment.

INSTALL D.O. MONITORING EQUIPMENT			
Facility	**Estimated Implementation Cost**	**Estimated Annual Savings ($/yr)**	**Simple Payback (years)**
WWTP - Lake Pointe	$5,000	$1,000	5.0
WWTP - Lometa*	$15,000	$7,000	2.1
WWTP - Elgin	$5,000	$1,000	5.0
TOTAL	**$25,000**	**$9,000**	**2.8**

*Project Cost Includes D.O. Control plus Cascade Aeration

VARIABLE FREQUENCY DRIVES

Variable Frequency Drives (VFD) for high service pumping offers several energy savings and O&M enhancements. VFDs would reduce full voltage starting amperage saving energy spiking costs. VFDs can reduce start/stops of high service pump and reduce system leakage due to pressure spikes.

VFDs can maintain a set pressure point in a distribution system and allow an elevated storage tank to be taken out of service for painting, maintenance, or repair. VFDs can stabilize plant operations by maintaining a constant flow into a water or wastewater treatment process. VFDs on a mechanical surface aerator can control D.O. levels as well as fine tune mixing required horsepower to optimum levels.

The table below summarizes the locations of the pumps adequate for VFDs.

The VFDs installed at the Elgin WWTP consist of two 75-HP pumps and two 15-HP pumps serving the main lift station and carrousel aeration for process and mixing control.

ADD VARIABLE FREQUENCY DRIVES TO PUMPS			
Facility	**Estimated Implementation Cost**	**Estimated Annual Savings* ($/yr)**	**Simple Payback (years)**
WWTP - Elgin	$60,000	$6,000	10.0
TOTAL	**$60,000**	**$6,000**	**10.0**

* Estimates include process control O&M savings.

AIR CONTROL VALVE FOR D.O. CONTROL

Installation of an Infinity Lock Lever Air Control Butterfly Valve can assist an operator to control dissolved oxygen level in an aeration basin over a more finely tuned range. This fine tuning adjustment could control D.O. as much as 1.0 mg/l. Power savings can be achieved at a rate of about $1,000 per MGD per mg/l D.O. The table below summarizes the plants which are adequate for the valves, with two (2) at each location.

ADD AIR CONTROL VALVE			
Facility	**Estimated Implementation Cost**	**Estimated Annual Savings ($/yr)**	**Simple Payback (years)**
WWTP - Windmill Ranch	$2,000	$250	8.0
WWTP - Camp Swift	$2,000	$450	4.4
TOTAL	**$4,000**	**$700**	**5.7**

AUTOMATIC WEIR AT AERATION BASIN

The Elgin WWTP will benefit with the installation of a motor operated automatic weir gate in the carrousel aeration basin for D.O. process and mixing control. The automatic weir gate can adjust the water level on the impeller blade to control dissolved oxygen in the aeration basin as well as control mixing horsepower. This D.O. adjustment can achieve an energy savings rate of about $1,000 per MGD treated per mg/l D.O. reduced. Mixing rate can be adjusted based directly upon Horsepower Draw of the motor, and this calculation assumes a 10% savings.

AUTOMATIC WEIR GATE AT AERATION			
Facility	**Estimated Implementation Cost**	**Estimated Annual Savings ($/yr)**	**Simple Payback (years)**
WWTP - Elgin	$10,000	$5,000	2.0
TOTAL	**$10,000**	**$5,000**	**2.0**

ON-SITE SLUDGE DEWATERING FACILITIES

Many WTPs and WWTPs haul sludge in liquid form at 1.5% - 2% solids for further processing or disposal. On-site sludge dewatering facilities have great potential to save unnecessary hauling cost. For example, calculations indicate that a belt filter press unit process can dewater sludge from 1.5% to 18% solids and reduce hauling costs by about a factor of 10. The facilities listed below do not have sludge dewatering equipment. The estimated cost noted below are based on the installation of a sludge dewatering system at each facility. The estimated savings is based on the transportation fuel savings associated with hauling-off the sludge. Please note, may consider purchasing a mobile sludge dewatering system rather than a stationary system at each site. With a mobile system the intial cost of the system can be shared by multiple facilities and in turn improving the payback for this UCRM.

