Susan Combs
Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

Canyon Regional Water Authority

850 Lakeside Pass
New Braunfels, Texas 78130

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SECO
State Energy Conservation Office

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Local Government Energy Management Program

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New Braunfels, TX 78130
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1.0 EXECUTIVE SUMMARY

The Canyon Regional Water Authority, now referred to as the CRWA, 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 CRWA 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 government entities for the purpose of planning, funding, and implementing energy saving measures, which will ultimately reduce the CRWA's annual energy costs.

The annual cost savings, implementation cost estimate and simple payback for all energy retrofit projects identified in this preliminary analysis are summarized below. Individual projects are summarized in Section 7.0 of this report.

Implementation Cost Estimate:	$95,400
Annual Energy Cost Savings:	$41,600
Simple Payback:	2.3

Recommendations and information of interest to the CRWA 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), Energy Management Policy (Section 8.0), and Funding Options for Capital Energy Projects (Section 9.0). A follow-up visit to the CRWA 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 CRWA may require in planning, funding and implementing the recommendations of this report. The CRWA 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

The Canyon Regional Water Authority (CRWA) operates a water treatment and transmission system in Guadalupe, Hays, Caldwell, and Bexar Counties. CRWA operates two water treatment plants, one water well field, and multiple water storage and pump stations including about 35 miles of water transmission pipelines. The CRWA has requested evaluation of four of its facilities for energy retrofit opportunities. These facilities include the Lake Dunlap Membrane WTP, the Hays-Caldwell Membrane WTP, the Wagner Booster Pump Station, the Loop 1604 Booster Station, and the Leisner Road Booster Station.

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. The majority of the CRWA's annual energy consumption is due to the processing and transportation of water. In addition the CRWA also occupies several buildings. A general description of each facility is provided below.

Lake Dunlap Membrane WTP

Water Processing Descriptions

The Lake Dunlap Membrane Water Treatment Plant (WTP) has a rated capacity of 15.5 MGD and currently treats about 6.0 MGD. Raw water is taken from Lake Dunlap on the Guadalupe River. Seven (7) raw water pumps are utilized for this purpose; 3 – 40 HP pumps are rated at 1500 gpm each and 4 – 60 HP pumps are rated at 3000 gpm each. Raw water is pumped to two (2) upflow clarifier units where chemicals are added to support solids removed. Water then is stored in two large ground storage tanks until it is pumped by 6 – 125 HP with VFD feed pumps to six (6) membrane units each rated at 2.7 MGD per unit.

Supplemental pumps which support the treatment plant are clearwell transfer pumps (3 – 30 HP), membrane cleaning pumps (2 – 75 HP), and recycle water pumps (3 – 15 HP). Treated water is stored in two (2) large clearwells and eight (8) high service pumps: (1 – 300 HP with VFD, 2400 gpm); (3 – 300 HP constant speed, 2400 gpm Ea.); (1-100 HP constant speed, 1000 gpm); and (2 – 260 HP constant speed, 1500 gpm Ea.) send water into the transmission system which serves multiple municipal wholesale connections with static head elevation range of about 200 feet.

Building Descriptions

Building:	Main Office Building – 5,000 SF* Chemical Feed Building – 3,000 SF* Membrane Treatment Building – 14,000 SF*
Bldg. Components:	Masonry exterior, pitched metal roof, slab on grade
Typical Lighting Fixtures:	T8 fluorescent fixtures with electronic ballasts in Main Office Building and T12 fluorescent fixture with magnetic ballasts in Membrane Treatment and Chemical Feed Buildings
HVAC:	Spit-DX systems
Controls:	Programmable Thermostats

*Estimated square footage

Hays-Caldwell Membrane WTP

Water Processing Descriptions

The Hays-Caldwell Membrane WTP has a rated capacity of 6.0 MGD and currently treats water at an average of 1.2 MGD. The WTP gets its raw water from Lake Dunlap on the Guadalupe River as well as the San Marcos River. A raw water pumping station located on the east side of Lake Dunlap owned by the Guadalupe-Blanco River Authority (GBRA) furnishes raw water to the City of San Marcos WTP and the Hays-Caldwell WTP via a 36-inch raw water pipeline. A 12-inch raw water line off the 36-inch pipeline goes directly to the Hays-Caldwell WTP. A separate pump station near the WTP on the San Marcos River utilizes 2 – 50 HP 1200 gpm each submersible pumps and pumps directly to the WTP. Raw water received from each source at the plant is combined in a wetwell and pumped by submersible VFD pumps into two upflow clarifiers where chemicals are added to separate the solids. Clarified water is stored in a 300,000 gallon clearwell and four (4) 100 HP VFD feed pumps send water to the three (3) membrane treatment units. Treated water is then stored in a large clearwell and four (4) high service pumps pump into the transmission system. Two (2) 150 HP high service pumps each rated at 1500 gpm pump to the Maxwell/Martindale service area and two (2) 30 HP high service pumps each rated at 350 gpm pump to the Chrystal Clear WSC service area. Miscellaneous plant pumping is also utilized: 2 – 60 HP 1700 gpm each backwash pumps and 3 – 20 HP 1200 gpm each recirculation pumps. The WTP facility also utilizes a 70,000 amp heat tank for cleaning membranes. Standby emergency power is supplied by one (1) 1100 kW diesel powered generator.

Building Descriptions

Building:	Office Building and Warehouse – 5,100 SF*
	Membrane Treatment Building – 14,000 SF*
Bldg. Components:	Metal exterior, pitched metal roof, slab on grade
Typical Lighting Fixtures:	T12 fluorescent fixture with magnetic ballasts in Office area and HID fixtures in Warehouse
HVAC:	Spit-DX systems
Controls:	Standard Thermostats

*Estimated square footage

Wagner Booster Station

Water Processing Descriptions

The Wagner Booster Station receives treated water from the Lake Dunlap Membrane WTP and stores it in 2 – 2,000,000 gallon ground storage tanks. It is rated at 9.5 MGD. Five (5) high service pumps convey water to the Cibolo service areas and the Green Valley SUV service area. The high service pump station includes 3 – 300 HP VFD pumps at 2400 gpm each and 2 – 300 HP soft start constant speed 2400 gpm each pumps.

One (1) 1500 kW diesel powered emergency generator is on site. The site has room for one more 2,000,000 gallon reservoir. All pumps operate on a 480 volt 3-phase power system.

Loop 1604 Booster Station

Water Processing Descriptions

The Loop 1604 Booster Station receives treated water from the Lake Dunlap Membrane WTP, and stores it in one (1) 3,000,000 gallon ground storage tank. It is rated at 4.6 MGD. Three (3) high service pumps convey water to the Cibolo service area. The high service pump station includes 2 – 300 HP VFD 2400 gpm pumps and 1 – 300 HP soft start constant speed pump. One (1) 1500 kW diesel powered emergency generator is on site. The site has room for two more 3,000,000 gallon reservoirs. All pumps operate on a 480 volt, 3-phase power system.

Leisner Road Booster Station

Water Processing Descriptions

The Leisner Road Booster Station receives treated water from the Lake Dunlap Membrane WTP, and stores it in one (1) 2,000,000 gallon ground storage tank. It is rated at 6.9 MGD. Three (3) high service pumps convey water to the Green Valley SUV and Marion service areas. The high service pump station includes 3 – 400 HP VFD 2400 gpm each pumps. One (1) diesel powered emergency generator is on site. The site is set up to add a 2,000,000 gallon ground storage tank and 3 more high service pumps. All pumps operate a 480 volt 3-phase power system.

3.0 ENERGY CONSUMPTION AND PERFORMANCE

A site survey was conducted at several of the CRWA's facilities. Annual electric invoices for the facilities surveyed were $1,114,818 for the 12-month period ending April 2010. A summary of annual utility costs is provided in **Appendix B**, Base Year Consumption History.

