

**LOCAL GOVERNMENTS  
ENERGY MANAGEMENT PROGRAM REPORT**

For

**Galveston County**



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Galveston, Texas 77553  
Phone: 409-765-2640

Administered By:



**SECO**

**State Energy Conservation Office**

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## Local Governments Energy Management Program

Galveston County

P.O. Box 1418

Galveston, Texas 77553

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### 1.0 EXECUTIVE SUMMARY

A preliminary, on-site analysis of Galveston County was conducted for the purpose of identifying cost effective energy system retrofit projects. This report documents that analysis.

This service was provided at no cost to Galveston County through the Local Government Energy Management 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 Local Governments for the purpose of planning, funding, and implementing energy saving measures, which will ultimately reduce facility energy bills.

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

Implementation Cost Estimate:	\$1,443,800
Annual Energy Cost Savings:	\$225,130
Simple Payback:	6.4 years

Recommendations and information of interest to Galveston County is provided in this report regarding Energy Consumption and Performance (Section 3.0), Energy Accounting (Section 4.0), Senate Bill 12 and House Bill 3693 Overview (Section 5.0), Recommended Maintenance and Operations Procedures (Section 6.0), Retrofit Opportunities (Section 7.0), Funding Options (Section 8.0), and Energy Management Policy (Section 9.0). A follow-up visit to Galveston County 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 Galveston County may require in planning, funding and implementing the recommendations of this report. The Galveston County is encouraged to direct any questions or concerns to of the following contact persons:

SECO / Stephen Ross  
(512) 463-1770

TEESI / Saleem Khan  
(512) 328-2533

## 2.0 FACILITY DESCRIPTIONS

This section provides a brief description of the facilities studied in this Preliminary Energy Management (PEM) report. Of the twenty-seven (27) facilities listed below TEESI's engineers conducted site visits at fourteen (14) facilities. Galveston County's staff provided information on the remaining thirteen (13) facilities as noted with an asterisk (\*). The purpose of the preliminary study was to evaluate the major energy consuming equipment in each facility (i.e. Lighting, HVAC, and Controls Equipment).

### 1. Galveston County Justice Center



Courts Bldg. and Central Plant  
Image Source: Microsoft® Virtual Earth™



Jail and Law Buildings

Stories and Area:	Courts Building – Four stories - 196,800 SF Jail Building – Single story – 290,066 SF Law Building – Two stories – 84,340 SF
Year Built:	2004
Bldg. Components:	Steel frame, masonry exterior, flat modified bitumen roof, slab on grade
Typical Lighting Fixtures:	T8 fluorescent fixtures with electronic ballasts
HVAC:	Central Plant – water-cooled chiller, cooling tower, gas boiler Buildings - multiple Air Handling Units (AHUs), Variable Air Volume (VAV) terminal boxes
Controls:	Energy management system (EMS), manufacturer Trane Tracer Summit

## **2. Sam Popovich Building**



Image Source: Microsoft® Virtual Earth™

Stories:	Single story
Area:	8,500 SF
Year Built:	1970
Bldg. Components:	Steel frame, brick exterior veneer, flat modified bitumen roof, slab on grade
Typical Lighting Fixtures:	T8 fluorescent fixtures with electronic ballasts
HVAC:	Packaged rooftop units with gas heat
Controls:	Energy management system (EMS), manufacturer Taylon

## **3. Records & Recycling Building**



Image Source: Microsoft® Virtual Earth™

Stories:	Single story with high bay warehouse space
Area:	8,800 SF
Year Built:	1981
Bldg. Components:	Concrete frame, concrete exterior walls, flat modified bitumen roof, slab on grade
Typical Lighting Fixtures:	T12 fluorescent fixtures with magnetic ballasts
HVAC:	Packaged rooftop units with gas heat
Controls:	Standard thermostats

#### **4. South Jail & Parking Garage**



Image Source: Microsoft® Virtual Earth™

Stories:	Six stories, Levels 1-4 Parking Garage and Levels 5 & 6 South Jail
Area:	Total 231,000 SF (South Jail approximately 77,000 SF)
Year Built:	1981
Bldg. Components:	Steel frame, masonry exterior, flat modified bitumen roof, slab on grade
Typical Lighting Fixtures:	T12 fluorescent fixtures with magnetic ballasts
HVAC:	Chilled and hot water heating service from Courthouse Central Plant, AHUs and fan coil units for jail facilities
Controls:	Energy management system (EMS), manufacturer Trane Tracer Summit

#### **5. Llewellyn Building**



Image Source: Microsoft® Virtual Earth™

Stories:	Two story main building with single story garage space
Area:	21,859 SF
Year Built:	1941
Bldg. Components:	Wood frame, brick exterior veneer, flat modified bitumen roof, slab on grade
Typical Lighting Fixtures:	T12 fluorescent fixtures with magnetic ballasts
HVAC:	Split-DX systems
Controls:	Standard thermostats

## **6. Courthouse/Annex/North Jail**



Image Source: Microsoft® Virtual Earth™  
\*North Jail planned for complete renovation

Stories and Area:	Courthouse – Six stories – 110,864 SF Annex – Two stories – 22,080 SF North Jail – Four stories – 51,422 SF
Year Built:	1958 - 1964
Bldg. Components:	Concrete frame, brick and masonry exterior, flat modified bitumen roof, slab on grade
Typical Lighting Fixtures:	T8 fluorescent fixtures with electronic ballasts in Courthouse, T12 fluorescent fixture with magnetic ballasts in Annex and North Jail
HVAC:	Chilled and hot water heating service from Courthouse Central Plant, Multi-zone AHUs with VAVs in courthouse, Multizone AHUs in Annex and North Jail
Controls:	Energy management system (EMS), manufacturer Trane Tracer Summit for Courthouse Pneumatic Controls at Annex and North Jail

## **7. Facilities and Maintenance Building**



Image Source: Microsoft® Virtual Earth™

Stories:	Single story
Area:	4,692 SF
Year Built:	1975
Bldg. Components:	Steel frame, masonry exterior, flat modified bitumen roof, slab on grade
Typical Lighting Fixtures:	T8 fluorescent fixtures with electronic ballasts
HVAC:	Split-DX systems
Controls:	Standard thermostats

## **8. Galveston Multi-Purpose Senior Center**



Image Source: TEESI

Stories:	Single story
Area:	12,000 SF
Year Built:	1990
Bldg. Components:	Masonry/wood/CMU frame, brick exterior veneer, flat modified bitumen roof with metal fascia, slab on grade
Typical Lighting Fixtures:	T12 fluorescent fixtures with magnetic ballasts
HVAC:	Split-DX systems
Controls:	Standard thermostats

## **9. Texas City Annex**



Image Source: Microsoft® Virtual Earth™

Stories:	Single story
Area:	12,444 SF
Year Built:	1973
Bldg. Components:	Steel frame, masonry and brick exterior, flat built up roof, slab on grade
Typical Lighting Fixtures:	T12 fluorescent fixtures with magnetic ballasts
HVAC:	Split-DX systems with multi-zone air handling units
Controls:	Energy management system (EMS), manufacturer Taylor

### **10. Medical Examiner\***



Image Source: Microsoft® Virtual Earth™

Stories:	Single story
Area:	5,500 SF
Year Built:	1984
Bldg. Components:	Concrete frame, concrete exterior, flat built up roof, slab on grade
Typical Lighting Fixtures:	T12 florescent fixtures with magnetic ballasts
HVAC:	Packaged rooftop units
Controls:	Standard thermostats

### **11. Juvenile Justice Center**



Image Source: Microsoft® Virtual Earth™

Stories:	Single story
Area:	37,400 SF
Year Built:	1996
Bldg. Components:	Concrete and steel frame, concrete exterior, flat built up roof, slab on grade
Typical Lighting Fixtures:	T12 florescent fixtures with magnetic ballasts
HVAC:	Air-cooled chiller, multi-zone Air Handling Units (AHUs) with Variable Air Volume (VAVs) terminal boxes
Controls:	Energy management system (EMS), manufacturer Trane Summit

## **12. West County Annex**



Image Source: TEESI

Stories:	Single story
Area:	6,319 SF
Year Built:	1981
Bldg. Components:	CMU construction, stucco exterior, pitched metal roof, slab on grade
Typical Lighting Fixtures:	T8 fluorescent fixtures with electronic ballasts
HVAC:	Split-DX systems
Controls:	Energy management system (EMS), manufacturer Taylon

## **13. West County Service Center\***



Image Source: Microsoft® Virtual Earth™

Stories:	Single story
Area:	5,835 SF
Year Built:	1978
Bldg. Components:	Metal and wood frame, metal exterior, pitched metal roof, slab on grade
Typical Lighting Fixtures:	T12 fluorescent fixtures with magnetic ballasts
HVAC:	Split-DX systems
Controls:	Standard thermostats

**14. Jack Brooks Park Service Center\***

Image Source: Microsoft® Virtual Earth™

Stories: Single story  
Area: 3,108 SF  
Year Built: 1986  
Bldg. Components: Metal frame, metal exterior, pitched metal roof, slab on grade  
Typical Lighting Fixtures: T12 fluorescent fixtures with magnetic ballasts  
HVAC: Split-DX system  
Controls: Standard thermostat

**15. Rung Park Community Center\***

Image Source: Microsoft® Virtual Earth™

Stories: Single story  
Area: 3,700 SF  
Year Built: 1987  
Bldg. Components: Wood frame, masonry and CMU exterior, flat built-up roof, slab on grade  
Typical Lighting Fixtures: T12 fluorescent fixtures with magnetic ballasts  
HVAC: Split-DX systems  
Controls: Standard thermostat

### **16. Road and Bridge Main Office/Repair Shop/Truck Storage\***



Image Source: Microsoft® Virtual Earth™

Stories:	Single story
Area:	6,640 SF office, 9,840 SF repair shop, 2,640 SF truck storage
Year Built:	Approximately 1950s
Bldg. Components:	Office – Wood/Metal frame, Masonry exterior, flat tar and gravel roof, slab on grade Repair Shop & Truck Storage – Wood/Metal frame, metal exterior, pitched metal roof, slab on grade
Typical Lighting Fixtures:	T12 fluorescent fixtures with magnetic ballasts
HVAC:	Split-DX systems
Controls:	Standard thermostats

### **17. Mosquito Control Office\***



Image Source: Microsoft® Virtual Earth™

Stories:	Single story
Area:	4,690 SF
Year Built:	1970
Bldg. Components:	Metal frame, metal exterior, pitched metal roof, slab on grade
Typical Lighting Fixtures:	T12 fluorescent fixtures with magnetic ballasts
HVAC:	Split-DX systems
Controls:	Standard thermostats

### **18. Dickinson Senior Center\***



Image Source: Microsoft® Virtual Earth™

Stories:	Single story
Area:	2,600 SF
Year Built:	1978
Bldg. Components:	Wood frame, masonry and brick exterior, pitched metal roof, slab on grade
Typical Lighting Fixtures:	T12 fluorescent fixtures with magnetic ballasts
HVAC:	Split-DX systems
Controls:	Standard thermostats

### **19. North County Annex**



Image Source: Microsoft® Virtual Earth™

Stories:	Single story
Area:	16,397 SF
Year Built:	1976
Bldg. Components:	Steel frame, masonry and brick exterior, flat built-up roof, slab on grade
Typical Lighting Fixtures:	T8 fluorescent fixtures with electronic ballasts
HVAC:	Air-cooled chiller, air handling units, dual duct system, terminal boxes with reheat coils
Controls:	Energy management system (EMS), manufacturer Tylon

**20. North Galveston County Building\***

Image Source: Microsoft® Virtual Earth™

Stories:	Single story
Area:	7,456 SF
Year Built:	1974 (scheduled for demolition)
Bldg. Components:	Steel and concrete frame, concrete exterior, flat built-up roof, slab on grade
Typical Lighting Fixtures:	T12 fluorescent fixtures with magnetic ballasts
HVAC:	Packaged rooftop units
Controls:	Standard thermostats