ON-SITE SLUDGE DEWATERING			
Facility	**Estimated Implementation Cost**	**Estimated Annual Savings ($/yr)***	**Simple Payback (years)**
WWTP - Lake Pointe	$250,000	$210,600	1.2
WWTP - Windmill Ranch	$250,000	$44,000	5.7
TOTAL	**$500,000**	**$254,600**	**2.0**

*Savings based on transportation fuel savings

ADDITIONAL STORAGE CAPACITY AND VARIABLE FREQUENCY DRIVES

As indicated in Section 2.0, the Sunrise Beach WTP has an inherent problem with water hammer believed to be due to the frequent cycling of the high service pumps. It is recommend the LCRA consider installing additional ground storage capacity and Variable Frequency Drive (VFDs) on the high service pumps to help improve the system operation and alleviate the water hammering issues. The addition of a larger ground storage capacity (of at least 100,000 gallons) will help reduce the operational start-stop demands on the well pumps and high service pumps. The additional storage capacity will help reduce the start/stop frequency of a pumping system either pumping to the storage or out of the storage. Furthermore, the installation of VFDs on the high service pumps would allow some of the existing PRVs and pump control valves (both controlling water hammer pressure spikes) to be removed or disabled. Another benefit for implementing these measures would be the ability to reduce pumping needs during peak energy cost time of day (if a Time-of-Use Electricity rate applies). The cost below includes the installation of additional storage capacity and the installation of VFDs on the high service pumps (3 – 50 HP). The estimated savings below is associated with the maintenance and repair of the water distribution system due to the pressure spikes.

ADDITIONAL STORAGE CAPACITY AND INSTALL VFDs			
Facility	**Estimated Implementation Cost**	**Estimated Annual Savings ($/yr)***	**Simple Payback (years)**
WTP - Sunrise Beach	$295,000	$25,000	11.8
TOTAL	**$295,000**	**$25,000**	**11.8**

*Savings based on maintenance and repair of water distribution system due to pressure spikes

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)**	**Simple Payback (years)**
REPLACE COARSE WITH FINE BUBBLE AERATION	$130,000	$33,800	3.8
INSTALL D.O. MONITORING EQUIPMENT	$25,000	$9,000	2.8
ADD VARIABLE FREQUENCY DRIVES TO PUMPS	$60,000	$6,000	10.0
ADD AIR CONTROL VALVE	$4,000	$700	5.7
AUTOMATIC WEIR GATE AT AERATION	$10,000	$5,000	2.0
ON-SITE SLUDGE DEWATERING	$500,000	$254,600	2.0
ADDITIONAL STORAGE CAPACITY AND INSTALL VFDs	$295,000	$25,000	11.8
TOTAL:	**$1,024,000**	**$334,100**	**3.1**

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

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

8.0 FACILITY IMPROVEMENT MEASURES

This section is intended to describe the Facility Improvement Measures (FIMs) that have energy savings opportunities but cannot be justified solely based on the potential energy savings alone. The following are the capital improvement projects recommended for the LCRA.

WWTP DISSOLVED OXYGEN

The following facility would benefit from the installation of dissolved oxygen monitoring equipment, despite its relatively low flow and processing. Although the energy savings and payback are not initially substantial, D.O. monitoring would better prepare for future expansion.

INSTALL D.O. MONITORING EQUIPMENT			
Facility	**Estimated Implementation Cost**	**Estimated Annual Savings ($/yr)**	**Simple Payback (years)**
WWTP - Ridge Harbor	$5,000	$100	50.0
TOTAL	**$5,000**	**$100**	**50.0**

VARIABLE FREQUENCY DRIVES

As described earlier, VFDs for high service pumping offers energy savings and O&M enhancements. The table below summarizes the locations of the pumps adequate for VFDs. They will benefit from the use of VFDs, despite the lower estimated savings and payback, because they will reduce energy and prepare the facility for future expansion.

The VFDs installed at Camp Swift consist of two 75 HP pumps serving the effluent irrigation pump station. The VFD will help regulate flow, reduce pumping energy and improve control of the irrigation system.