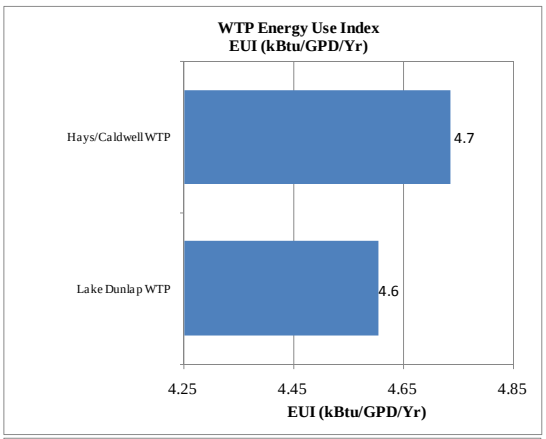
The following table summarizes the annual energy consumption for selected facilities.

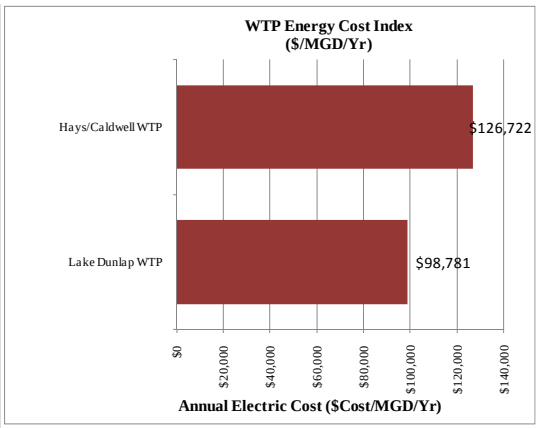
TABLE 1 – ENERGY COST AND CONSUMPTION BENCHMARKS

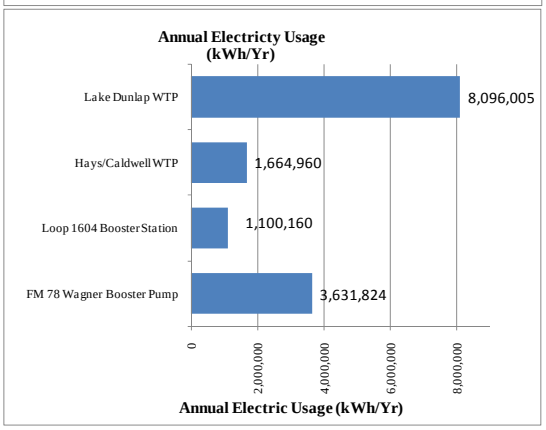
Energy Cost and Consumption Benchmarks											
		Electric			Average Rate	Design Capacity	Average Flow[2]	EUI[3]	ECI[4]	National Average[5]	
	Building	KWH/Yr	kBTU/Yr[1]	$Cost/Yr	($/kWh)	(MGD)	(MGD)	kBtu/GPD/Yr	$/MGD/Yr	kBtu/GPD/Yr	$/MGD/Yr
1	Lake Dunlap WTP	8,096,005	27,623,569	592,685	$0.073	15.5	6.0	4.6	$98,781	2	$42,948
2	Hays/Caldwell WTP	1,664,960	5,680,844	152,067	$0.091	6.0	1.2	4.7	$126,722	2	$53,582
3	Loop 1604 Booster Station	1,100,160	3,753,746	92,653	$0.084	N/A	N/A	N/A	N/A	N/A	N/A
4	FM 78 Wagner Booster Pump	3,631,824	12,391,783	277,413	$0.076	N/A	N/A	N/A	N/A	N/A	N/A
		14,492,949	49,449,942	1,114,818	$0.077	-	-	-	-	-	-

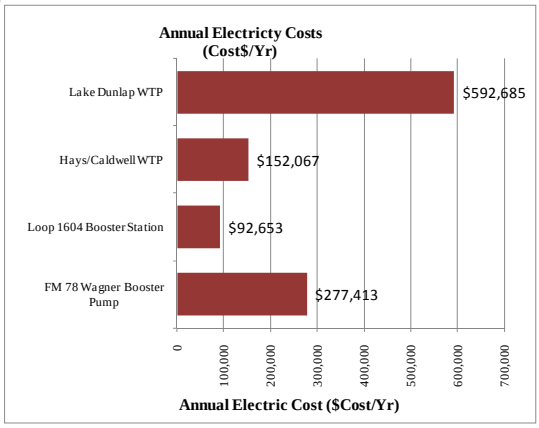
1. Electric consumption conversion based on 3.412 kBtu/kWH.
2. Estimated
3. Energy Use Index (EUI) calculated based annual kBtu divided by the Average Flow in gallons per day (GPD).
4. Energy Cost Index (ECI) calculated based on annual energy cost divided by the Average Flow in million gallons per day (MGD).
5. National Averages based on ENERGY STAR Portfolio Manager benchmarks.

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

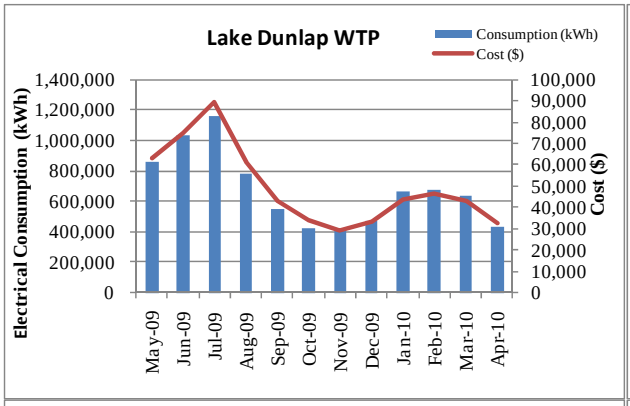


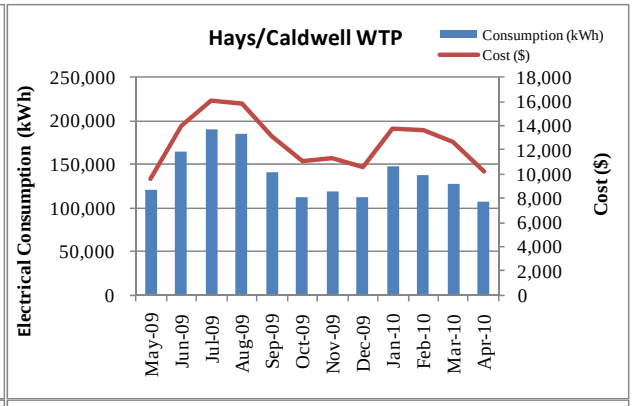


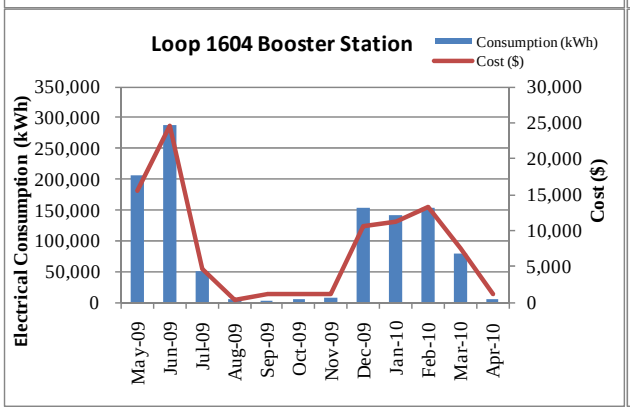


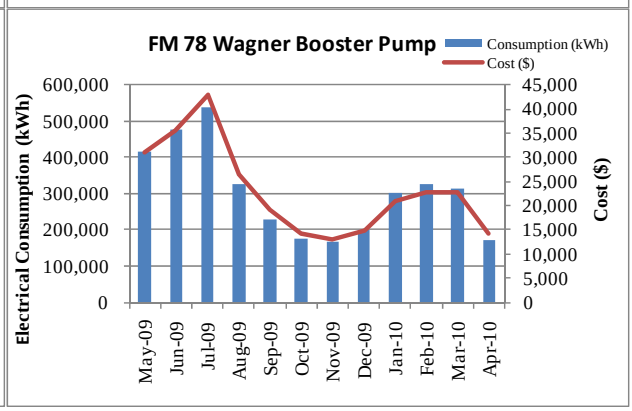


The following charts summarize each facility's monthly utility data. See **Appendix B** for further detail.