**21. Emergency Management Building**

Image Source: TEESI

Stories:	Three story
Area:	23,500 SF
Year Built:	2005
Bldg. Components:	Steel frame, masonry and brick exterior, pitched metal roof, slab on grade
Typical Lighting Fixtures:	T8 fluorescent fixtures with electronic ballasts
HVAC:	Split-DX systems, central air handling units, VAV terminal boxes
Controls:	Energy management system (EMS), manufacturer Tylon

**22. Walter Hall Park Service Center\***

Image Source: Microsoft® Virtual Earth™

Stories:	Single story
Area:	2,000 SF
Year Built:	2001
Bldg. Components:	Wood frame, masonry and metal exterior, pitched metal roof, slab on grade
Typical Lighting Fixtures:	T8 fluorescent fixtures with electronic ballasts (estimated)
HVAC:	Split-DX systems
Controls:	Standard thermostats

**23. Walter Hall Park Community Center\***

Image Source: Microsoft® Virtual Earth™

Stories:	Two story
Area:	9,150 SF
Year Built:	1989
Bldg. Components:	Masonry and CMU frame and exterior, pitched metal roof, slab on grade
Typical Lighting Fixtures:	T12 fluorescent fixtures with magnetic ballasts
HVAC:	Split-DX systems
Controls:	Standard thermostats

**24. Bacliff Community Center\***

Image Source: Microsoft® Virtual Earth™

Stories: Single story  
Area: 2,971 SF  
Year Built: 1987  
Bldg. Components: Metal frame, metal exterior, pitched metal roof, slab on grade  
Typical Lighting Fixtures: T12 fluorescent fixtures with magnetic ballasts  
HVAC: Split-DX systems  
Controls: Standard thermostats

**25. Bacliff JP Office\***

Image Source: Microsoft® Virtual Earth™

Stories: Single story  
Area: 3,128 SF  
Year Built: 1990  
Bldg. Components: Metal frame, metal exterior, pitched metal roof, slab on grade  
Typical Lighting Fixtures: T12 fluorescent fixtures with magnetic ballasts  
HVAC: Split-DX systems  
Controls: Standard thermostats

## 26. La Marque JP Courts\*



Image Source: Microsoft® Virtual Earth™

Stories:	Single story
Area:	4,650 SF
Year Built:	1990
Bldg. Components:	Metal frame, brick exterior, pitched metal roof, slab on grade
Typical Lighting Fixtures:	T12 florescent fixtures with magnetic ballasts
HVAC:	Split-DX systems
Controls:	Standard thermostats

## 27. Carbide Park Community Center



Image Source: TEESI

Stories:	Single story
Area:	15,000 SF
Year Built:	2002
Bldg. Components:	Steel frame, metal and brick exterior, pitched metal roof, slab on grade
Typical Lighting Fixtures:	T8 florescent fixtures with electronic ballasts
HVAC:	Split-DX systems
Controls:	Energy management system (EMS), manufacturer Taylon

### 3.0 ENERGY CONSUMPTION AND PERFORMANCE

During this assessment, 12 months of utility data was compiled to assess the energy consumption and performance of several of Galveston County's facilities. The data analyzed comprised of over 50 utility accounts (natural gas and electric). Please see Appendix C for a complete summary of each account's monthly usage and their calculated energy performance.

The County facilities studied in this report comprised a total gross area of approximately 1.07 million square feet. Annual electric and natural gas invoices for the building surveyed were \$2,775,851 for the 12-month period ending December 2007. A summary of annual utility costs is provided in Appendix C, Base Year Consumption History.

#### ENERGY PERFORMANCE INDICES

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

Energy Cost and Consumption Benchmarks										
Building	Electric		Natural Gas		Total	Total	EUI	ECI		
	KWH/Yr	\$Cost/Yr	MCF/Yr	\$Cost/Yr	\$Cost/Yr	MMBTU/Yr	kBTU/SF/Yr	\$/SF/Yr	SF	
1 New Justice Center Complex	13,826,996	1,454,929	17,180	205,162	1,660,091	64,886	114	2.91	571,206	
2 Sam Popovich Bldg.	180,600	20,976	82	1,191	22,167	701	82	2.61	8,500	
3 Records & Recycling Bldg.	78,160	11,076	342	4,313	15,389	619	70	1.75	8,800	
4 South Jail & Parking Garage	837,328	89,392	1	189	89,581	2,858	37	1.16	77,000	
5 Llewellyn Bldg. **	375,760	41,172	16	377	41,549	1,299	59	1.90	21,859	
6 Courthouse/CH Annex/N. Jail ***	2,248,807	221,564	4,802	57,369	278,933	12,622	68	1.51	184,366	
7 Facilities & Maint. Building**	62,160	7,397	79	1,279	8,676	293	63	1.85	4,692	
8 Multi-Purpose Senior Center	256,080	28,681	59	865	29,546	934	78	2.46	12,000	
9 Texas City Annex	350,720	40,549	601	7,031	47,580	1,816	146	3.82	12,444	
10 Medical Examiners*	172,000	20,815	50	668	21,483	639	116	3.91	5,500	
11 Juvenile Justice Center	1,405,280	140,717	1,326	12,600	153,317	6,162	165	4.10	37,400	
12 West County Annex	163,440	18,663	0	0	18,663	558	88	2.95	6,319	
13 West County Service Center*	64,740	7,473	70	935	8,408	293	50	1.44	5,835	
14 Jack Brooks Park Service Center*	15,760	2,360	0	0	2,360	54	17	0.76	3,108	
15 Runge Park Community Center*	39,740	5,660	0	0	5,660	136	37	1.53	3,700	
16 Road & Bridge Complex*	300,600	35,497	0	0	35,497	1,026	62	2.15	16,480	
17 Mosquito Control Office*	82,495	11,188	0	0	11,188	282	60	2.39	4,690	
18 Dickinson Senior Center*	66,862	8,064	80	982	9,045	310	119	3.48	2,600	
19 North County Annex	707,680	80,853	529	5,762	86,615	2,960	181	5.28	16,397	
20 North Galveston County Bldg *, ****	221,040	25,053	0	0	25,053	754	101	3.36	7,456	
21 Emergency Management Bldg.	959,360	104,507	0	0	104,507	3,274	138	4.42	23,670	
22 Walter Hall Park Service Center*	36,300	4,530	0	0	4,530	124	62	2.26	2,000	
23 Walter Hall Park Community Center*	198,640	24,246	0	0	24,246	678	74	2.65	9,150	
24 Bacliff Community Center*	30,158	4,684	0	0	4,684	103	35	1.58	2,971	
25 Bacliff JP Office*	44,240	5,622	0	0	5,622	151	48	1.80	3,128	
26 LaMarque JP Courts*	84,040	10,845	0	0	10,845	287	62	2.33	4,650	
27 Carbide Park Community Center	419,100	49,077	143	1,541	50,618	1,578	105	3.37	15,000	
	KWH/Yr	\$Cost/Yr	MCF/Yr	\$Cost/Yr	\$Cost/Yr	MMBTU/Yr	kBTU/SF/Yr	\$/SF/Yr	SF	
	23,228,086	2,475,588	25,360	300,263	2,775,851	105,398	98	2.59	1,070,921	

\* Onsite visit not performed, facility related information provided by County staff.

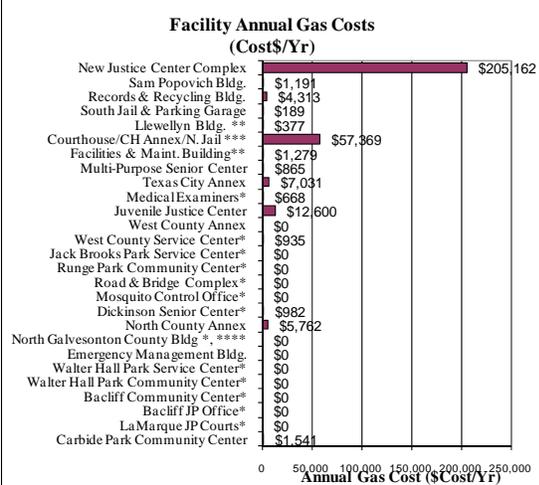
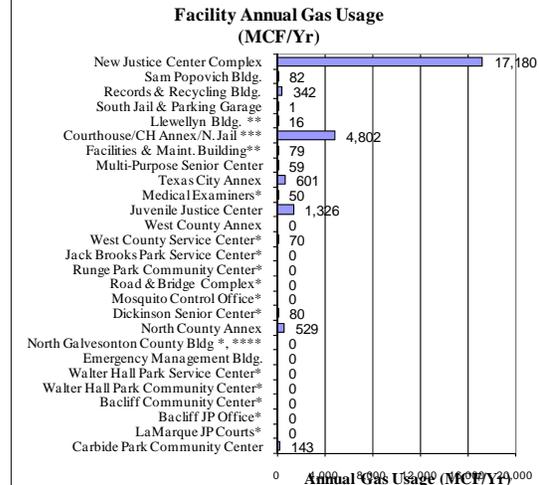
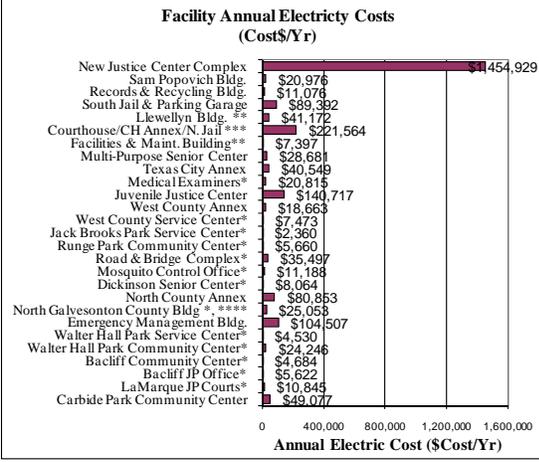
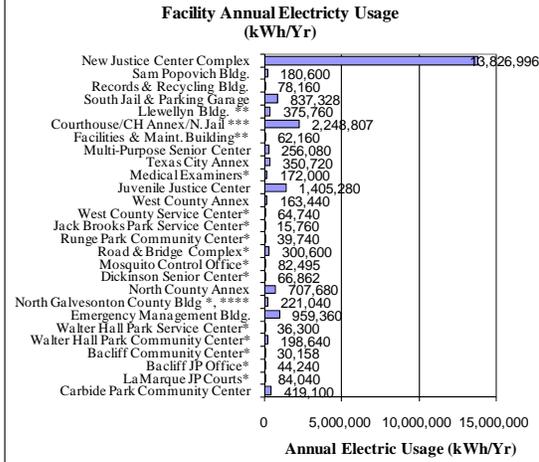
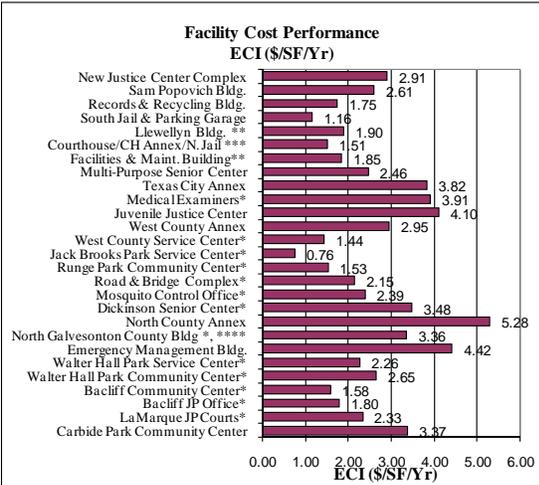
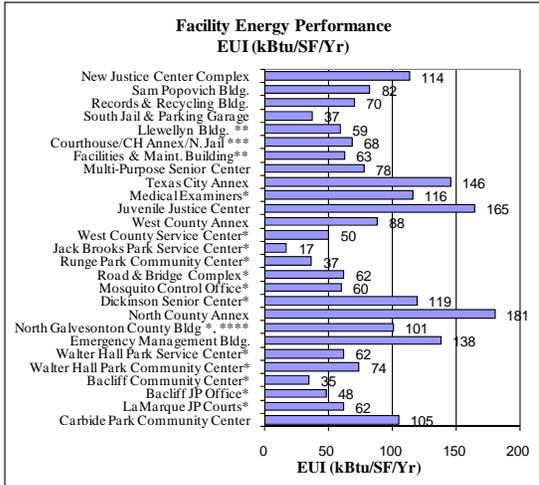
\*\* Building experienced extensive damage due to Hurricane Ike (Sept-08).