ADD VARIABLE FREQUENCY DRIVES TO PUMPS			
Facility	**Estimated Implementation Cost**	**Estimated Annual Savings* ($/yr)**	**Simple Payback (years)**
WWTP - Camp Swift	$44,000	$1,000	44.0
TOTAL	**$44,000**	**$1,000**	**44.0**

* Estimates include process control O&M savings.

ON-SITE SLUDGE DEWATERING FACILITIES

Dewatering at the LCRA facilities can lead to reduced hauling and processing costs, as described in Section 7.0. The facilities listed below do not have sludge dewatering equipment. The estimated cost noted below are based on the installation of a sludge dewatering system at each facility. The estimated savings is based on the transportation fuel savings associated with hauling-off the sludge. Similarly, LCRA may consider a mobile sludge dewatering system, as opposed to a stationary system at each site. This mobile system would greatly reduce the initial cost of the system, and would be shared by multiple facilities, which would lead to improved savings and payback periods.

ON-SITE SLUDGE DEWATERING			
Facility	**Estimated Implementation Cost**	**Estimated Annual Savings ($/yr)***	**Simple Payback (years)**
WWTP - Ridge Harbor	$250,000	$3,900	64.1
WTP - Lometa	$250,000	$6,900	36
TOTAL	**$500,000**	**$10,800**	**46.3**

*Savings based on transportation fuel savings

9.0 ENERGY MANAGEMENT POLICY

The LCRA 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 LCRA.

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.
- Establish 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 public entity proceeds to implement funded projects through the traditional bid/specification process. Contact: Eddy Trevino (512/463-1080).

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 LCRA 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.

11.0 ANALYST IDENTIFICATION

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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:

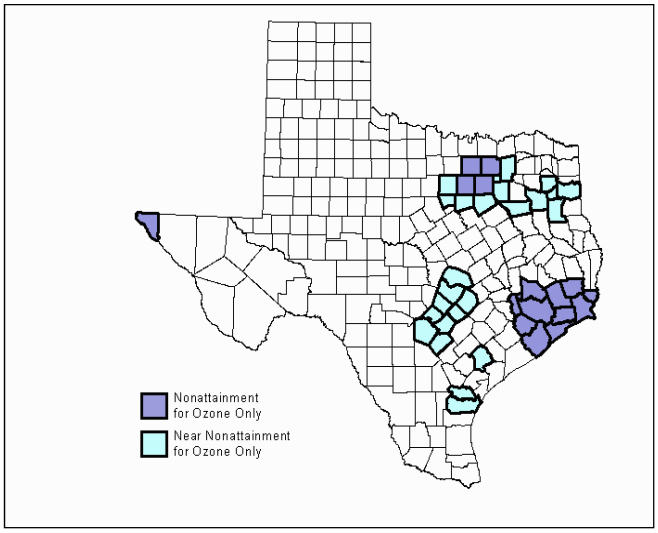
• installation of insulation and high-efficiency windows and doors • modifications or replacement of HVAC systems, lighting fixtures and electrical systems • installation of automatic energy control systems • installation of energy recovery systems or renewable energy generation equipment • building 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.

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APPENDIX B

BASE YEAR CONSUMPTION HISTORY

WTP- Energy Cost and Consumption Benchmarks

		Electric[1]			Design Capacity (MGD)	Average Flow[3] (MGD)	EUI[4]	ECI[5]
	WWTP	kWh/Yr	kBtu/Yr[2]	$Cost/Yr			kBtu/GPD/Yr	$/MGD/Yr
1	West Travis County WTP	9,440,209	32,209,993	$531,736	20.000	5.05	6.4	$105,357
2	Lometa WTP	677,288	2,310,907	$81,422	1.000	0.37	6.2	$218,976
3	Sunrise Beach WTP	143,813	490,690	$15,015	0.470	0.08	5.9	$180,904
4	Ridge Harbor WTP	112,550	384,021	$11,603	0.144	0.06	6.5	$196,380
		10,373,860	35,395,610	$639,776	-	-	-	-

1. Electric consumption includes several utility accounts, see Appendix B for detail (includes booster pumps, treatment, etc.).
2. Electric consumption conversion based on 3.412 kBtu/kWH.
3. Average flow based on 12 month average Influent Flow.
4. Energy Use Index (EUI) calculated based annual kBtu divided by the Average Effluent Flow in gallons per day (GPD).
5. Energy Cost Index (ECI) calculated based on annual energy cost divided by the Average Effluent Flow in million gallons per day (MGD).