4.0 ENERGY ACCOUNTING

UTILITY PROVIDERS AND AVERAGE UTILITY RATES

Guadalupe Valley Electric Coop (GVEC) provides electric service to the Lake Dunlap WTP and the Wagner Booster Pump Station. Bluebonnet provides electric service to the Hays/Caldwell WTP, and City Public Service (CPS) provides electric service to the Loop 1604 Booster Station. Below is a table summarizing the utility provider and their average utility rates.

Electric Utility Average Rate Summary

Utilty Provider	Facility	Rate Type	Demand Charge ($/kW)	Energy Charge ($/kWh)	TOU Rates[2] ($/kWh)	Service Charge (Monthly)	Average Rate[3] ($/kWh)
GVEC	Lake Dunlap WTP	G5-Large Power	$3.20	$0.00100[1]	TOU RATES[4] Economy $0.043 Normal $0.063 Peak $0.080	$500	$0.0732
GVEC	FM 78 Wagner Booster Pump	G4-Large Power	$3.00	$0.00277[1]		$100	$0.0764
Bluebonnet	Hays/Caldwell WTP	Large Power	$5.75	$0.0742[2]	N/A	$100	$0.0913
CPS	Loop 1604 Booster Station	General Service PL	200 kWh added per Billing Demand in excess of 5 kW	$0.0695 first 1600 kWh $0.0325 all additional kWh + ±Fuel Cost Adjustment	Peak Capacity Charge[5] $0.0175 Summer $.0100 Non-Summer	$8.25	$0.0842

1. Energy Rate based on Tarriff
2. Based on a 12 month average
3. Based on an annual overall usage and cost.
4. TOU rates see further dicussion in this section.
5. This charge is a $/kWh rate (for all kwh in excess of 600 kWh) based on month of the year (Summer = Jun-Sep, Non-Summer = Oct-May)

TIME-OF-USE RATE (TOU)

GVEC provides a Time-of-Use (TOU) Rate to the CRWA. GVEC TOU rate is based on the time of day energy is consumed as well as whether it is consumed during the peak summer months. The table chart below describes the TOU blocks and associated rates within each block.

TIME OF DAY	4 Summer Months (Jun-Sept)	8 Non-Summer Months (Oct-May)
1:00 AM	Economy 9 Hrs	Economy 6 Hrs
2:00 AM		
3:00 AM		
4:00 AM		
5:00 AM		
6:00 AM		
7:00 AM		Normal 10 Hrs
8:00 AM		
9:00 AM		
10:00 AM	Normal 4 Hrs	
11:00 AM		
12:00 PM		
1:00 PM		
2:00 PM	Peak 4 Hrs	
3:00 PM		
4:00 PM		
5:00 PM		Peak 2 Hrs
6:00 PM	Normal 5 Hrs	
7:00 PM		Normal 4 Hrs
8:00 PM		
9:00 PM		
10:00 PM		
11:00 PM	Economy 2 Hrs	Economy 2 Hrs
12:00 AM		

Average TOU Energy Rates

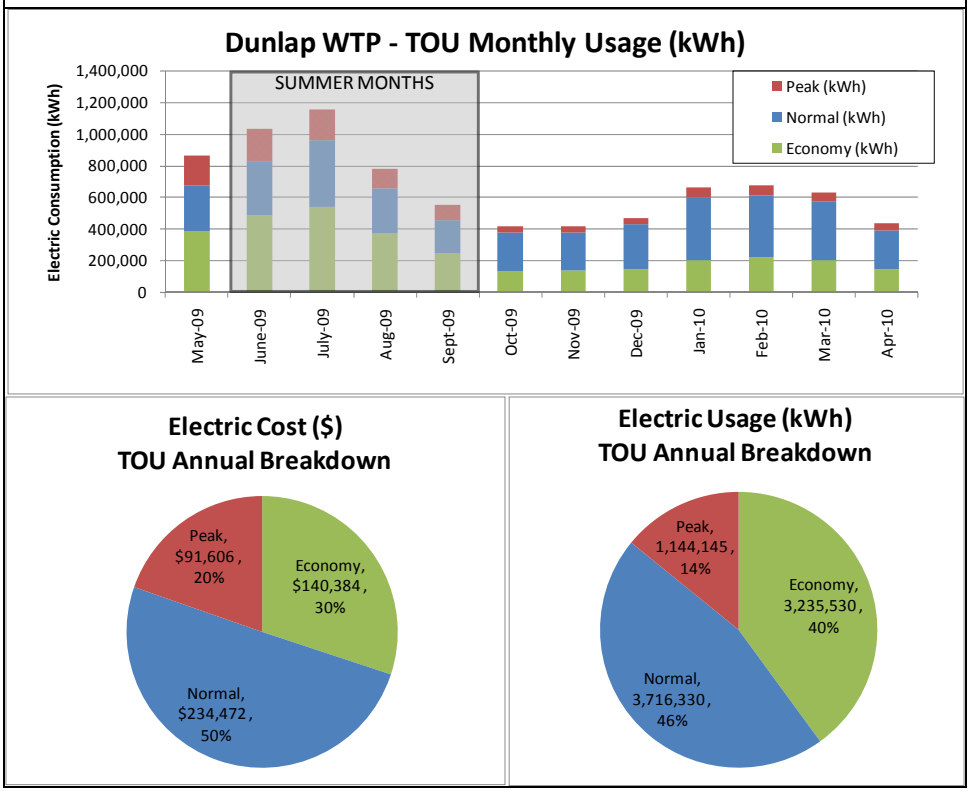
TOU	Average Rate ($/kWh)*
Economy	$0.043
Normal	$0.063
Peak	$0.080

* Based on a 12 month average.

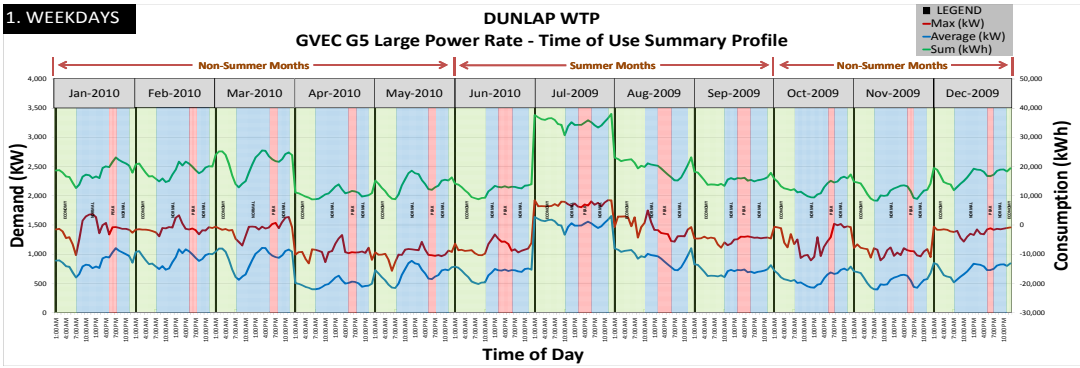
The following charts provide a summary of the annual usage within each TOU block for the Dunlap WTP.