\*\*\* CH Annex and North Jail are scheduled for extensive renovations.

\*\*\*\* Scheduled for demolition in December 2008.

Knowing the EUI and ECI is useful to help determine the overall energy performance of the facilities surveyed. The County's EUI of 98 indicates the building's overall performance can be improved. Considering the no cost energy conservation measures and retrofits discussed in this report will help meet the County's annual energy reduction goals.

The following charts summarize the data presented in Table 1 above. See appendix C for further detail.



\* Onsite visit not performed, facility related information provided by County staff.  
 \*\* Building experienced extensive damage due to Hurricane Ike (Sept-08).  
 \*\*\* CH Annex and North Jail are scheduled for extensive renovations.  
 \*\*\*\* Scheduled for demolition in December 2008.

## 4.0 ENERGY ACCOUNTING

### UTILITY PROVIDERS

The County's facilities receive their electric service from Reliant Energy. CenterPoint Energy and Texas Gas Service provide natural gas utility service.

### 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, milestones, and deadlines.

Presently, the County does not have a centralized procedure to track and monitor energy consumption and performance. The County should consider consolidating the tracking and recording of all utility accounts (i.e., Electricity, Natural Gas, Water, etc.) to a centralized location. Along with total utility costs (\$), utility consumption should be recorded as well (i.e., kWh, MCF, gallons, etc.).

There are several commercially available utility tracking software that can be tailored to meet the County's specific needs. The County can use this data to track utility consumption patterns and budget utility expenses. Having this historical data improves the County's awareness of their energy performance and will help in tracking their energy reduction goals.

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

1. Perform regular updates. An effective system requires current and comprehensive data. Monthly updates should be strongly encouraged.
2. Conduct periodic reviews. Such reviews should focus on progress made, problems encountered, and potential rewards.
3. Identify necessary corrective actions. This step is essential for identifying if a specific activity is not meeting its expected performance and is in need of review.

In addition, having this historical utility data would facilitate **House Bill 3693** and **Senate Bill 12** reporting requirements. Please see Section 5.0 for additional information regarding these requirements.

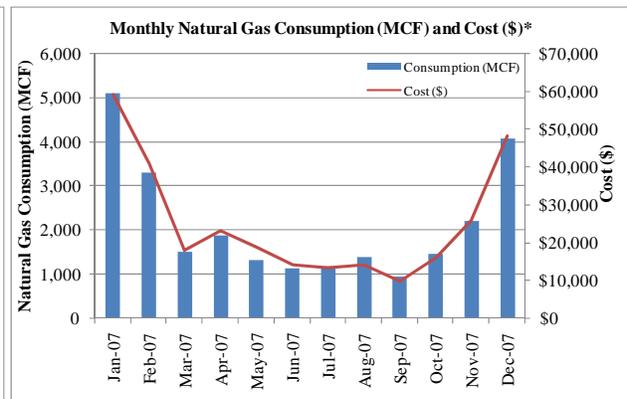
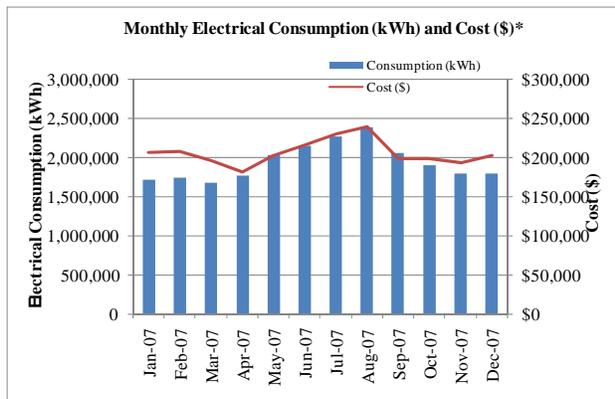
Furthermore, below is a sample format which the County can customize to help summarize their overall utility usage and costs.

The data presented below is a summation of the data provided by Galveston County. This data below includes over 50 utility accounts and is for reference purposes only and does not represent the County’s total utility data. See Appendix C for further detail regarding each utility account represented in the table below.

### Galveston County - Sample Utility Data Input Form

MONTH	ELECTRICITY			NATURAL GAS			WATER		
	KWH	COST \$	\$/KWH	MCF	COST \$	\$/MCF	GAL	COST \$	\$/GAL
Jan-07	1,706,992	\$207,422	\$0.1215	5,078	\$58,934	\$11.6060			
Feb-07	1,730,286	\$208,457	\$0.1205	3,282	\$40,766	\$12.4219			
Mar-07	1,673,651	\$196,021	\$0.1171	1,506	\$18,005	\$11.9572			
Apr-07	1,766,611	\$181,943	\$0.1030	1,869	\$23,073	\$12.3432			
May-07	2,029,039	\$202,733	\$0.0999	1,307	\$18,698	\$14.3082			
Jun-07	2,143,252	\$215,432	\$0.1005	1,128	\$14,041	\$12.4454			
Jul-07	2,268,672	\$229,758	\$0.1013	1,161	\$13,166	\$11.3387			
Aug-07	2,385,447	\$239,443	\$0.1004	1,370	\$14,091	\$10.2869			
Sep-07	2,054,143	\$199,408	\$0.0971	944	\$9,752	\$10.3313			
Oct-07	1,894,949	\$198,317	\$0.1047	1,458	\$15,909	\$10.9151			
Nov-07	1,785,415	\$193,834	\$0.1086	2,204	\$25,735	\$11.6750			
Dec-07	1,789,629	\$202,820	\$0.1133	4,053	\$48,093	\$11.8657			
Total	23,228,086	\$2,475,588	\$0.1066	25,360	\$300,263	\$11.8402			

Gross Building Area	1,070,921	SF
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## 5.0 SENATE BILL 12 AND HOUSE BILL 3693 OVERVIEW

In 2001, the 77th Texas Legislature passed Senate Bill 5 (SB5), also known as the Texas Emissions Reduction Plan, to amend the Texas Health and Safety Code. The legislation required ambitious, fundamental changes in energy use to help the state comply with federal Clean Air Act standards. It applied to all political subdivisions within 38 designated counties, later expanded to 41 counties.

In 2007, the 80th Texas Legislature passed Senate Bill 12 (SB 12) which among other things extended the timeline set in SB 5 for emission reductions. In the same period, the 80<sup>th</sup> Texas Legislature passed House Bill 3693 (HB 3693) which amended provisions of several codes relating primarily to energy efficiency.

The Bill requirements that are most relevant to this program are as follows:

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**

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. With this in mind, the following maintenance and operation procedures are recommended.

### **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.

### **OPTIMIZE SCHEDULING AND SETTING OF HVAC SYSTEMS**

It is strongly recommended that persistent monitoring of occupancy patterns and scheduling thermostats accordingly will help reduce the equipment runtime. In addition, establishing a uniform temperature set-point throughout buildings will help reduce the HVAC energy usage. An established uniform building set-point will help remind staff members of their role to help reduce the overall annual energy consumption.

### **REPLACE INCANDESCENT LAMPS WITH COMPACT FLUORESCENTS**

Replace existing incandescent lamps with compact fluorescent lamps (CFLs) 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.

### **INSTALL ENERGY SAVING DEVICES ON VENDING MACHINE**

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

### **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 hibernation 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.

### **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.

### IMPROVE CONTROL OF INTERIOR & EXTERIOR LIGHTING

Establish procedures to monitor use of lighting at times and places of possible/probable unnecessary use: Offices at lunchtime, closets, parking lots during daylight hours, etc. One or two friendly reminders for minor infractions will usually result in lower electric bills.

### CONTROL OUTSIDE AIR INFILTRATION

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

### HAIL GUARDS ON CONDENSING AND ROOFTOP UNITS

When an HVAC unit is replaced the County should ensure the new unit be specified with hail guards. The hail guards protect the condensing unit's heat exchanger coils from hail damage. Damage to the condensing unit heat exchangers reduces the efficiency of the units. During the preliminary walk-through, it was noted that several of units showed signs of hail damage. It is recommended that unit(s) with damaged condensing fins be straightened using a fin comb.

## 7.0 RETROFIT OPPORTUNITIES

Energy retrofit projects identified during the preliminary analysis are detailed below. Project cost estimates include complete design and construction management services.

### LIGHTING RETROFIT

Replace T-12 fluorescent lamps and magnetic ballasts with high efficiency T-8 fluorescent lamps and electronic ballasts at the Galveston County's facilities listed below. 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 cost and savings noted below are based on preliminary observations and data provided by Galveston County. Exact cost and quantities can be identified through a detailed energy audit.

<b>FLUORESCENT LIGHTING RETROFIT</b>			
<b>Building</b>	<b>Estimated Implementation Cost</b>	<b>Estimated Annual Savings</b>	<b>Payback (years)</b>
Records & Recycling Bldg.	\$5,700	\$950	6.0
South Jail & Parking Garage	\$110,000	\$18,330	6.0
Llewellyn Bldg. **	\$10,600	\$1,920	5.5
Courthouse Annex / N. Jail	\$52,000	\$9,400	5.5
Multi-Purpose Senior Center	\$7,800	\$1,700	4.6
Texas City Annex	\$8,000	\$1,700	4.7
Medical Examiners*	\$3,500	\$800	4.4
Juvenile Justice Center	\$34,300	\$6,800	5.0
West County Service Center*	\$3,000	\$500	6.0
Jack Brooks Park Service Center*	\$1,600	\$260	6.2
Runge Park Community Center*	\$2,400	\$430	5.6
Road & Bridge Complex*	\$9,000	\$1,800	5.0
Mosquito Control Office*	\$3,000	\$540	5.6
Dickinson Senior Center*	\$1,600	\$290	5.5
Walter Hall Park Community Center*	\$5,900	\$1,180	5.0
Bacliff Community Center*	\$1,900	\$310	6.1
Bacliff JP Office*	\$2,000	\$360	5.6
LaMarque JP Courts*	\$3,000	\$540	5.6
<b>TOTAL</b>	<b>\$265,300</b>	<b>\$47,810</b>	<b>5.5</b>

\* Onsite visit not performed, facility related information provided by County staff.

\*\* Building experienced extensive damage due to Hurricane Ike (Sept-08).

## 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 a preliminary observation of each facility and data provided by Galveston County. Lamp replacements for the estimates shown below are limited to general areas such as corridors, rest rooms, storage rooms. Meaning the estimates below are limited to general areas that have lighting levels above recommended levels and can accommodate lower wattage lamps. Exact cost and quantities can be identified through a detailed energy audit.

<b>LOW WATTAGE T8 LAMPS</b>			
<b>Building</b>	<b>Estimated Implementation Cost</b>	<b>Estimated Annual Savings</b>	<b>Payback (years)</b>
Sam Popovich Bldg.	\$400	\$200	2.0
North County Annex	\$600	\$400	1.5
Emergency Management Bldg.	\$900	\$600	1.5
Walter Hall Park Service Center*	\$100	\$60	1.7
Carbide Park Community Center	\$3,100	\$1,500	2.1
<b>TOTAL</b>	<b>\$5,100</b>	<b>\$2,760</b>	<b>1.8</b>

\* Onsite visit not performed, facility related information provided by County staff.