WWTP - Energy Cost and Consumption Benchmarks

		Electric[1]			Design Capacity (MGD)	Average Effluent Flow[3] (MGD)	EUI[4]	ECI[5]
	WWTP	kWh/Yr	kBtu/Yr[2]	$Cost/Yr			kBtu/GPD/Yr	$/MGD/Yr
1	Elgin WWTP	718,620	2,451,931	$64,469	0.950	0.670	3.7	$96,211
2	Camp Swift WWTP	811,380	2,768,429	$64,682	0.700	0.259	10.7	$249,415
3	Lake Pointe WWTP	1,441,800	4,919,422	$78,621	0.525	0.536	9.2	$146,590
4	Windmill Ranch WWTP	327,880	1,118,727	$27,435	0.250	0.070	16.1	$393,661
5	Lometa WWTP	134,488	458,873	$14,919	0.100	0.060	7.6	$247,622
6	Ridge Harbor WWTP	159,000	542,508	$15,577	0.018	0.016	34.3	$983,823
		3,593,168	12,259,889	$265,704	-	-	-	-

1. Electric consumption is based on electric meters serving the main WWTP 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 STAR Portfolio Manager requires the Influent flow (MGD) to calculate a performance rating. For this analysis Effluent flow was considered to be sufficient for benchmarking purposes.
4. Energy Use Index (EUI) calculated based annual kBtu divided by the Average Effluent Flow in gallons per day (GPD).
5. Energy Cost Index (ECI) calculated based on annual energy cost divided by the Average Effluent Flow in million gallons per day (MGD).

ACCOUNT# 1478584001, 11939601, 1500179100, 1500548300, 1500179200, 5530001 Electric

Gas

BUILDING: WTP - Lometa

Entity LCRA

AVG. DAILY FLOW 0.37 MGD

		ELECTRICAL					NATURAL GAS	
			DEMAND			TOTAL ALL		
		CONSUMPTION	METERED	CHARGED	COST OF	ELECTRIC	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND ($)	COSTS ($)	MCF	COSTS ($)
July	2009	60,965		0		8,230		
August	2009	92,615		0		8,751		
September	2009	112,146		0		9,167		
October	2009	99,708		0		7,918		
November	2009	28,084		0		5,166		
December	2009	27,787		0		5,326		
January	2010	37,906		0		5,233		
February	2010	50,398		0		7,901		
March	2010	73,139		0		8,030		
April	2010	31,802		0		4,234		
May	2010	31,369		0		5,733		
June*	2010	31,369		0		5,733		
TOTAL		677,288		0		81,422		

* Estimated Utility Data

Annual Total Energy Cost = 81,422 $/year

Total KWH/yr x 3.412 = 2,310,907 kBTU/year

Total MCF/yr x 1,030 = 0.00 kBTU/year

Total Other x_____ = 0.0 kBTU/year

Total Site kBTU's/yr = 2,310,907 kBTU/year

Energy Use Index:

Total kBTU's/Yr ÷ Avg Daily Flow (GPD) = 6.2 kBTU/GPD/year

Energy Cost Index:

Total Cost/Yr ÷ Avg Daily Flow (MGD) = 220,061 $/MGD/year

Electric Utility: Hamilton Electric Co-Op and Lampasas Public Utilities

Gas Utility: N/A

Entity LCRA

ACCOUNT# 1622324400, 1622329300 _____ Electric

_____ Gas

BUILDING: WTP - Ridge Harbor AVG. DAILY FLOW 0.06 MGD

		ELECTRICAL					NATURAL GAS	
			DEMAND			TOTAL ALL		
		CONSUMPTION	METERED	CHARGED	COST OF	ELECTRIC	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND ($)	COSTS ($)	MCF	COSTS ($)
July	2009	14,675		0		1,518	0	0
August	2009	14,675		0		1,498	0	0
September	2009	10,200		0		1,064	0	0
October	2009	5,525		0		611	0	0
November	2009	6,600		0		715	0	0
December	2009	6,600		0		702	0	0
January	2010	7,950		0		830	0	0
February	2010	8,000		0		835	0	0
March	2010	7,575		0		794	0	0
April	2010	9,050		0		934	0	0
May	2010	10,850		0		1,051	0	0
June	2010	10,850		0		1,051	0	0
TOTAL		112,550		0		11,603	0.0	0

Energy Use Index:

Annual Total Energy Cost = 11,603 $/year

Total kBTU's/Yr ÷ Avg Daily Flow (GPD) = 6.4 kBTU/GPD/year

Total KWH/yr x 3.412 = 384,021 kBTU/year

Total MCF/yr x 1,030 = 0.00 kBTU/year

Total Other x_____ = 0.0 kBTU/year

Total Site kBTU's/yr = 384,021 kBTU/year

Energy Cost Index:

Total Cost/Yr ÷ Avg Daily Flow (MGD) = 193,379 $/MGD/year

Electric Utility: PEC

Gas Utility: N/A

ACCOUNT# 14916102, 25994901, 22889003, 27074300, 27074400 Electric
Gas

Entity LCRA

BUILDING: WTP - Sunrise Beach

AVG. DAILY FLOW 0.08 MGD

		ELECTRICAL					NATURAL GAS	
			DEMAND			TOTAL ALL		
		CONSUMPTION	METERED	CHARGED	COST OF	ELECTRIC	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND ($)	COSTS ($)	MCF	COSTS ($)
July	2009	17,197		0		1,555	0	0
August	2009	16,530		0		1,478	0	0
September	2009	13,501		0		1,524	0	0
October	2009	8,748		0		816	0	0
November	2009	8,548		0		792	0	0
December	2009	11,637		0		1,052	0	0
January	2010	15,818		0		1,373	0	0
February	2010	10,944		0		1,306	0	0
March	2010	8,752		0		1,149	0	0
April	2010	9,457		0		1,230	0	0
May	2010	9,718		0		1,246	0	0
June	2010	12,963		0		1,494	0	0
TOTAL		143,813		0		15,015	0.0	0

Annual Total Energy Cost = 15,015 $/year

Total KWH/yr x 3.412 = 490,690 kBTU/year
Total MCF/yr x 1,030 = 0.00 kBTU/year
Total Other x_____ = 0.0 kBTU/year
Total Site kBTU's/yr = 490,690 kBTU/year

Energy Use Index:
Total kBTU's/Yr ÷ Avg Daily Flow (GPD) = 6.1 kBTU/GPD/year

Energy Cost Index:
Total Cost/Yr ÷ Avg Daily Flow (MGD) = 187,688 $/MGD/year

Electric Utility: CTEC

Gas Utility: N/A

Entity LCRA

ACCOUNT# 5000063644, 5000063658, 5000063650, 500063700 Electric

Gas

BUILDING: WWTP - Camp Swift

AVG. DAILY FLOW 0.26 MGD

		ELECTRICAL					NATURAL GAS	
			DEMAND			TOTAL ALL		
		CONSUMPTION	METERED	CHARGED	COST OF	ELECTRIC	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND ($)	COSTS ($)	MCF	COSTS ($)
July	2009	103,036		0		8,073	0	0
August	2009	99,103		0		7,767	0	0
September	2009	93,616		0		7,334	0	0
October	2009	92,170		0		7,697	0	0
November	2009	82,986		0		7,054	0	0
December	2009	85,222		0		7,332	0	0
January	2010	95,860		0		8,178	0	0
February	2010	100,613		0		9,059	0	0
March	2010	102,841		0		10,565	0	0
April	2010	93,003		0		9,468	0	0
May	2010	69,238		0		6,629	0	0
June	2010	88,596		0		8,600	0	0
TOTAL		1,106,284		0		97,755	0.0	0