Dunlap WTP – TOU Summary

TOU	Consumption (kWh)	%	Cost ($)	%	Average Rate ($/kWh)
Economy	3,235,530	40%	$140,384	30%	$0.043
Normal	3,716,330	46%	$234,472	50%	$0.063
Peak	1,144,145	14%	$91,606	20%	$0.080
	8,096,005	100%	$466,463	100%	



Also below is an example of a more detailed TOU summary provided in **Appendix C** .

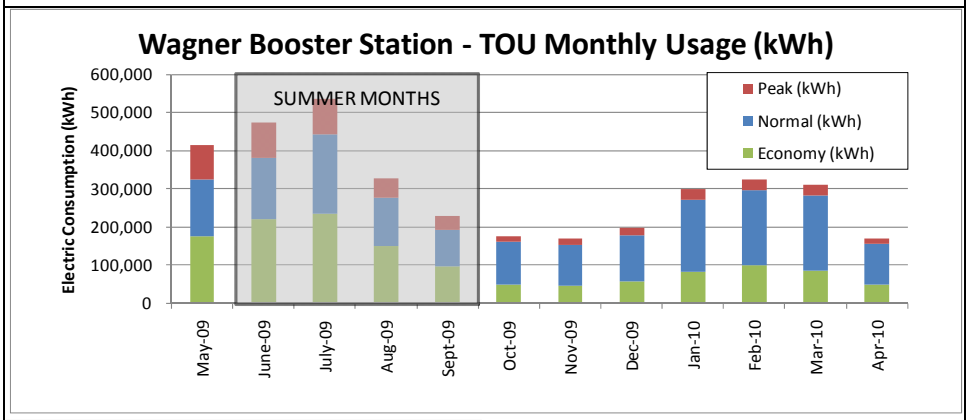


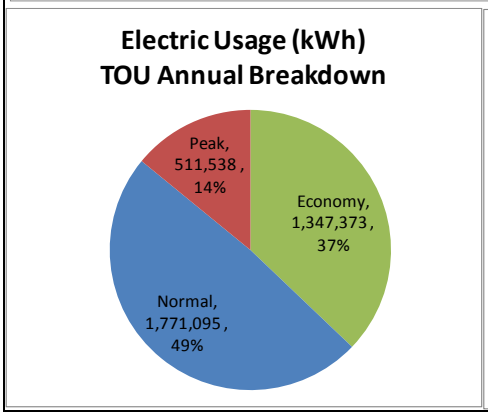
(Note: 15-minute interval data from July 09 through June 2010)

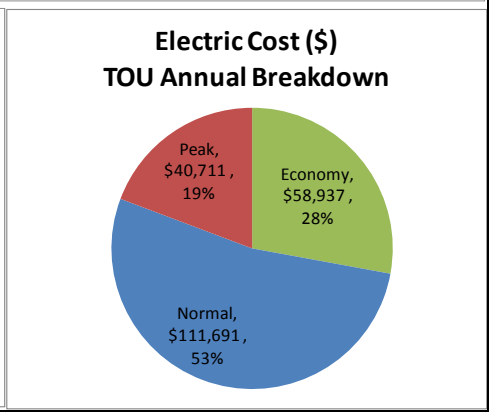
The following charts provide a summary of the annual usage within each TOU block for the Wagner Booster Station. A more detailed summary is provided in **Appendix C**.

Wagner Booster Station – TOU Summary

TOU	Consumption (kWh)	%	Cost ($)	%	Average Rate ($/kWh)
Economy	1,347,373	37%	$58,937	28%	$0.044
Normal	1,771,095	49%	$111,691	53%	$0.063
Peak	511,538	14%	$40,711	19%	$0.080
Total	3,630,006	100%	$211,339	100%	







By review of the previous charts the CRWA may consider implementing a TOU Load Shifting program to maximize the use of the more cost effective "non-peak" energy rates. See **Section 7.0** for more discussion on this subject.

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 CRWA should consider consolidating and recording all the CRWA's utility accounts into an electronic spreadsheet similar to the example shown on the following page. In addition, the CRWA should compare each water processing facilities' average daily flow (MGD) to the total energy required to process and transport the water. Table 1 found in Section 3 provides an example on how to benchmark these facilities.

To help with this benchmarking process the CRWA 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. It offers the ability to compare the energy use of their plants with other peer plants using the EPA energy performance rating system. 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

Having this historical data improves the CRWA's awareness of their energy performance and will help in tracking their energy reduction goals. The CRWA 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.

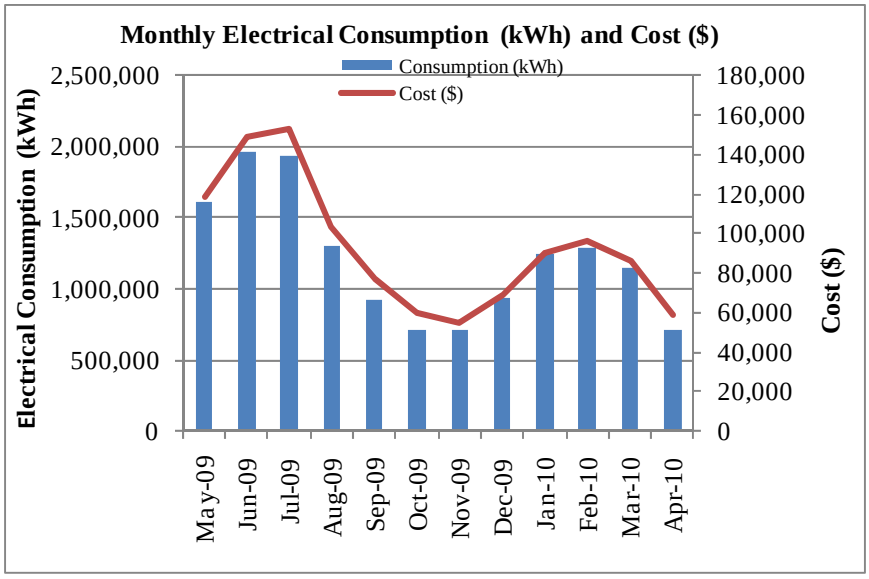
3. Identify necessary corrective actions. This step is essential for identifying if a specific activity is not meeting its expected performance and is in need of review.

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

CRWA - Sample Utility Input Form

MONTH	ELECTRICITY		
	KWH	COST $	Avg. Rate $/KWH
May-09	1,604,356	118,788	$0.0740
Jun-09	1,966,103	148,766	$0.0757
Jul-09	1,932,463	152,811	$0.0791
Aug-09	1,299,790	103,475	$0.0796
Sep-09	926,706	76,747	$0.0828
Oct-09	713,421	60,346	$0.0846
Nov-09	709,786	54,734	$0.0771
Dec-09	934,680	68,851	$0.0737
Jan-10	1,250,698	90,046	$0.0720
Feb-10	1,289,056	95,814	$0.0743
Mar-10	1,150,272	86,061	$0.0748
Apr-10	715,618	58,378	$0.0816
Total	14,492,949	$1,114,818	$0.0769



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.

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).

6.0 RECOMMENDED MAINTENANCE & OPERATION PROCEDURES

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

M&O Recommendations - Water Processing 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.

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 CRWA'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 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.

Exterior Lights: The picture on the right below indicates exterior lighting on during daylight hours. Exterior lighting is typically controlled using light sensing photocells, timeclocks or manual switching. The first two control methods should be calibrated regularly (monthly) and scheduled appropriately (monthly to account for changing dawn/dusk hours). If a manual switch controls the exterior lighting it is recommended the latter two control options be considered since manual switching requires persistent monitoring which is prone to control fatigue.