## INSTALLATION OF OCCUPANCY SENSORS FOR INDOOR LIGHTING CONTROL

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

<b>OCCUPANCY SENSORS</b>			
<b>Building</b>	<b>Estimated Implementation Cost</b>	<b>Estimated Annual Savings</b>	<b>Payback (years)</b>
Sam Popovich Bldg.	\$800	\$160	5.0
Records & Recycling Bldg.	\$800	\$160	5.0
Llewellyn Bldg. **	\$800	\$160	5.0
Multi-Purpose Senior Center	\$800	\$160	5.0
Texas City Annex	\$1,200	\$240	5.0
Medical Examiners*	\$800	\$160	5.0
West County Annex	\$800	\$160	5.0
Runge Park Community Center*	\$800	\$160	5.0
Road & Bridge Complex*	\$800	\$160	5.0
Mosquito Control Office*	\$800	\$160	5.0
Dickinson Senior Center*	\$400	\$80	5.0
North County Annex	\$1,200	\$240	5.0
Walter Hall Park Service Center*	\$400	\$80	5.0
Walter Hall Park Community Center*	\$1,200	\$240	5.0
Bacliff Community Center*	\$400	\$80	5.0
Bacliff JP Office*	\$400	\$80	5.0
LaMarque JP Courts*	\$400	\$80	5.0
Carbide Park Community Center	\$2,000	\$400	5.0
<b>TOTAL</b>	<b>\$14,800</b>	<b>\$2,960</b>	<b>5.0</b>

\* Onsite visit not performed, facility related information provided by County staff.

\*\* Building experienced extensive damage due to Hurricane Ike (Sept-08).

## 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.

<b>PROGRAMMABLE THERMOSTATS</b>			
<b>Building</b>	<b>Estimated Implementation Cost</b>	<b>Estimated Annual Savings</b>	<b>Payback (years)</b>
Records & Recycling Bldg.	\$1,000	\$200	5.0
Llewellyn Bldg. **	\$1,000	\$200	5.0
Multi-Purpose Senior Center	\$750	\$200	3.8
Medical Examiners*	\$750	\$150	5.0
West County Service Center*	\$200	\$50	4.0
Jack Brooks Park Service Center*	\$200	\$50	4.0
Runge Park Community Center*	\$700	\$100	7.0
Road & Bridge Complex*	\$500	\$100	5.0
Mosquito Control Office*	\$500	\$100	5.0
Dickinson Senior Center*	\$700	\$200	3.5
Walter Hall Park Service Center*	\$200	\$50	4.0
Walter Hall Park Community Center*	\$1,000	\$200	5.0
Bacliff Community Center*	\$500	\$100	5.0
Bacliff JP Office*	\$500	\$100	5.0
LaMarque JP Courts*	\$1,000	\$200	5.0
<b>TOTAL</b>	<b>\$9,500</b>	<b>\$2,000</b>	<b>4.8</b>

\* Onsite visit not performed, facility related information provided by County staff.

\*\* Building experienced extensive damage due to Hurricane Ike (Sept-08).

## REPLACE HVAC SYSTEMS

This section describes the replacement of existing HVAC equipment at the facilities listed below. During the preliminary walkthrough these systems were identified to be inefficient, beyond their economical life and required extensive maintenance. The following descriptions and table below summarize the estimated cost and savings for replacing the units at each facility.

**Texas County Annex** – Replace existing Gas Fired Boiler (approx. 900 MBH) serving the building’s HVAC heating system. The existing boiler requires extensive maintenance, is inefficient and beyond its useful life. Replace the boiler with a new high efficiency boiler will improve the heating systems operations and reliability.

– Replace existing Multi-zone Air Handling Units (AHU1 and AHU2) serving the building. The existing units are over 25 years old and are beyond their useful life. Replacing the existing 2 AHUs will improve the HVACs overall system performance and enhance occupant comfort.

**North County Annex** – Replace 2 central AHUs serving the building. The existing units are over 25 years old and are beyond their useful life. Replacing the existing 2 AHUs will improve the HVACs overall system performance and enhance occupant comfort.

<b>HVAC RETROFIT</b>			
<b>Building</b>	<b>Estimated Implementation Cost</b>	<b>Estimated Annual Savings</b>	<b>Payback (years)</b>
Texas City Annex (1 Boiler and 2 AHUs)	\$182,000	\$9,000	20.2
North County Annex (2 AHUs)	\$140,000	\$7,700	18.2
<b>TOTAL</b>	<b>\$322,000</b>	<b>\$16,700</b>	<b>19.3</b>

### UPGRADE ENERGY MANAGEMENT SYSTEM (EMS)

Upgrade existing Energy Management System (EMS) to provide optimum scheduling and precise temperature supervision for the HVAC systems throughout each facility. The EMS will minimize the run time of the units while maintaining comfort throughout the facility. Additionally, EMS can remotely diagnose and document HVAC maintenance.

Presently the Courthouse Annex and North Jail are scheduled for extensive renovations. It is recommended the existing EMS be upgraded to a full Direct Digital Controlled (DDC) system. The existing HVAC control system is a hybrid of DDC and Pneumatic controllers. Upgrading the Courthouse Annex and North Jail to full DDC system will enhance the existing EMS control and improve overall system efficiency. The Courthouse Annex and North Jail EMS upgrade estimation below is limited to replacing existing pneumatic controls and thermostats required to functions as a comprehensive DDC system.

A Taylon Energy Management System (EMS) presently controls the North County Annex. The existing EMS has limited functions and capabilities. In addition, several of the controls are pneumatic such as the Space Sensors and Terminal Box Damper Actuators. The present system does not allow for full control of the terminal boxes limiting the capabilities of the existing EMS system. It is recommended the existing EMS system be upgraded to a full DDC system. The North County Annex EMS upgrade estimation below is limited to replacing existing pneumatic controls and thermostats required to functions as a comprehensive DDC system.

Exact implementation cost and savings can be identified during a Detailed Energy Assessment. For example additional cost implication such as deferred maintenance items must be investigated to determine actual system cost and savings. The EMS system proposed in the estimation below will have basic functions such as remote access capabilities, multiple scheduling, and optimum start/stop features. The table below summarizes the estimated cost and saving for these projects.

<b>UPGRADE EMS</b>			
<b>Building</b>	<b>Estimated Implementation Cost</b>	<b>Estimated Annual Savings</b>	<b>Payback (years)</b>
Courthouse Annex / N. Jail	\$135,000	\$9,000	15.0
North County Annex	\$70,000	\$5,000	14.0
<b>TOTAL</b>	<b>\$205,000</b>	<b>\$14,000</b>	<b>14.6</b>

## BUILDING COMMISSIONING (Cx)

Detailed HVAC commissioning in an existing building involves analysis of existing systems to ensure compliance with original set-up/design conditions and where feasible to adjust operating parameters to enhance comfort and reduce energy consumption. Based on the preliminary examination (utility data review, discussion with staff, and walkthrough) of the County's facilities indicated potential for energy cost savings primarily in the HVAC and lighting systems operations. The facilities noted on the following table would greatly benefit by implementing a comprehensive Building HVAC & Controls Commissioning (Cx) program. Any scheduled renovations and/or EMS upgrades must be completed prior to start of Cx program.

Commissioning measures are typically characterized as fast payback, usually 36-60 months. Examples include chiller, boiler, air handler and cooling tower service and/or adjustment, calibration of control systems and temperature settings, balancing conditioned air and/or chilled water flows etc. There are various degrees and types of commissioning programs. The cost and savings estimates presented here are for a detailed commissioning program. The project implementation duration may vary from a 10 to 14 months period.

The goal of commissioning is to deliver a facility that operates as it was intended, meets the needs of the building owner and occupants, and provides training of facility operators. To reach this goal it is necessary for the commissioning process to provide documentation and verification of the performance of all building equipment and systems. For the process to work successfully it is equally important to have good communications between all participants (building designers, owners, operators and the commissioning agent) and to keep all parties involved and informed of all pertinent decisions.

At the building level, typical commissioning measures will look into opportunities to optimize the operations of HVAC equipment. Detailed commissioning measures at the building level may include the following:

1. Optimize the AHU operation
  - Develop optimal schedule for the AHUs.
  - Develop optimal reset schedules for single duct VAV unit discharge air temperature setpoints.
  - Develop optimal cold deck and hot deck temperature reset schedules.
  - Develop optimal duct static pressure reset schedules for VAV units.
  - Improve economizer cycle operation (if applicable).
  - Determine damper positions for minimum outside air intake.
  - Optimize air distribution where necessary.
2. Verify and calibrate the temperature and pressure sensors
  - Verify the accuracy of space temperature sensors, discharge air, cold deck and hot deck temperature sensors, as well as duct static pressure sensor and water differential pressure sensors. Calibrate the sensors if necessary.
3. Set up trends for major control parameters

- Trending for major control parameters such as cold and hot deck temperatures, discharge air temperatures and static pressures.
4. Identify malfunctioning devices
    - Identify malfunctioning devices such as leaky valves. Reconnect damper linkages that are disconnected.
  5. Reprogram control sequences where required
  6. Optimize Central Plant Performance
    - Develop optimal start/stop schedules for chillers and boilers.
    - Develop optimal reset schedule for water supply temperature (chillers and boilers).

The following Commissioning estimates are based on a preliminary walkthrough and available utility data analysis. Please note, not included in the estimate below are the anticipated costs for items such as software & hardware upgrades and deferred maintenance items.

<b>BUILDING COMMISSIONING (Cx)*</b>			
<b>Building</b>	<b>Estimated Implementation Cost</b>	<b>Estimated Annual Savings</b>	<b>Payback (years)</b>
New Justice Center Complex	\$339,800	\$75,500	4.5
South Jail	\$53,000	\$10,600	5.0
Courthouse/CH Annex/N. Jail ***	\$129,000	\$25,800	5.0
Juvenile Justice Center	\$48,000	\$13,700	3.5
North County Annex	\$27,000	\$7,000	3.9
Emergency Management Bldg.	\$25,300	\$6,300	4.0
<b>TOTAL</b>	<b>\$622,100</b>	<b>\$138,900</b>	<b>4.5</b>

\* The Cx estimates are contingent upon HVAC and EMS system upgrades noted in this section.

\*\*\* CH Annex and North Jail are scheduled for extensive renovations.

The following table is a complete summary of the implementation costs, annual savings and payback for the above mentioned projects:

<b>SUMMARY OF ENERGY COST REDUCTION MEASURES</b>			
<b>Project Description</b>	<b>Estimated Implementation Cost</b>	<b>Estimated Annual Savings</b>	<b>Payback (years)</b>
FLUORESCENT LIGHTING RETROFIT	\$265,300	\$47,810	5.5
LOW WATTAGE T8 LAMPS	\$5,100	\$2,760	1.8
OCCUPANCY SENSORS	\$14,800	\$2,960	5.0
PROGRAMMABLE THERMOSTATS	\$9,500	\$2,000	4.8
HVAC RETROFIT	\$322,000	\$16,700	19.3
UPGRADE EMS	\$205,000	\$14,000	14.6
BUILDING COMMISSIONING (Cx)*	\$622,100	\$138,900	4.5
<b>TOTAL:</b>	<b>\$1,443,800</b>	<b>\$225,130</b>	<b>6.4</b>

\* The Cx estimates are contingent upon HVAC and EMS system upgrades noted in this section.

The above project implementation costs and annual savings are estimated based on a preliminary examination of the facilities. Final costs will be determined from detailed building assessments, engineering calculations, and contractor estimates.