Annual Total Energy Cost = 97,755 $/year

Total KWH/yr x 3.412 = 3,774,641 kBTU/year

Total MCF/yr x 1,030 = 0.00 kBTU/year

Total Other x_____ = 0.0 kBTU/year

Total Site kBTU's/yr = 3,774,641 kBTU/year

Energy Use Index:

Total kBTU's/Yr ÷ Avg Daily Flow (GPD) = 14.5 kBTU/GPD/year

Energy Cost Index:

Total Cost/Yr ÷ Avg Daily Flow (MGD) = 375,981 $/MGD/year

Electric Utility: Bluebonnet Electric

Gas Utility: N/A

ACCOUNT# 1029264, 1029267, 1029268, 1029269, 1029262, 1029265, 1029261, 5000063644 Electric

Gas

BUILDING: WWTP - Elgin

Entity LCRA

AVG. DAILY FLOW 0.67 MGD

		ELECTRICAL					NATURAL GAS	
			DEMAND			TOTAL ALL		
		CONSUMPTION	METERED	CHARGED	COST OF	ELECTRIC	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND ($)	COSTS ($)	MCF	COSTS ($)
July	2009	81,632		0		7,308	0	0
August	2009	72,879		0		6,583	0	0
September	2009	69,300		0		6,314	0	0
October	2009	70,948		0		6,521	0	0
November	2009	86,115		0		7,710	0	0
December	2009	89,220		0		8,148	0	0
January	2010	89,300		0		8,211	0	0
February	2010	88,627		0		8,155	0	0
March	2010	91,278		0		8,726	0	0
April	2010	77,397		0		7,729	0	0
May	2010	70,021		0		6,965	0	0
June	2010	64,895		0		6,062	0	0
TOTAL		951,612		0		88,433	0.0	0

Annual Total Energy Cost = 88,433 $/year

Total KWH/yr x 3.412 = 3,246,900 kBTU/year

Total MCF/yr x 1,030 = 0.00 kBTU/year

Total Other x_____ = 0.0 kBTU/year

Total Site kBTU's/yr = 3,246,900 kBTU/year

Energy Use Index:

Total kBTU's/Yr ÷ Avg Daily Flow (GPD) = 4.8 kBTU/GPD/year

Energy Cost Index:

Total Cost/Yr ÷ Avg Daily Flow (MGD) = 131,990 $/MGD/year

Electric Utility: Direct Energy

Gas Utility: N/A

ACCOUNT# 39078910, 39079140, 39079272, 61624805, 39079728, 39079843, 39082482, 42131359, 42131235, 43530328, 44701142, 45158409, 47772199, 47772249, 5930962-5, 5834467-2 Electric

Gas

BUILDING: WWTP - Lake Pointe

Entity LCRA

AVG. DAILY FLOW 0.54 MGD

		ELECTRICAL					NATURAL GAS	
			DEMAND			TOTAL ALL		
		CONSUMPTION	METERED	CHARGED	COST OF	ELECTRIC	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND ($)	COSTS ($)	MCF	COSTS ($)
July	2009	167,268		0		10,381	0	0
August	2009	153,621		0		8,850	0	0
September	2009	131,042		0		7,739	0	0
October	2009	138,660		0		8,056	0	0
November	2009	140,450		0		7,959	0	0
December	2009	144,147		0		8,258	0	0
January	2010	154,148		0		8,808	0	0
February	2010	132,089		0		7,563	0	0
March	2010	141,602		0		8,182	0	0
April	2010	148,759		0		8,497	0	0
May	2010	135,208		0		7,854	0	0
June	2010	135,208		0		7,854	0	0
TOTAL		1,722,202		0		100,001	0.0	0

Annual Total Energy Cost = 100,001 $/year

Total KWH/yr x 3.412 = 5,876,153 kBTU/year
Total MCF/yr x 1,030 = 0.00 kBTU/year
Total Other x_____ = 0.0 kBTU/year
Total Site kBTU's/yr = 5,876,153 kBTU/year