Interior lighting on in areas of intermittent use, may benefit with installation of motion sensors.

Exterior Lighting on during hours (if applicable) adjustment to timeclock or photocell may be necessary

7.0 UTILITY COST REDUCTION MEASURES

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

T12 TO T8 FLUORESCENT LIGHTING RETROFIT

The CRWA has a combination of T8 and T12 Fluorescent fixtures. It is recommended the CRWA 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. The table below indicates the facilities where T-12 fluorescent lamps were observed during the preliminary walkthrough. The cost and savings noted below are based on preliminary observations of the facilities. 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.

T12 TO LOW WATTAGE T8 FLUORESCENT LAMP REPLACEMENT			
Building	**Estimated Implementation Cost**	**Estimated Annual Savings ($/yr)**	**Simple Payback (years)**
Hays/Caldwell WTP - Office Building	$1,300	$500	2.6
Lake Dunlap WTP - Membrane Treatment & Chem. Feed Bldgs.	$7,800	$2,200	3.5
TOTAL	**$9,100**	**$2,700**	**3.4**

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.

T8 TO LOW WATTAGE T8 FLUORESCENT LIGHTING RETROFIT			
Building	**Estimated Implementation Cost**	**Estimated Annual Savings ($/yr)**	**Simple Payback (years)**
Lake Dunlap WTP - Main Office Building	$1,000	$500	2.0
TOTAL	**$1,000**	**$500**	**2.0**

WAREHOUSE HID TO FLUORESCENT FIXTURE LIGHTING RETROFIT

The Hays/Caldwell WTP utilizes High Intensity Discharge (HID) fixtures to light the pump warehouse area. It is recommended that the CRWA replace the existing HID fixtures with fluorescent fixtures suitable for high bay applications. Fluorescent fixtures offer improved control, reduce energy consumption and improve lighting levels. In addition, due to the long re-strike times associated with HID fixtures, they cannot be effectively switched on/off during unoccupied periods. This causes the HID lamps to operate longer, which both consumes more energy and affects lamp life. The cost and savings estimates below are based on preliminary observations and analysis.

HID TO T5 FLUORESCENT FIXTURE REPLACEMENT			
Building	**Estimated Implementation Cost**	**Estimated Annual Savings ($/yr)**	**Simple Payback (years)**
Hays/Caldwell WTP - Office Building "Warehouse Area"	$4,900	$700	7.0
TOTAL	**$4,900**	**$700**	**7.0**

INSTALLATION OF OCCUPANCY SENSORS FOR INDOOR LIGHTING CONTROL

It is recommended the CRWA 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 therefore exact sensor location, technology (Infrared, Ultrasonic, and Dual Technology) and quantity can be determined during a detailed assessment or design phase. In general, enclosed areas with intermittent use are typically good candidates for occupancy sensors (i.e. offices, break rooms, etc.).

MOTION SENSOR INSTALLATION			
Building	**Estimated Implementation Cost**	**Estimated Annual Savings ($/yr)**	**Simple Payback (years)**
Hays/Caldwell WTP - Office Building and Warehouse Area	$1,800	$300	6.0
Lake Dunlap WTP - Main Office, Chemical Feed, and Membrane Bldgs.	$3,100	$600	5.2
TOTAL	**$4,900**	**$900**	**5.4**

INSTALL PROGRAMMABLE THERMOSTATS

Install programmable thermostats at the locations noted in the table below to provide improved control of the air-conditioning systems. Installing programmable thermostats will establish an operating schedule more suited to the occupancy patterns of the building. At minimum the programmable thermostat should have the following system features: 7 day scheduling, holiday scheduling, push button override (1-2 hrs), set point temperature limit (min/max), keypad lockout, unoccupied temperature settings, and be EnergySTAR rated.

PROGRAMMABLE THERMOSTATS			
Building	**Estimated Implementation Cost**	**Estimated Annual Savings ($/yr)**	**Simple Payback (years)**
Hays/Caldwell WTP - Office Building "Warehouse Area"	$500	$100	5.0
TOTAL	**$500**	**$100**	**5.0**

TIME-OF-USE LOAD SHIFTING PROGRAM

The Lake Dunlap Water Treatment Plant and the Wagner Booster Station can benefit with the implementation of a Time-of-Use (TOU) Load Shifting Program. As discussed in Section 4.0, these two facilities are served by GVEC under a TOU rate structure. Typically, the demand for water and the energy requirements to process and transport water coincide with the peak seasonal demands experienced by electric utilities. This load shifting program mainly relates to the pumping systems. Implementing a TOU Load Shifting Program will help achieve significant energy cost savings. For example, setting up a program that would shift the treatment and pumping operations to take advantage of GVEC's lower "non-peak" energy rates will help realize these savings. Possible solutions may include the use of high-efficiency equipment, utilizing effective instrumentation and control, managing pumping operation by efficient use of available storage, and utilizing other treatment and pumping facilities not subject to GVEC's "Peak" rates. The table below provides an estimated cost and annual savings for implementing such a program. The estimated cost is based on a system balance analysis, development of a system operation sequence and system commissioning. The estimated savings are based on existing energy usage and assuming a shift of approximately 18% of applicable energy consumption to a more economical energy rate.

TOU LOAD SHIFTING PROGRAM			
Building	**Estimated Implementation Cost**	**Estimated Annual Savings ($/yr)**	**Simple Payback (years)**
Lake Dunlap WTP	$20,000	$20,000	1.0
FM 78 Wagner Booster Pump	$15,000	$10,000	1.5
TOTAL	**$35,000**	**$30,000**	**1.2**

BYPASS OF RAW WATER MIXING SUBMERSIBLE PUMP STATION

It appears that the Raw Water Mixing Pump Station at the Hays-Caldwell Membrane Water Treatment Plant (WTP) can be bypassed by utilizing the existing pressure head of the raw water pumps pumping from the San Marcos River as well as the pressure head of the GBRA Lake Dunlap raw water pump station. Flow metering and a flow control valve on each raw water inlet could be installed and then connected by manifold to the existing pipeline running to the upflow clarifier units. This type of connection could replace the complete operation of this station.

BYPASS OR RAW WATER MIXING SUBMERSIBLE PUMP STATION			
Building	**Estimated Implementation Cost**	**Estimated Annual Savings ($/yr)**	**Simple Payback (years)**
Hays/Caldwell WTP	$40,000	$6,700	6.0
TOTAL	**$40,000**	**$6,700**	**6.0**

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)**	**Simple Payback (years)**
Building UCRMs			
T12 TO LOW WATTAGE T8 FLUORESCENT LAMP REPLACEMENT	$9,100	$2,700	3.4
T8 TO LOW WATTAGE T8 FLUORESCENT LIGHTING RETROFIT	$1,000	$500	2.0
HID TO T5 FLUORESCENT FIXTURE REPLACEMENT	$4,900	$700	7.0
MOTION SENSOR INSTALLATION	$4,900	$900	5.4
PROGRAMMABLE THERMOSTATS	$500	$100	5.0
WTP UCRMs			
TOU LOAD SHIFTING PROGRAM	$35,000	$30,000	1.2
BYPASS OR RAW WATER MIXING SUBMERSIBLE PUMP STATION	$40,000	$6,700	6.0
TOTAL:	**$95,400**	**$41,600**	**2.3**

The above projects implementation costs and annual savings are estimated based on a preliminary examination of the facilities. Furthermore, maintenance cost savings and possible controls software and hardware upgrade costs for WTP utility cost reduction measures are not included in this preliminary energy assessment. Final costs and savings will be determined from detailed assessment 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 CRWA requirements, and construction management would be provided by the engineering group who prepared the drawings and specifications.