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

## **8.0 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 with a typical interest rate of 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 County of Galveston proceeds to implement funded projects through the traditional bid/specification process. Contact: Theresa Sifuentes (512/463-1896).

### INTERNAL FINANCING

Improvements can be paid for by direct allocations of revenues from an organization's currently available operating or capital funds. 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 budgets 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 County of Galveston 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.

## 9.0 ENERGY MANAGEMENT POLICY

At present, the County has not adopted a comprehensive County-wide energy management policy. The County is committed to improving their energy performance and this is evident by the request to perform a Preliminary Energy Assessment. However, in order to ensure and sustain long-term energy efficient practices a comprehensive Energy Management Policy should be adopted by the County.

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

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

To help the County develop such a document a sample Energy Management Policy has been included in Appendix H. This document is intended to be used as a template, which can be tailored to meet the County's specific needs. In addition, as supplement to the policy, a Water Efficiency Guideline developed by SECO has been included in Appendix I

## **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  
David Rocha, LEED-AP

# APPENDICES

# APPENDIX A

## SENATE BILL 12 AND HOUSE BILL 3693 SUMMARY

# 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 80<sup>th</sup> Texas Legislature signified the continuance of Senate Bill 5 (SB5), the 77<sup>th</sup> 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 80<sup>th</sup> Texas Legislature is intended to provide additional provisions for energy-efficiency in Texas. Adopted with an effective date of September 1, 2007, HB 3693 is an additional mechanism by which the state can encourage energy-efficiency through various means for School Districts, State Facilities and Political Jurisdictions in Texas.

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

### **Record, Report and Display Consumption Data**

All Political Subdivisions, School Districts and State-Funded Institutes of Higher Education, are mandated to record and report the entity's metered resource consumption usage data for electricity, natural gas and water on a publically accessible internet page.

**Note:** *The format, content and display of this information are determined by the entity or subdivision providing this information.*

### **Energy Efficient Light Bulbs**

All School Districts and State-Funded Institutes of Higher Education shall purchase and use energy-efficient light bulbs in education and housing facilities.

### **Who must comply?**

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

## How do you define energy-efficiency measures?

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

### **Examples of energy-efficiency measures include:**

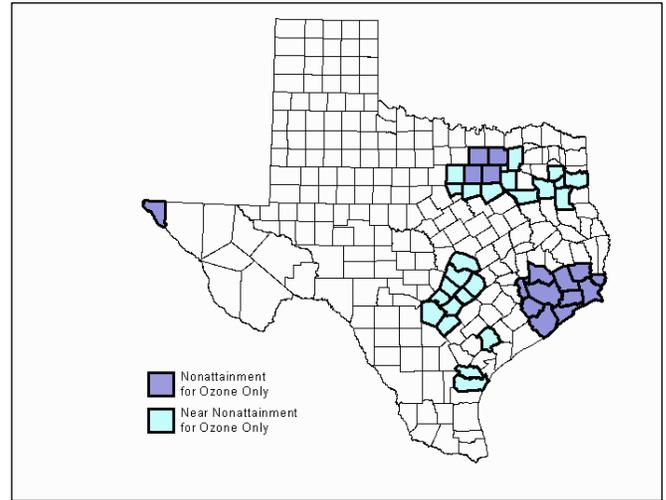
- installation of insulation and high-efficiency windows and doors
- modifications or replacement of HVAC systems, lighting fixtures and electrical systems
- installation of automatic energy control systems
- installation of energy recovery systems or renewable energy generation equipment
- building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

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

## What counties are affected?

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

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



## What assistance is available for affected areas?

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

To assist jurisdictions, the Texas Energy Partnership will:

- Present workshops and training seminars in partnership with private industry on a range of topics that include energy services, financing, building technologies and energy performance rating and benchmarking
- Prepare information packages – containing flyers, documents and national lab reports about energy services, management tools and national, state and industry resources that will help communities throughout the region
- Launch an electronic newsletter to provide continuous updates and develop additional information packages as needed

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

## SECO Program Contact Information

**LoanSTAR;**  
**Preliminary Energy Assessments:**  
Theresa Sifuentes - 512-463-1896  
[Theresa.Sifuentes@cpa.state.tx.us](mailto:Theresa.Sifuentes@cpa.state.tx.us)

**Schools Partnership Program:**  
Glenda Baldwin - 512-463-1731  
[Glenda.Baldwin@cpa.state.tx.us](mailto:Glenda.Baldwin@cpa.state.tx.us)

**Engineering (Codes / Standards):**  
Felix Lopez - 512-463-1080  
[Felix.Lopez@cpa.state.tx.us](mailto:Felix.Lopez@cpa.state.tx.us)

**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:**  
Mary-Jo Rowan - 512-463-2637  
[Mary-Jo.Rowan@cpa.state.tx.us](mailto:Mary-Jo.Rowan@cpa.state.tx.us)

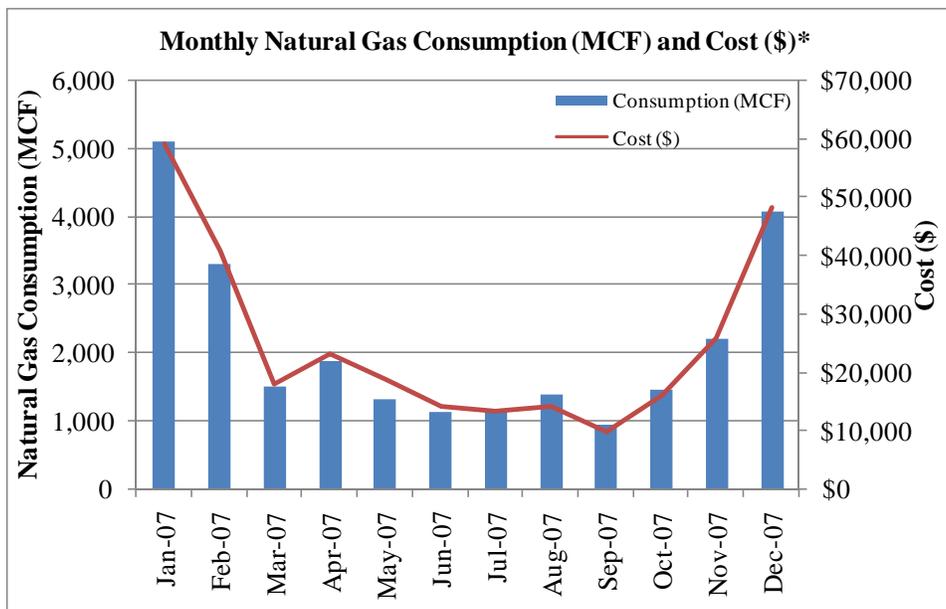
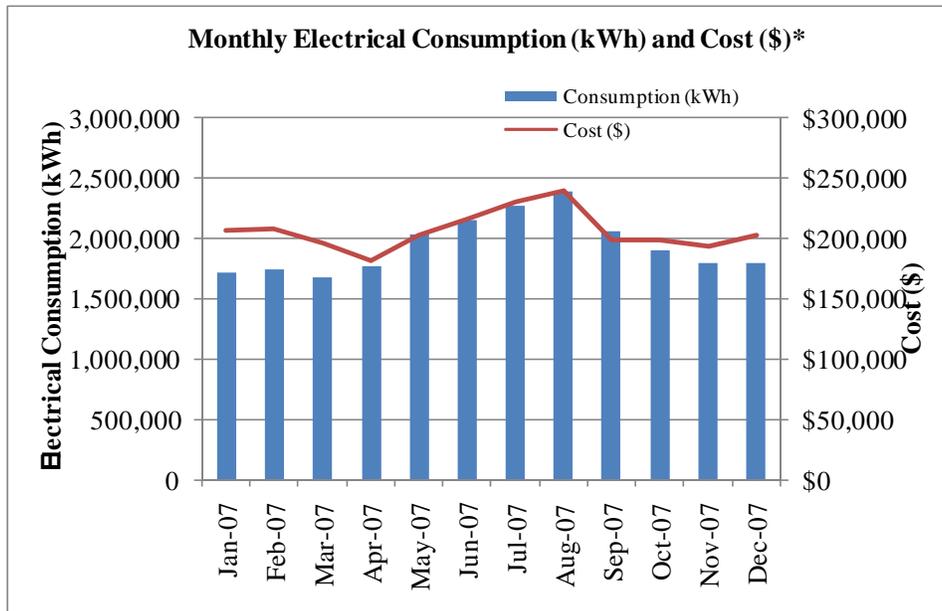
## APPENDIX B

### SAMPLE UTILITY INPUT FORM

# Galveston County - Sample Utility Data Input Form

MONTH	ELECTRICITY			NATURAL GAS			WATER		
	KWH	COST \$	\$/KWH	MCF	COST \$	\$/MCF	GAL	COST \$	\$/GAL
Jan-07	1,706,992	\$207,422	\$0.1215	5,078	\$58,934	\$11.6060			
Feb-07	1,730,286	\$208,457	\$0.1205	3,282	\$40,766	\$12.4219			
Mar-07	1,673,651	\$196,021	\$0.1171	1,506	\$18,005	\$11.9572			
Apr-07	1,766,611	\$181,943	\$0.1030	1,869	\$23,073	\$12.3432			
May-07	2,029,039	\$202,733	\$0.0999	1,307	\$18,698	\$14.3082			
Jun-07	2,143,252	\$215,432	\$0.1005	1,128	\$14,041	\$12.4454			
Jul-07	2,268,672	\$229,758	\$0.1013	1,161	\$13,166	\$11.3387			
Aug-07	2,385,447	\$239,443	\$0.1004	1,370	\$14,091	\$10.2869			
Sep-07	2,054,143	\$199,408	\$0.0971	944	\$9,752	\$10.3313			
Oct-07	1,894,949	\$198,317	\$0.1047	1,458	\$15,909	\$10.9151			
Nov-07	1,785,415	\$193,834	\$0.1086	2,204	\$25,735	\$11.6750			
Dec-07	1,789,629	\$202,820	\$0.1133	4,053	\$48,093	\$11.8657			
Total	23,228,086	\$2,475,588	\$0.1066	25,360	\$300,263	\$11.8402			

Gross Building Area	1,070,921	SF
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# APPENDIX C