Energy Use Index:
Total kBTU's/Yr ÷ Avg Daily Flow (GPD) = 10.9 kBTU/GPD/year

Energy Cost Index:
Total Cost/Yr ÷ Avg Daily Flow (MGD) = 185,188 $/MGD/year

Electric Utility: City of Austin

Gas Utility: N/A

Entity LCRA

ACCOUNT# 5900601, 5915401, 5959201 Electric

Gas

BUILDING: WWTP - Lometa

AVG. DAILY FLOW 0.06 MGD

		ELECTRICAL					NATURAL GAS	
			DEMAND			TOTAL ALL		
		CONSUMPTION	METERED	CHARGED	COST OF	ELECTRIC	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND ($)	COSTS ($)	MCF	COSTS ($)
July	2009	10,952		0		1,259	0	0
August	2009	10,554		0		1,184	0	0
September	2009	13,974		0		1,502	0	0
October	2009	13,536		0		1,415	0	0
November	2009	11,723		0		1,316	0	0
December	2009	12,050		0		1,429	0	0
January	2010	15,078		0		1,704	0	0
February	2010	14,308		0		1,682	0	0
March	2010	15,995		0		1,853	0	0
April	2010	11,931		0		1,405	0	0
May	2010	10,665		0		1,263	0	0
June	2010	10,776		0		1,258	0	0
TOTAL		151,542		0		17,268	0.0	0

Annual Total Energy Cost = 17,268 $/year

Total KWH/yr x 3.412 = 517,061 kBTU/year

Total MCF/yr x 1,030 = 0.00 kBTU/year

Total Other x_____ = 0.0 kBTU/year

Total Site kBTU's/yr = 517,061 kBTU/year

Energy Use Index:

Total kBTU's/Yr ÷ Avg Daily Flow (GPD) = 8.6 kBTU/GPD/year

Energy Cost Index:

Total Cost/Yr ÷ Avg Daily Flow (MGD) = 287,808 $/MGD/year

Electric Utility: Hamilton Electric Co-Op and Lampasas Public Utilities

Gas Utility: N/A

Entity LCRA

ACCOUNT# 1622331900, 1622334300, 1622330100 Electric

Gas

BUILDING: WWTP - Ridge Harbor

AVG. DAILY FLOW 0.02 MGD

		ELECTRICAL					NATURAL GAS	
			DEMAND			TOTAL ALL		
		CONSUMPTION	METERED	CHARGED	COST OF	ELECTRIC	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND ($)	COSTS ($)	MCF	COSTS ($)
July	2009	13,390		0		1,426	0	0
August	2009	13,462		0		1,418	0	0
September	2009	14,391		0		1,508	0	0
October	2009	12,583		0		1,333	0	0
November	2009	13,838		0		1,454	0	0
December	2009	14,387		0		1,479	0	0
January	2010	13,648		0		1,409	0	0
February	2010	14,123		0		1,454	0	0
March	2010	14,474		0		1,487	0	0
April	2010	13,871		0		1,430	0	0
May	2010	12,858		0		1,269	0	0
June	2010	12,858		0		1,269	0	0
TOTAL		163,883		0		16,934	0.0	0

Annual Total Energy Cost = 16,934 $/year

Total KWH/yr x 3.412 = 559,169 kBTU/year

Total MCF/yr x 1,030 = 0.00 kBTU/year

Total Other x_____ = 0.0 kBTU/year

Total Site kBTU's/yr = 559,169 kBTU/year

Energy Use Index:

Total kBTU's/Yr ÷ Avg Daily Flow (GPD) = 28.0 kBTU/GPD/year

Energy Cost Index:

Total Cost/Yr ÷ Avg Daily Flow (MGD) = 846,711 $/MGD/year

Electric Utility: PEC

Gas Utility: N/A

Entity LCRA

ACCOUNT# 0203079-9 0203092-2 4257553-0 4720883-0 Electric

Gas

BUILDING: WTP - WTC

AVG. DAILY FLOW 5.05 MGD

		ELECTRICAL					NATURAL GAS	
			DEMAND			TOTAL ALL		
		CONSUMPTION	METERED	CHARGED	COST OF	ELECTRIC	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND ($)	COSTS ($)	MCF	COSTS ($)
July	2009	1,267,808		0		71,783	0	0
August	2009	1,201,264		0		62,151	0	0
September	2009	1,279,277		0		72,821	0	0
October	2009	766,570		0		41,150	0	0
November	2009	540,442		0		28,278	0	0
December	2009	946,693		0		53,848	0	0
January	2010	880,830		0		46,011	0	0
February	2010	562,786		0		41,944	0	0
March	2010	529,120		0		29,781	0	0
April	2010	698,255		0		38,546	0	0
May	2010	383,582		0		22,711	0	0
June	2010	383,582		0		22,711	0	0
TOTAL		9,440,209		0		531,735	0.0	0

Annual Total Energy Cost = 531,735 $/year

Total KWH/yr x 3.412 = 32,209,993 kBTU/year

Total MCF/yr x 1,030 = 0.00 kBTU/year

Total Other x_____ = 0.0 kBTU/year

Total Site kBTU's/yr = 32,209,993 kBTU/year

Energy Use Index:

Total kBTU's/Yr ÷ Avg Daily Flow (GPD) = 6.4 kBTU/GPD/year

Energy Cost Index:

Total Cost/Yr ÷ Avg Daily Flow (MGD) = 105,294 $/MGD/year

Electric Utility: _____

Gas Utility: N/A

Entity LCRA

ACCOUNT# 5000007030, 5000007027 Electric

Gas

BUILDING: WWTP - Windmill Ranch

AVG. DAILY FLOW 0.07 MGD

		ELECTRICAL					NATURAL GAS	
			DEMAND			TOTAL ALL		
		CONSUMPTION	METERED	CHARGED	COST OF	ELECTRIC	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND ($)	COSTS ($)	MCF	COSTS ($)
July	2009	37,360		0		2,749	0	0
August	2009	39,560		0		2,905	0	0
September	2009	33,800		0		2,497	0	0
October	2009	20,840		0		1,682	0	0
November	2009	21,360		0		1,757	0	0
December	2009	22,760		0		1,929	0	0
January	2010	21,320		0		1,824	0	0
February	2010	21,360		0		1,843	0	0
March	2010	23,360		0		2,292	0	0
April	2010	26,160		0		2,517	0	0
May	2010	30,880		0		2,822	0	0
June	2010	29,120		0		2,618	0	0
TOTAL		327,880		0		27,435	0.0	0

Annual Total Energy Cost = 27,435 $/year

Total KWH/yr x 3.412 = 1,118,727 kBTU/year

Total MCF/yr x 1,030 = 0.00 kBTU/year

Total Other x_____ = 0.0 kBTU/year

Total Site kBTU's/yr = 1,118,727 kBTU/year

Energy Use Index:

Total kBTU's/Yr ÷ Avg Daily Flow (GPD) = 16.0 kBTU/GPD/year

Energy Cost Index:

Total Cost/Yr ÷ Avg Daily Flow (MGD) = 391,929 $/MGD/year

Electric Utility: Bluebonnet Electric

Gas Utility: N/A

APPENDIX C

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

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 D

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) 463-1080

APPENDIX E

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 **Lower Colorado River Authority** _____ , 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: _____ Date: 6/22/10

Name (Mr./Ms./Dr.) Mr. Christopher Kennedy _____ Title: Executive Manager and Chief Admin. Officer

Organization: Lower Colorado River Authority _____ Phone: 512 473-3333 x 3293

Street Address: 3700 Lake Austin Blvd, Austin, Texas _____ Fax: 512 473-3274

Mailing Address: P.O. Box 220, Austin, Texas 78767 _____ E-Mail: Christopher.Kennedy@lcra.org

County: Travis

Contact Information

Name (Mr./Ms./Dr.): Ms. Nancy Overesch _____ Title: Corporate Environmental Advisor

Phone: 512 473-3333 x 2939 / cell 512 468-0046 _____ Fax: 512 473-3274

E-Mail: Nancy.Overesch@LCRA.org County: Travis

Please sign and mail or fax to: 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.**