8.0 ENERGY MANAGEMENT POLICY

The CRWA 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 CRWA.

A 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.

9.0 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 CRWA 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 CRWA 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.

10.0 ANALYST IDENTIFICATION

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Capital View Center, Suite B-325
1301 Capital of Texas Highway
Austin, Texas 78746
(512) 328-2533

M. Saleem Khan, P.E., CxA
Robert Thonhoff, P.E.
David Rocha, CEM, LEED-AP

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.*

State Energy Conservation Office

111 E. 17th Street, Room 1114 • Austin, Texas • 78711-1440 • Phone: 512.463.1931 • Fax: 512.475.2569

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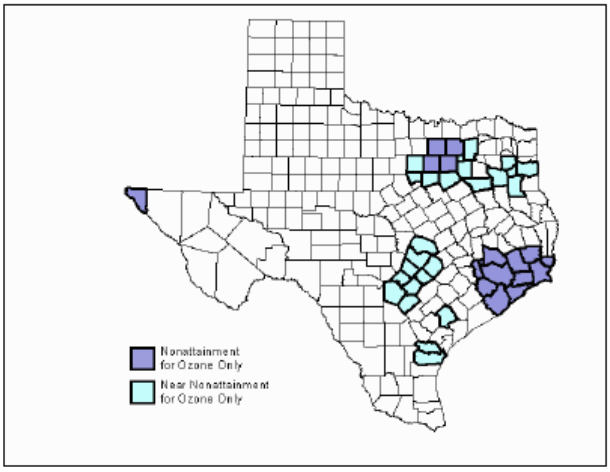
What counties are affected?

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:
Eddie Trevino - 512-463-1080
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Schools Partnership Program:
Juline Ferris - 512-463-1731
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Engineering (Codes / Standards):
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Innovative / Renewable Energy:
Pamela Groce - 512-463-1889
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Energy / Housing Partnership Programs:
Stephen Ross - 512-463-1770
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Alternate Fuels / Transportation:
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APPENDIX B

BASE YEAR CONSUMPTION HISTORY

Energy Cost and Consumption Benchmarks

		Electric			Average Rate	Design Capacity	Average Flow[2]	EUI[3]	ECI[4]	National Average[5]	
	Building	KWH/Yr	kBTU/Yr[1]	$Cost/Yr	($/kWh)	(MGD)	(MGD)	kBtu/GPD/Yr	$/MGD/Yr	kBtu/GPD/Yr	$/MGD/Yr
1	Lake Dunlap WTP	8,096,005	27,623,569	592,685	$0.073	15.5	6.0	5	$98,781	2	$257,689
2	Hays/Caldwell WTP	1,664,960	5,680,844	152,067	$0.091	6.0	1.2	5	$126,722	2	$64,299
3	Loop 1604 Booster Station	1,100,160	3,753,746	92,653	$0.084	N/A	3,755	N/A	N/A	N/A	N/A
4	FM 78 Wagner Booster Pump	3,631,824	12,391,783	277,413	$0.076	N/A	12,395	N/A	N/A	N/A	N/A
		14,492,949	49,449,942	1,114,818	$0.077	-	-	-	-	-	-

1. Electric consumption conversion based on 3.412 kBtu/kWH.
2. Estimated
3. Energy Use Index (EUI) calculated based annual kBtu divided by the Average Flow in gallons per day (GPD).
4. Energy Cost Index (ECI) calculated based on annual energy cost divided by the Average Flow in million gallons per day (MGD).
5. National Averages based on ENERGY STAR Portfolio Manager benchmarks.

Entity: Canyon Regional Water Authority

ACCOUNT# 218730001 Electric

Gas

BUILDING: Lake Dunlap WTP

AVG. DAILY FLOW 6.0 MGD*

		ELECTRICAL					NATURAL GAS / FUEL	
			DEMAND			TOTAL ALL		
		CONSUMPTION	METERED	CHARGED	COST OF	ELECTRIC	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND ($)	COSTS ($)	MCF	COSTS ($)
May	2009	862,994		2,049		62,728	0	0
June	2009	1,036,111		1,907		74,517	0	0
July	2009	1,155,159		2,004		89,245	0	0
August	2009	782,652		2,027		60,831	0	0
September	2009	552,662		1,519		43,329	0	0
October	2009	419,422		1,621		33,916	0	0
November	2009	414,722		1,433		29,132	0	0
December	2009	469,222		1,596		32,963	0	0
January	2009	661,317		1,815		44,004	0	0
February	2009	674,838		1,715		46,120	0	0
March	2010	632,515		1,695		43,234	0	0
April	2010	434,391		1,715		32,665	0	0
TOTAL		8,096,005				592,685	0.0	0

* Estimated

Annual Total Energy Cost = 592,685 $/year

Total KWH/yr x 3.412 = 27,623,569 kBTU/year

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

Total Other x _____ = 0.0 kBTU/year

Total Site kBTU's/yr = 27,623,569 kBTU/year

Energy Use Index:

Total kBTU's/Yr ÷ Avg Daily Flow (GPD) = 4.6 kBTU/GPD/year

Energy Cost Index:

Total Cost/Yr ÷ Avg Daily Flow (MGD) = 98,781 $/MGD/year

Electric Utility: Guadalupe Valley Electric Coop

Gas Utility: N/A

Version 1

Entity: Canyon Regional Water Authority

ACCOUNT# 5000057123 5000057123 Electric

Gas

BUILDING: Hays/Caldwell WTP

AVG. DAILY FLOW 1.2 MGD*

		Electrical				NATURAL GAS / FUEL		
			DEMAND			TOTAL ALL		
		CONSUMPTION	METERED	CHARGED	COST OF	ELECTRIC	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND ($)	COSTS ($)	MCF	COSTS ($)
May	2009	120,360		362		9,569	0	0
June	2009	164,040		402		14,067	0	0
July	2009	191,040		421		16,090	0	0
August	2009	185,040		450		15,833	0	0
September	2009	141,960		402		13,213	0	0
October	2009	112,560		424		11,102	0	0
November	2009	118,320		395		11,375	0	0
December	2009	112,800		330		10,585	0	0
January	2009	147,950		412		13,727	0	0
February	2009	137,332		427		13,658	0	0
March	2010	127,118		387		12,606	0	0
April	2010	106,440		362		10,241	0	0
TOTAL		1,664,960				152,067	0.0	0

* Estimated

Energy Use Index:

Annual Total Energy Cost = 152,067 $/year

Total kBTU's/Yr ÷ Avg Daily Flow (GPD) = 4.7 kBTU/GPD/year

Total KWH/yr x 3.412 = 5,680,844 kBTU/year

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

Total Other x _____ = 0.0 kBTU/year

Total Site kBTU's/yr = 5,680,844 kBTU/year

Energy Cost Index:

Total Cost/Yr ÷ Avg Daily Flow (MGD) = 126,722 $/MGD/year

Electric Utility: Bluebonnet

Gas Utility: N/A

Entity: Canyon Regional Water Authority

ACCOUNT# 300-1517-335 Electric

Gas

BUILDING: Loop 1604 Booster Station

AVG. DAILY FLOW N/A MGD

		ELECTRICAL					NATURAL GAS / FUEL	
			DEMAND			TOTAL ALL		
		CONSUMPTION	METERED	CHARGED	COST OF	ELECTRIC	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND ($)	COSTS ($)	MCF	COSTS ($)
May	2009	207,360		0		15,572	0	0
June	2009	288,960		0		24,657	0	0
July	2009	49,920		0		4,643	0	0
August	2009	5,760		0		440	0	0
September	2009	3,840		0		1,126	0	0
October	2009	4,800		0		1,126	0	0
November	2009	7,680		0		1,126	0	0
December	2009	154,560		0		10,532	0	0
January	2009	141,120		0		11,280	0	0
February	2009	152,640		0		13,359	0	0
March	2010	78,720		0		7,568	0	0
April	2010	4,800		0		1,225	0	0
TOTAL		1,100,160				92,653	0.0	0