## BASE YEAR CONSUMPTION HISTORY

Energy Cost and Cosumption Benchmarks										
	Building	Electric		Natural Gas		Total	Total	EUI	ECI	
		KWH/Yr	\$Cost/Yr	MCF/Yr	\$Cost/Yr	\$Cost/Yr	MMBTU/Yr	kBTU/SF/Yr	\$/SF/Yr	SF
1	New Justice Center Complex	13,826,996	1,454,929	17,180	205,162	1,660,091	64,886	114	2.91	571,206
2	Sam Popovich Bldg.	180,600	20,976	82	1,191	22,167	701	82	2.61	8,500
3	Records & Recycling Bldg.	78,160	11,076	342	4,313	15,389	619	70	1.75	8,800
4	South Jail & Parking Garage	837,328	89,392	1	189	89,581	2,858	37	1.16	77,000
5	Llewellyn Bldg. **	375,760	41,172	16	377	41,549	1,299	59	1.90	21,859
6	Courthouse/CH Annex/N. Jail ***	2,248,807	221,564	4,802	57,369	278,933	12,622	68	1.51	184,366
7	Facilities & Maint. Building**	62,160	7,397	79	1,279	8,676	293	63	1.85	4,692
8	Multi-Purpose Senior Center	256,080	28,681	59	865	29,546	934	78	2.46	12,000
9	Texas City Annex	350,720	40,549	601	7,031	47,580	1,816	146	3.82	12,444
10	Medical Examiners*	172,000	20,815	50	668	21,483	639	116	3.91	5,500
11	Juvenile Justice Center	1,405,280	140,717	1,326	12,600	153,317	6,162	165	4.10	37,400
12	West County Annex	163,440	18,663	0	0	18,663	558	88	2.95	6,319
13	West County Service Center*	64,740	7,473	70	935	8,408	293	50	1.44	5,835
14	Jack Brooks Park Service Center*	15,760	2,360	0	0	2,360	54	17	0.76	3,108
15	Runge Park Community Center*	39,740	5,660	0	0	5,660	136	37	1.53	3,700
16	Road & Bridge Complex*	300,600	35,497	0	0	35,497	1,026	62	2.15	16,480
17	Mosquito Control Office*	82,495	11,188	0	0	11,188	282	60	2.39	4,690
18	Dickinson Senior Center*	66,862	8,064	80	982	9,045	310	119	3.48	2,600
19	North County Annex	707,680	80,853	529	5,762	86,615	2,960	181	5.28	16,397
20	North Galvesonton County Bldg *, ****	221,040	25,053	0	0	25,053	754	101	3.36	7,456
21	Emergency Management Bldg.	959,360	104,507	0	0	104,507	3,274	138	4.42	23,670
22	Walter Hall Park Service Center*	36,300	4,530	0	0	4,530	124	62	2.26	2,000
23	Walter Hall Park Community Center*	198,640	24,246	0	0	24,246	678	74	2.65	9,150
24	Bacliff Community Center*	30,158	4,684	0	0	4,684	103	35	1.58	2,971
25	Bacliff JP Office*	44,240	5,622	0	0	5,622	151	48	1.80	3,128
26	LaMarque JP Courts*	84,040	10,845	0	0	10,845	287	62	2.33	4,650
27	Carbide Park Community Center	419,100	49,077	143	1,541	50,618	1,578	105	3.37	15,000
		KWH/Yr	\$Cost/Yr	MCF/Yr	\$Cost/Yr	\$Cost/Yr	MMBTU/Yr	kBTU/SF/Yr	\$/SF/Yr	SF
		23,228,086	2,475,588	25,360	300,263	2,775,851	105,398	98	2.59	1,070,921

\* Onsite visit not performed, facility related information provided by County staff.

\*\* Building experienced extensive damage due to Hurricane Ike (Sept-08).

\*\*\* CH Annex and North Jail are scheduled for extensive renovations.

\*\*\*\* Scheduled for demolition in December 2008.

1008901023816381470105

1008901023816200670105

1008901023816301600105

ACCOUNT# 1008901023816200660105 Electric

910735538 910051067 910735538 910735538 Gas

BUILDING: New Justice Center Complex

County: Galveston

FLOOR AREA: 571,206

		Electrical				NATURAL GAS / FUEL		
		CONSUMPTION	DEMAND METERED	CHARGED	COST OF	TOTAL ALL ELECTRIC	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND (\$)	COSTS (\$)	MCF	COSTS (\$)
January	2007	1,018,480				122,615	3,297	38,680
February	2007	1,048,489				124,088	2,408	29,456
March	2007	1,043,217				117,973	751	9,321
April	2007	1,064,671				106,583	1,411	17,337
May	2007	1,251,203				122,075	1,123	17,029
June	2007	1,312,769				128,664	928	12,291
July	2007	1,333,539				132,295	995	11,701
August	2007	1,401,660				137,726	964	10,070
September	2007	1,174,322				119,935	642	6,463
October	2007	1,120,844				115,845	787	8,360
November	2007	1,022,270				110,154	1,329	14,953
December	2007	1,035,532				116,977	2,546	29,500
TOTAL		13,826,996				1,454,929	17,179.5	205,162

Annual Total Energy Cost = 1,660,091 \$/year

**Energy Use Index:**  
Total site BTU's/Yr ÷ Total Area (SF) = 114 kBTU/SF/year

Total KWH/yr x 0.003413 = 47,191.54 MMBTU/year

Total MCF/yr x 1.03 = 17,694.89 MMBTU/year

Total Other x \_\_\_\_\_ = 0.0 MMBTU/year

Total Site MMBTU's/yr = 64,886 MMBTU/year

**Energy Cost Index:**  
Total Energy Cost/Yr ÷ Total Area (SF) = 2.91 \$/SF/year

Electric Utility: Reliant Energy

Gas Utility: Texas Gas Service

ACCOUNT# 1008901003410083340100 Electric  
910421127 1179469 45 Gas  
 BUILDING: Sam Popovich Bldg. County: Galveston  
 FLOOR AREA: 8,500

		ELECTRICAL			NATURAL GAS / FUEL			
		CONSUMPTION	DEMAND	CHARGED	COST OF	TOTAL ALL	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND (\$)	ELECTRIC COSTS (\$)	MCF	COSTS (\$)
January	2007	9,720				1,356	34	408
February	2007	10,840				1,420	29	418
March	2007	12,400				1,624	19	230
April	2007	16,080				1,799	0	15
May	2007	19,240				2,073	0	15
June	2007	19,880				2,151	0	15
July	2007	20,400				2,193	0	15
August	2007	23,400				2,478	0	15
September	2007	17,680				1,988	0	15
October	2007	11,760				1,416	0	15
November	2007	10,600				1,328	0	15
December	2007	8,600				1,151	0	15
<b>TOTAL</b>		<b>180,600</b>				<b>20,976</b>	<b>82.0</b>	<b>1,191</b>

\* Preliminary Onsite Survey Conducted

**Energy Use Index:**  
 Annual Total Energy Cost = 22,167 \$/year      Total site BTU's/Yr ÷ Total Area (SF) = 82 kBTU/SF/year

Total KWH/yr x 0.003413 = 616.39 MMBTU/year  
 Total MCF/yr x 1.03 = 84.46 MMBTU/year  
 Total Other x \_\_\_\_\_ = 0.0 MMBTU/year  
 Total Site MMBTU's/yr = 701 MMBTU/year

**Energy Cost Index:**  
 Total Energy Cost/Yr ÷ Total Area (SF) = 2.61 \$/SF/year

Electric Utility: Reliant Energy      Gas Utility: Texas Gas Service

ACCOUNT# 1008901003410075015100 Electric  
910602248 1405266 00 Gas  
BUILDING: Records & Recycling Bldg. County: Galveston  
FLOOR AREA: 8,800

		ELECTRICAL			NATURAL GAS / FUEL			
		CONSUMPTION	DEMAND	CHARGED	COST OF	TOTAL ALL		
MONTH	YEAR	KWH	METERED KW	KW	DEMAND (\$)	ELECTRIC COSTS (\$)	CONSUMPTION MCF	TOTAL COSTS (\$)
January	2007	3,800				697	146	1,720
February	2007	2,240				531	39	544
March	2007	2,520				547	10	127
April	2007	5,800				821	0	15
May	2007	8,920				1,100	0	15
June	2007	10,540				1,343	0	15
July	2007	12,020				1,457	0	15
August	2007	13,080				1,547	0	15
September	2007	8,760				1,140	0	15
October	2007	3,640				660	17	208
November	2007	2,840				566	50	588
December	2007	4,000				668	81	1,035
<b>TOTAL</b>		<b>78,160</b>				<b>11,076</b>	<b>342.3</b>	<b>4,313</b>

**Energy Use Index:**  
Annual Total Energy Cost = 15,389 \$/year      Total site BTU's/Yr ÷ Total Area (SF) = 70 kBTU/SF/year

Total KWH/yr x 0.003413 = 266.76 MMBTU/year  
Total MCF/yr x 1.03 = 352.57 MMBTU/year  
Total Other x \_\_\_\_\_ = 0.0 MMBTU/year  
Total Site MMBTU's/yr = 619 MMBTU/year

**Energy Cost Index:**  
Total Energy Cost/Yr ÷ Total Area (SF) = 1.75 \$/SF/year

Electric Utility: Reliant Energy      Gas Utility: Texas Gas Service

1008901023800507080100  
 ACCOUNT# 1008901003410085000100 Electric  
 910651345 1410576 64 Gas  
 BUILDING: South Jail & Parking Garage

County: Galveston  
 Jail Parking (Levels  
 (Levels 5&6) 1-4)  
 FLOOR AREA: 77,000 | 154,000

		ELECTRICAL			NATURAL GAS / FUEL			
		CONSUMPTION	DEMAND METERED	CHARGED	COST OF DEMAND (\$)	TOTAL ALL ELECTRIC COSTS (\$)	CONSUMPTION MCF	TOTAL COSTS (\$)
MONTH	YEAR	KWH	KW	KW				
January	2007	73,168				8,595	0	15
February	2007	59,824				7,164	0	15
March	2007	62,072				7,328	0	15
April	2007	63,800				6,509	0	15
May	2007	67,128				6,726	0	15
June	2007	61,120				6,254	1	24
July	2007	69,128				7,088	0	15
August	2007	85,232				8,597	0	15
September	2007	74,552				7,681	0	15
October	2007	69,056				7,099	0	15
November	2007	77,808				8,202	0	15
December	2007	74,440				8,147	0	15
<b>TOTAL</b>		<b>837,328</b>				<b>89,392</b>	<b>0.5</b>	<b>189</b>

Annual Total Energy Cost = 89,581 \$/year  
 Total KWH/yr x 0.003413 = 2,857.80 MMBTU/year  
 Total MCF/yr x 1.03 = 0.52 MMBTU/year  
 Total Other x \_\_\_\_\_ = 0.0 MMBTU/year  
 Total Site MMBTU's/yr = 2,858 MMBTU/year

**Energy Use Index:**  
 Total site BTU's/Yr ÷ Total Area (SF) = 37 kBTU/SF/year

**Energy Cost Index:**  
 Total Energy Cost/Yr ÷ Total Area (SF) = 1.16 \$/SF/year

Electric Utility: Reliant Energy

Gas Utility: Texas Gas Service

County: Galveston

ACCOUNT# 1008901003410083560100 Electric  
910392895 1146919 82 Gas  
 BUILDING: Llewellyn Bldg. \*\*

FLOOR AREA: 21,859

		ELECTRICAL			NATURAL GAS / FUEL			
			DEMAND			TOTAL ALL		
MONTH	YEAR	CONSUMPTION	METERED	CHARGED	COST OF	ELECTRIC	CONSUMPTION	TOTAL
		KWH	KW	KW	DEMAND (\$)	COSTS (\$)	MCF	COSTS (\$)
January	2007	29,440				3,626	11	143
February	2007	26,400				3,295	2	45
March	2007	29,280				3,576	0	15
April	2007	34,480				3,619	0	15
May	2007	40,720				4,122	0	15
June	2007	42,080				4,284	0	15
July	2007	41,120				4,198	0	15
August	2007	42,160				4,323	0	15
September	2007	24,080				2,643	0	15
October	2007	24,960				2,729	0	15
November	2007	22,000				2,493	0	16
December	2007	19,040				2,264	3	52
<b>TOTAL</b>		<b>375,760</b>				<b>41,172</b>	<b>16.2</b>	<b>377</b>

\*\* Building experienced extensive damage due to Hurricane Ike (Sept-08).

**Energy Use Index:**  
 Annual Total Energy Cost = 41,549 \$/year      Total site BTU's/Yr ÷ Total Area (SF) = 59 kBTU/SF/year

Total KWH/yr x 0.003413 = 1,282.47 MMBTU/year  
 Total MCF/yr x 1.03 = 16.69 MMBTU/year  
 Total Other x \_\_\_\_\_ = 0.0 MMBTU/year  
 Total Site MMBTU's/yr = 1,299 MMBTU/year

**Energy Cost Index:**  
 Total Energy Cost/Yr ÷ Total Area (SF) = 1.90 \$/SF/year

Electric Utility: Reliant Energy

Gas Utility: Texas Gas Service

County: Galveston

ACCOUNT# 1008901000144280013100 Electric  
910605401 1114846 27 910421127 1630767 45 Gas

BUILDING: Courthouse/CH Annex/N. Jail \*\*\* FLOOR AREA: 184,366

		ELECTRICAL			NATURAL GAS / FUEL			
			DEMAND			TOTAL ALL		
MONTH	YEAR	CONSUMPTION	METERED	CHARGED	COST OF	ELECTRIC	CONSUMPTION	TOTAL
		KWH	KW	KW	DEMAND (\$)	COSTS (\$)	MCF	COSTS (\$)
January	2007	147,552				16,694	1,036	11,962
February	2007	157,201				17,637	421	5,796
March	2007	109,791				12,633	338	3,847
April	2007	102,961				10,402	235	3,053
May	2007	108,750				10,774	12	190
June	2007	158,809				14,971	11	158
July	2007	211,465				19,746	2	48
August	2007	262,374				24,025	275	2,853
September	2007	240,671				22,350	170	1,730
October	2007	251,511				23,405	459	5,163
November	2007	244,184				23,564	703	8,170
December	2007	253,538				25,363	1,141	14,398
<b>TOTAL</b>		<b>2,248,807</b>				<b>221,564</b>	<b>4,802.4</b>	<b>57,369</b>

\*\*\* CH Annex and North Jail are scheduled for extensive renovations.

Annual Total Energy Cost = 278,933 \$/year      **Energy Use Index:**  
 Total site BTU's/Yr ÷ Total Area (SF) = 68 kBTU/SF/year

Total KWH/yr x 0.003413 = 7,675.18 MMBTU/year  
 Total MCF/yr x 1.03 = 4,946.47 MMBTU/year  
 Total Other x \_\_\_\_\_ = 0.0 MMBTU/year  
 Total Site MMBTU's/yr = 12,622 MMBTU/year

**Energy Cost Index:**  
 Total Energy Cost/Yr ÷ Total Area (SF) = 1.51 \$/SF/year

Electric Utility: Reliant Energy

Gas Utility: Texas Gas Service

County: Galveston

ACCOUNT# 1008901003410083295100 Electric  
910644690 1202009 64 910644690 1217866 00 Gas

BUILDING: Facilities & Maint. Building\*\*

FLOOR AREA: 4,692

		ELECTRICAL			NATURAL GAS / FUEL			
			DEMAND			TOTAL ALL		
MONTH	YEAR	CONSUMPTION	METERED	CHARGED	COST OF	ELECTRIC	CONSUMPTION	TOTAL
		KWH	KW	KW	DEMAND (\$)	COSTS (\$)	MCF	COSTS (\$)
January	2007	3,420				469	22	283
February	2007	3,180				460	30	399
March	2007	3,840				525	4	82
April	2007	5,640				633	0	20
May	2007	6,540				716	1	40
June	2007	6,900				755	1	44
July	2007	7,440				823	7	110
August	2007	8,340				912	2	50
September	2007	5,880				689	3	56
October	2007	3,960				486	2	51
November	2007	3,600				469	3	58
December	2007	3,420				463	5	86
<b>TOTAL</b>		<b>62,160</b>				<b>7,397</b>	<b>78.8</b>	<b>1,279</b>

\*\* Building experienced extensive damage due to Hurricane Ike (Sept-08).

**Energy Use Index:**  
 Annual Total Energy Cost = 8,676 \$/year      Total site BTU's/Yr ÷ Total Area (SF) = 63 kBTU/SF/year

Total KWH/yr x 0.003413 = 212.15 MMBTU/year  
 Total MCF/yr x 1.03 = 81.16 MMBTU/year  
 Total Other x \_\_\_\_\_ = 0.0 MMBTU/year  
 Total Site MMBTU's/yr = 293 MMBTU/year

**Energy Cost Index:**  
 Total Energy Cost/Yr ÷ Total Area (SF) = 1.85 \$/SF/year

Electric Utility: Reliant Energy

Gas Utility: Texas Gas Service

ACCOUNT# 1008901023801322340100 Electric  
910326263 1175534 45 Gas  
 BUILDING: Multi-Purpose Senior Center FLOOR AREA: 12,000  
 County: Galveston

		ELECTRICAL			NATURAL GAS / FUEL			
		CONSUMPTION	DEMAND	CHARGED	COST OF	TOTAL ALL	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	METERED KW	KW	DEMAND (\$)	ELECTRIC COSTS (\$)	MCF	COSTS (\$)
January	2007	16,380				2,102	6	90
February	2007	15,000				1,935	4	74
March	2007	17,160				2,170	2	40
April	2007	20,760				2,234	8	118
May	2007	25,560				2,662	6	90
June	2007	26,220				2,746	4	64
July	2007	27,600				2,888	5	61
August	2007	31,320				3,248	5	61
September	2007	24,660				2,643	4	58
October	2007	19,260				2,181	5	70
November	2007	18,180				2,134	6	79
December	2007	13,980				1,734	4	60
<b>TOTAL</b>		<b>256,080</b>				<b>28,681</b>	<b>58.6</b>	<b>865</b>

Annual Total Energy Cost = 29,546 \$/year  
 Total KWH/yr x 0.003413 = 874.00 MMBTU/year  
 Total MCF/yr x 1.03 = 60.36 MMBTU/year  
 Total Other x \_\_\_\_\_ = 0.0 MMBTU/year  
 Total Site MMBTU's/yr = 934 MMBTU/year

**Energy Use Index:**  
 Total site BTU's/Yr ÷ Total Area (SF) = 78 kBTU/SF/year  
**Energy Cost Index:**  
 Total Energy Cost/Yr ÷ Total Area (SF) = 2.46 \$/SF/year

Electric Utility: Reliant Energy Gas Utility: Texas Gas Service

ACCOUNT# 10400511938010001 Electric  
4809179 Gas  
 BUILDING: Texas City Annex County: Galveston  
 FLOOR AREA: 12,444

		ELECTRICAL			NATURAL GAS / FUEL			
		CONSUMPTION	DEMAND	CHARGED	COST OF	TOTAL ALL	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND (\$)	ELECTRIC COSTS (\$)	MCF	COSTS (\$)
January **	2007	24,640				3,114	195	1,998
February **	2007	25,520				3,301	71	804
March **	2007	24,480				3,142	114	1,275
April **	2007	30,160				3,394	46	530
May	2007	31,520				3,440	7	64
June	2007	33,440				3,652	2	25
July	2007	38,080				4,136	2	26
August	2007	33,120				3,692	2	26
September	2007	33,520				3,717	2	29
October	2007	27,200				3,082	2	29
November	2007	25,120				2,947	6	625
December	2007	23,920				2,933	155	1,600
<b>TOTAL</b>		<b>350,720</b>				<b>40,549</b>	<b>600.9</b>	<b>7,031</b>

\*\* Estimated Natural Gas Data based on 2008 figures

**Energy Use Index:**  
 Annual Total Energy Cost = 47,580 \$/year      Total site BTU's/Yr ÷ Total Area (SF) = 146 kBTU/SF/year

Total KWH/yr x 0.003413 = 1,197.01 MMBTU/year  
 Total MCF/yr x 1.03 = 618.94 MMBTU/year  
 Total Other x \_\_\_\_\_ = 0.0 MMBTU/year  
 Total Site MMBTU's/yr = 1,816 MMBTU/year

**Energy Cost Index:**  
 Total Energy Cost/Yr ÷ Total Area (SF) = 3.82 \$/SF/year

Electric Utility: Reliant Energy      Gas Utility: Center Point Gas

ACCOUNT# 10400511805370001 Electric  
4831861 Gas  
 BUILDING: Medical Examiners\* FLOOR AREA: 5,500  
 County: Galveston

		ELECTRICAL			NATURAL GAS / FUEL			
		CONSUMPTION	DEMAND	CHARGED	COST OF	TOTAL ALL	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND (\$)	ELECTRIC COSTS (\$)	MCF	COSTS (\$)
January **	2007	10,440				1,453	5	69
February **	2007	10,840				1,504	5	66
March **	2007	12,360				1,659	5	65
April **	2007	14,720				1,695	4	58
May	2007	16,600				1,878	4	45
June	2007	16,160				1,846	4	41
July	2007	18,680				2,086	4	40
August	2007	18,880				2,147	3	48
September	2007	14,960				1,707	4	51
October	2007	14,120				1,697	4	53
November	2007	12,760				1,607	5	61
December	2007	11,480				1,535	5	71
<b>TOTAL</b>		<b>172,000</b>				<b>20,815</b>	<b>50.1</b>	<b>668</b>

\* Onsite visit not performed, information based on County information provided.

\*\* Estimated Natural Gas Data based on 2008 figures

Annual Total Energy Cost = 21,483 \$/year

**Energy Use Index:**  
 Total site BTU's/Yr ÷ Total Area (SF) = 116 kBTU/SF/year

Total KWH/yr x 0.003413 = 587.04 MMBTU/year  
 Total MCF/yr x 1.03 = 51.60 MMBTU/year  
 Total Other x \_\_\_\_\_ = 0.0 MMBTU/year  
 Total Site MMBTU's/yr = 639 MMBTU/year

**Energy Cost Index:**  
 Total Energy Cost/Yr ÷ Total Area (SF) = 3.91 \$/SF/year

Electric Utility: Reliant Energy

Gas Utility: Center Point Gas

ACCOUNT# 10400513584960001 Electric  
4754372 Gas  
 BUILDING: Juvenile Justice Center County: Galveston  
 FLOOR AREA: 37,400

		ELECTRICAL			NATURAL GAS / FUEL			
		CONSUMPTION	DEMAND	CHARGED	COST OF	TOTAL ALL	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND (\$)	ELECTRIC COSTS (\$)	MCF	COSTS (\$)
January **	2007	98,320				12,055	136	1,523
February **	2007	106,640				13,025	108	1,214
March **	2007	98,400				12,003	102	1,148
April **	2007	129,760				13,258	105	1,182
May **	2007	133,680				13,570	125	902
June	2007	137,120				14,091	138	995
July	2007	151,120				15,452	135	972
August	2007	134,080				14,187	97	708
September	2007	136,080				1,438	103	1,071
October	2007	99,840				10,809	165	1,699
November	2007	91,840				10,415	56	594
December	2007	88,400				10,413	56	594
<b>TOTAL</b>		<b>1,405,280</b>				<b>140,717</b>	<b>1,326.0</b>	<b>12,600</b>

\*\* Estimated Natural Gas Data based on 2008 figures

**Energy Use Index:**  
 Annual Total Energy Cost = 153,317 \$/year      Total site BTU's/Yr ÷ Total Area (SF) = 165 kBTU/SF/year

Total KWH/yr x 0.003413 = 4,796.22 MMBTU/year  
 Total MCF/yr x 1.03 = 1,365.78 MMBTU/year  
 Total Other x \_\_\_\_\_ = 0.0 MMBTU/year  
 Total Site MMBTU's/yr = 6,162 MMBTU/year

**Energy Cost Index:**  
 Total Energy Cost/Yr ÷ Total Area (SF) = 4.10 \$/SF/year

Electric Utility: Reliant Energy      Gas Utility: Center Point Gas

ACCOUNT# 1008901032357596535100 Electric  
 Gas  
 BUILDING: West County Annex FLOOR AREA: 6,319  
 County: Galveston

		ELECTRICAL			NATURAL GAS / FUEL			
		CONSUMPTION	DEMAND	CHARGED	COST OF	TOTAL ALL		
MONTH	YEAR	KWH	METERED KW	KW	DEMAND (\$)	ELECTRIC COSTS (\$)	CONSUMPTION MCF	TOTAL COSTS (\$)
January	2007	12,300				1,578		
February	2007	10,980				1,403		
March	2007	11,820				1,492		
April	2007	18,660				1,916		
May	2007	9,240				1,101		
June	2007	15,660				1,688		
July	2007	16,080				1,731		
August	2007	14,220				1,574		
September	2007	14,280				1,589		
October	2007	13,260				1,490		
November	2007	13,080				1,490		
December	2007	13,860				1,610		
<b>TOTAL</b>		<b>163,440</b>				<b>18,663</b>		