Annual Total Energy Cost = 92,653 $/year

Total KWH/yr x 3.412 = 3,753,746 kBTU/year

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

Total Other x _____ = 0.0 kBTU/year

Total Site kBTU's/yr = 3,753,746 kBTU/year

Energy Use Index:

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

Energy Cost Index:

Total Cost/Yr ÷ Avg Daily Flow (MGD) = N/A $/MGD/year

Electric Utility: CPS Energy

Gas Utility: N/A

Entity: Canyon Regional Water Authority

ACCOUNT# 218730006 Electric

Gas

BUILDING: FM 78 Wagner Booster Pump

AVG. DAILY FLOW N/A MGD

		ELECTRICAL					NATURAL GAS / FUEL	
			DEMAND			TOTAL ALL		
		CONSUMPTION	METERED	CHARGED	COST OF	ELECTRIC	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND ($)	COSTS ($)	MCF	COSTS ($)
May	2009	413,642		1,076		30,919	0	0
June	2009	476,992		1,075		35,525	0	0
July	2009	536,344		1,044		42,833	0	0
August	2009	326,338		1,073		26,371	0	0
September	2009	228,244		955		19,080	0	0
October	2009	176,639		583		14,202	0	0
November	2009	169,064		860		13,101	0	0
December	2009	198,098		1,025		14,771	0	0
January	2009	300,311		1,013		21,034	0	0
February	2009	324,246		864		22,678	0	0
March	2010	311,919		1,087		22,653	0	0
April	2010	169,987		1,084		14,247	0	0
TOTAL		3,631,824				277,413	0.0	0

Energy Use Index:

Annual Total Energy Cost = 277,413 $/year

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

Total KWH/yr x 3.412 = 12,391,783 kBTU/year

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

Total Other x _____ = 0.0 kBTU/year

Total Site kBTU's/yr = 12,391,783 kBTU/year

Energy Cost Index:

Total Cost/Yr ÷ Avg Daily Flow (MGD) = N/A $/MGD/year

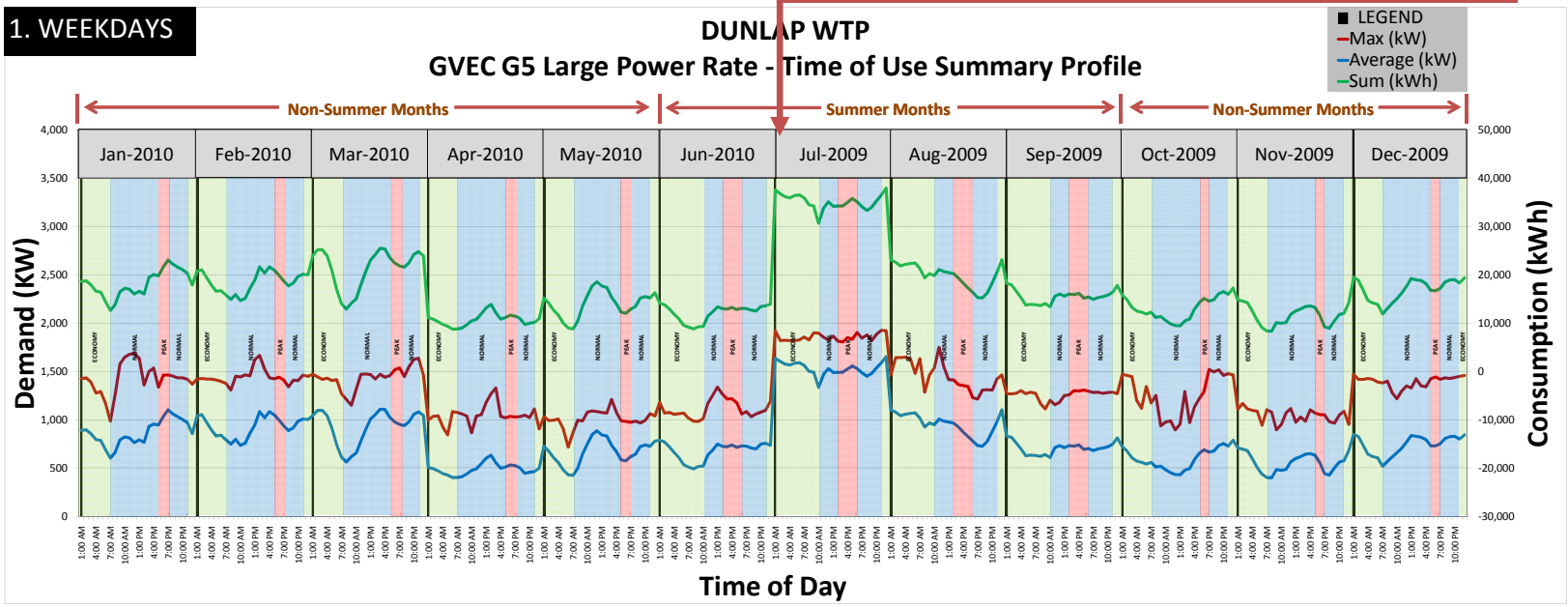
Electric Utility: Guadalupe Valley Electric Coop

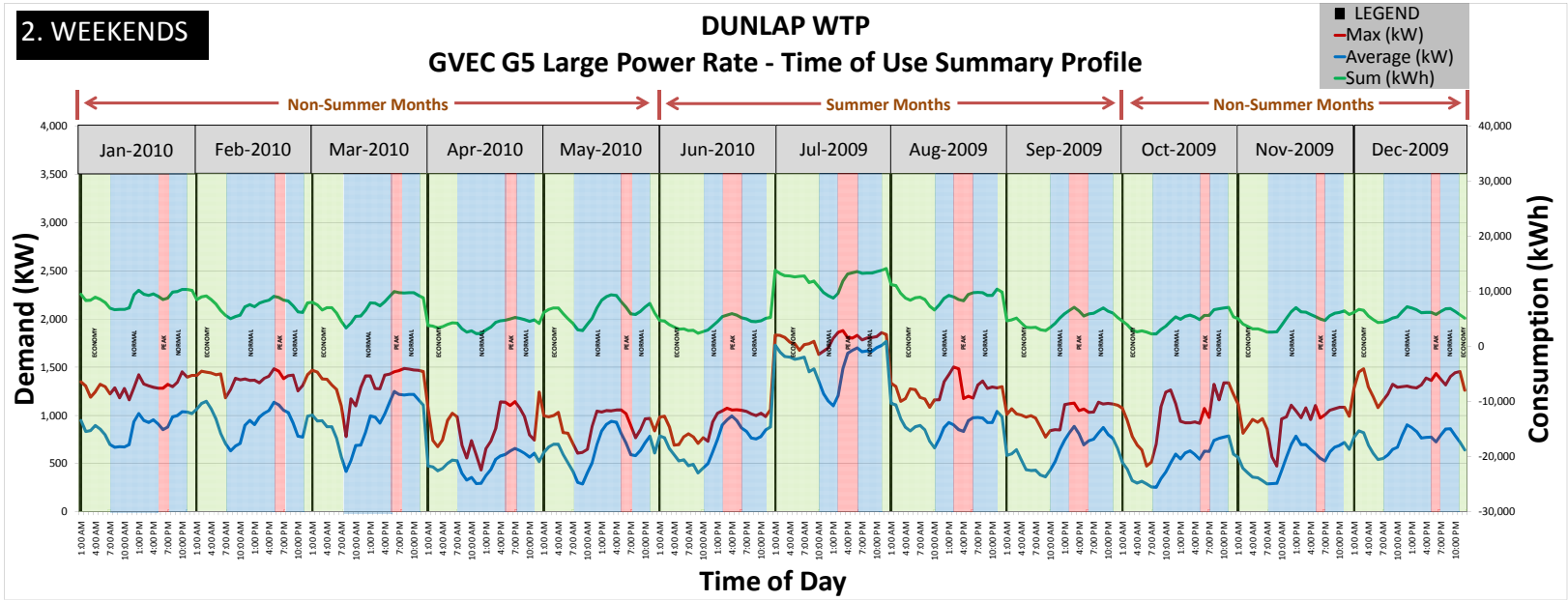
Gas Utility: N/A

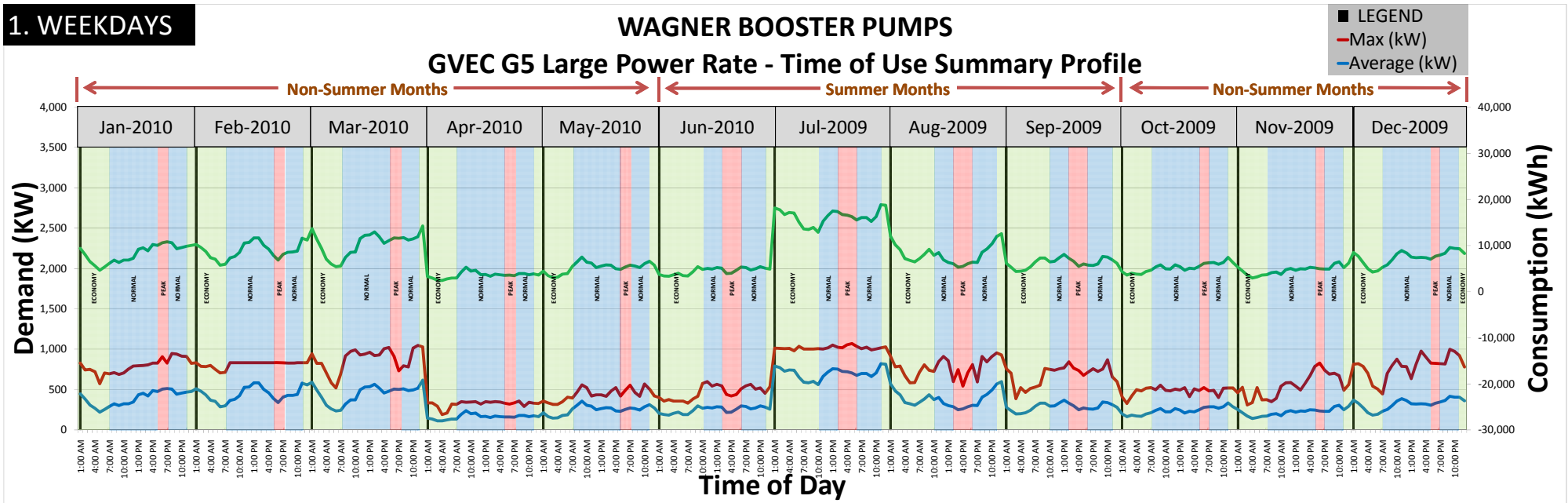
APPENDIX C

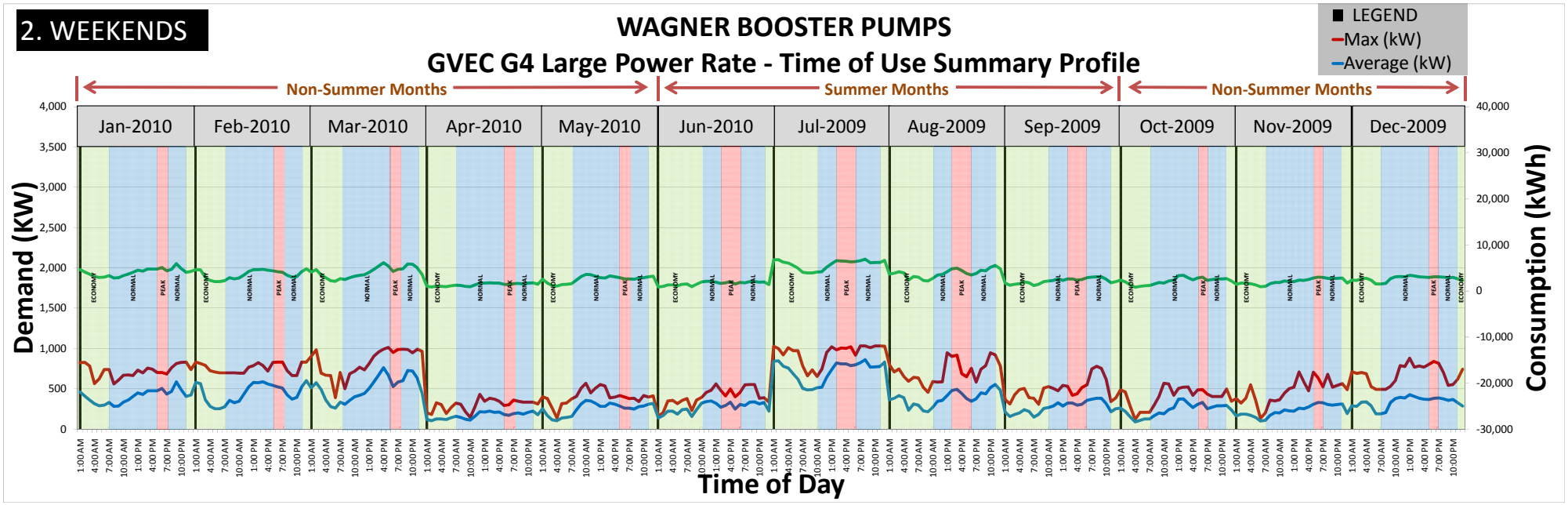
TOU SUMMARY CHARTS

Please note data starts from July 2009 to June 2010.






1. WEEKDAYS
WAGNER BOOSTER PUMPS
GVEC G5 Large Power Rate - Time of Use Summary Profile
LEGEND
Max (kW)
Average (kW)
Non-Summer Months
Summer Months
Non-Summer Months
Jan-2010
Feb-2010
Mar-2010
Apr-2010
May-2010
Jun-2010
Jul-2009
Aug-2009
Sep-2009
Oct-2009
Nov-2009
Dec-2009
Demand (KW)
Consumption (kWh)
Time of Day


2. WEEKENDS
WAGNER BOOSTER PUMPS
GVEC G4 Large Power Rate - Time of Use Summary Profile
LEGEND
Max (kW)
Average (kW)
Non-Summer Months
Summer Months
Non-Summer Months
Jan-2010
Feb-2010
Mar-2010
Apr-2010
May-2010
Jun-2010
Jul-2009
Aug-2009
Sep-2009
Oct-2009
Nov-2009
Dec-2009
Demand (KW)
Consumption (kWh)
Time of Day

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

RECEIVED JUN - 2 2010

SECO
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 Canyon Regional Water Auth., 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: 6-1-10

Name (Mr./Ms./Dr.) David Davenport Title: General Manager

Organization: Canyon Regional Water Authority Phone: 830-609-0543

Street Address: 850 Lakeside Pass Fax: 830-609-0740

Mailing Address: New Braunfels, TX 78130 E-Mail: CRWA@CRWA.com

County: Guadalupe

Contact Information:

Name (Mr./Ms./Dr.): David Davenport Title: General Manager

Phone: 830-609-0543 Fax: 830-609-0740

E-Mail: CRWA@CRWA.com County: Guadalupe

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.**

Finance Dept.