**Energy Use Index:**  
 Annual Total Energy Cost = 18,663 \$/year  
 Total site BTU's/Yr ÷ Total Area (SF) = 88 kBTU/SF/year

Total KWH/yr x 0.003413 = 557.82 MMBTU/year  
 Total MCF/yr x 1.03 = 0.00 MMBTU/year  
 Total Other x \_\_\_\_\_ = 0.0 MMBTU/year  
 Total Site MMBTU's/yr = 558 MMBTU/year

**Energy Cost Index:**  
 Total Energy Cost/Yr ÷ Total Area (SF) = 2.95 \$/SF/year

Electric Utility: Reliant Energy Gas Utility: N/A

ACCOUNT# 1008901032357597130100 Electric  
4472227 Gas  
 BUILDING: West County Service Center\* FLOOR AREA: 5,835 County: Galveston

		ELECTRICAL			NATURAL GAS / FUEL			
		CONSUMPTION	DEMAND	CHARGED	COST OF	TOTAL ALL		
MONTH	YEAR	KWH	METERED KW	KW	DEMAND (\$)	ELECTRIC COSTS (\$)	CONSUMPTION MCF	TOTAL COSTS (\$)
January **	2007	4,237				546	30	355
February **	2007	4,058				529	22	260
March **	2007	4,412				568	8	110
April **	2007	5,566				614	1	26
May	2007	6,202				676	1	18
June	2007	6,875				734	0	14
July	2007	7,238				786	0	12
August	2007	5,326				601	1	16
September	2007	6,061				677	0	12
October	2007	5,643				644	0	12
November	2007	4,509				536	0	12
December	2007	4,613				563	7	85
<b>TOTAL</b>		<b>64,740</b>				<b>7,473</b>	<b>70.0</b>	<b>935</b>

\* Onsite visit not performed, information based on County information provided.

\*\* Estimated Natural Gas Data based on 2008 figures

Annual Total Energy Cost = 8,408 \$/year

**Energy Use Index:**  
 Total site BTU's/Yr ÷ Total Area (SF) = 50 kBTU/SF/year

Total KWH/yr x 0.003413 = 220.96 MMBTU/year  
 Total MCF/yr x 1.03 = 72.10 MMBTU/year  
 Total Other x \_\_\_\_\_ = 0.0 MMBTU/year  
 Total Site MMBTU's/yr = 293 MMBTU/year

**Energy Cost Index:**  
 Total Energy Cost/Yr ÷ Total Area (SF) = 1.44 \$/SF/year

Electric Utility: Reliant Energy

Gas Utility: CenterPoint Gas

ACCOUNT# 1008901009457460605100 Electric  
 Gas  
 BUILDING: Jack Brooks Park Service Center\* FLOOR AREA: 3,108 County: Galveston

		ELECTRICAL			NATURAL GAS / FUEL			
		CONSUMPTION	DEMAND	CHARGED	COST OF	TOTAL ALL	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND (\$)	ELECTRIC COSTS (\$)	MCF	COSTS (\$)
January	2007	920				174		
February	2007	920				170		
March	2007	1,000				178		
April	2007	1,440				203		
May	2007	1,720				235		
June	2007	1,960				251		
July	2007	1,800				238		
August	2007	1,920				250		
September	2007	1,320				192		
October	2007	1,080				175		
November	2007	1,080				178		
December	2007	600				114		
<b>TOTAL</b>		<b>15,760</b>				<b>2,360</b>		

\* Onsite visit not performed, information based on County information provided.

**Energy Use Index:**  
 Annual Total Energy Cost = 2,360 \$/year      Total site BTU's/Yr ÷ Total Area (SF) = 17 kBTU/SF/year

Total KWH/yr x 0.003413 = 53.79 MMBTU/year  
 Total MCF/yr x 1.03 = 0.00 MMBTU/year  
 Total Other x \_\_\_\_\_ = 0.0 MMBTU/year  
 Total Site MMBTU's/yr = 54 MMBTU/year

**Energy Cost Index:**  
 Total Energy Cost/Yr ÷ Total Area (SF) = 0.76 \$/SF/year

Electric Utility: Reliant Energy      Gas Utility: N/A

ACCOUNT# 1008901036360397113100 Electric  
 Gas  
 BUILDING: Runge Park Community Center\* FLOOR AREA: 3,700 County: Galveston

		ELECTRICAL			NATURAL GAS / FUEL			
		CONSUMPTION	DEMAND	CHARGED	COST OF	TOTAL ALL		
MONTH	YEAR	KWH	METERED	KW	DEMAND (\$)	ELECTRIC	CONSUMPTION	TOTAL
						COSTS (\$)	MCF	COSTS (\$)
January	2007	4,891				716		
February	2007	1,680				358		
March	2007	1,801				335		
April	2007	2,327				363		
May	2007	3,682				477		
June	2007	4,274				533		
July	2007	4,336				543		
August	2007	5,418				660		
September	2007	3,370				459		
October	2007	2,338				358		
November	2007	1,834				317		
December	2007	3,789				540		
<b>TOTAL</b>		<b>39,740</b>				<b>5,660</b>		

\* Onsite visit not performed, information based on County information provided.

**Energy Use Index:**  
 Annual Total Energy Cost = 5,660 \$/year Total site BTU's/Yr ÷ Total Area (SF) = 37 kBTU/SF/year  
 Total KWH/yr x 0.003413 = 135.63 MMBTU/year  
 Total MCF/yr x 1.03 = 0.00 MMBTU/year  
 Total Other x \_\_\_\_\_ = 0.0 MMBTU/year  
 Total Site MMBTU's/yr = 136 MMBTU/year

**Energy Cost Index:**  
 Total Energy Cost/Yr ÷ Total Area (SF) = 1.53 \$/SF/year

Electric Utility: Reliant Energy Gas Utility: N/A

10400511616760001 10400511616760002  
 ACCOUNT# 1400511616770002 Electric  
 Gas  
 BUILDING: Road & Bridge Complex\*

County: Galveston

FLOOR AREA: 16,480

		ELECTRICAL			NATURAL GAS / FUEL			
		CONSUMPTION	DEMAND	CHARGED	COST OF	TOTAL ALL	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND (\$)	ELECTRIC COSTS (\$)	MCF	COSTS (\$)
January	2007	23,440				2,963		
February	2007	20,000				2,653		
March	2007	19,800				2,604		
April	2007	25,160				2,925		
May	2007	30,160				3,275		
June	2007	29,360				3,252		
July	2007	33,280				3,660		
August	2007	29,440				3,330		
September	2007	26,880				3,111		
October	2007	21,520				2,630		
November	2007	19,800				2,399		
December	2007	21,760				2,695		
<b>TOTAL</b>		<b>300,600</b>				<b>35,497</b>		

\* Onsite visit not performed, information based on County information provided.

**Energy Use Index:**  
 Annual Total Energy Cost = 35,497 \$/year      Total site BTU's/Yr ÷ Total Area (SF) = 62 kBTU/SF/year

Total KWH/yr x 0.003413 = 1,025.95 MMBTU/year  
 Total MCF/yr x 1.03 = 0.00 MMBTU/year  
 Total Other x \_\_\_\_\_ = 0.0 MMBTU/year  
 Total Site MMBTU's/yr = 1,026 MMBTU/year

**Energy Cost Index:**  
 Total Energy Cost/Yr ÷ Total Area (SF) = 2.15 \$/SF/year

Electric Utility: Reliant Energy

Gas Utility: N/A

ACCOUNT# 1040051161677001 Electric  
 Gas  
 BUILDING: Mosquito Control Office\* FLOOR AREA: 4,690 County: Galveston

		ELECTRICAL			NATURAL GAS / FUEL			
		CONSUMPTION	DEMAND	CHARGED	COST OF	TOTAL ALL		
MONTH	YEAR	KWH	METERED KW	KW	DEMAND (\$)	ELECTRIC COSTS (\$)	CONSUMPTION MCF	TOTAL COSTS (\$)
January	2007	5,873				897		
February	2007	6,296				965		
March	2007	6,693				991		
April	2007	7,329				934		
May	2007	7,751				967		
June	2007	7,368				918		
July	2007	8,058				994		
August	2007	7,158				916		
September	2007	6,931				900		
October	2007	6,600				868		
November	2007	6,250				929		
December	2007	6,188				910		
<b>TOTAL</b>		<b>82,495</b>				<b>11,188</b>		

\* Onsite visit not performed, information based on County information provided.

**Energy Use Index:**  
 Annual Total Energy Cost = 11,188 \$/year Total site BTU's/Yr ÷ Total Area (SF) = 60 kBTU/SF/year  
 Total KWH/yr x 0.003413 = 281.56 MMBTU/year  
 Total MCF/yr x 1.03 = 0.00 MMBTU/year  
 Total Other x \_\_\_\_\_ = 0.0 MMBTU/year  
 Total Site MMBTU's/yr = 282 MMBTU/year

**Energy Cost Index:**  
 Total Energy Cost/Yr ÷ Total Area (SF) = 2.39 \$/SF/year

Electric Utility: Reliant Energy Gas Utility: N/A

ACCOUNT# 10400511565660001 Electric  
4848220 Gas  
 BUILDING: Dickinson Senior Center\* FLOOR AREA: 2,600  
 County: Galveston

		ELECTRICAL			NATURAL GAS / FUEL			
		CONSUMPTION	DEMAND METERED	CHARGED	COST OF DEMAND (\$)	TOTAL ALL ELECTRIC COSTS (\$)	CONSUMPTION MCF	TOTAL COSTS (\$)
MONTH	YEAR	KWH	KW	KW	DEMAND (\$)	COSTS (\$)	MCF	COSTS (\$)
January **	2007	3,900				535	15	177
February **	2007	3,836				534	10	128
March **	2007	5,212				672	6	81
April **	2007	5,411				631	11	137
May	2007	6,293				702	4	44
June	2007	7,051				795	4	41
July	2007	6,946				790	4	41
August	2007	7,328				831	4	43
September	2007	7,406				843	4	52
October	2007	5,197				638	3	48
November	2007	4,214				534	4	57
December	2007	4,068				557	11	134
<b>TOTAL</b>		<b>66,862</b>				<b>8,064</b>	<b>79.6</b>	<b>982</b>

\* Onsite visit not performed, information based on County information provided.

\*\* Estimated Natural Gas Data based on 2008 figures

Annual Total Energy Cost = 9,045 \$/year

**Energy Use Index:**  
 Total site BTU's/Yr ÷ Total Area (SF) = 119 kBTU/SF/year

Total KWH/yr x 0.003413 = 228.20 MMBTU/year  
 Total MCF/yr x 1.03 = 81.99 MMBTU/year  
 Total Other x \_\_\_\_\_ = 0.0 MMBTU/year  
 Total Site MMBTU's/yr = 310 MMBTU/year

**Energy Cost Index:**  
 Total Energy Cost/Yr ÷ Total Area (SF) = 3.48 \$/SF/year

Electric Utility: Reliant Energy

Gas Utility: CenterPoint Gas

ACCOUNT# 10400511680560001 Electric  
4693683 Gas  
 BUILDING: North County Annex FLOOR AREA: 16,397  
 County: Galveston

		ELECTRICAL			NATURAL GAS / FUEL			
		CONSUMPTION	DEMAND	CHARGED	COST OF	TOTAL ALL	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND (\$)	ELECTRIC COSTS (\$)	MCF	COSTS (\$)
January **	2007	58,880				7,405	133	1,378
February **	2007	66,320				8,220	124	1,394
March **	2007	57,360				7,040	136	1,517
April **	2007	59,600				6,324	39	451
May	2007	68,080				6,953	12	105
June	2007	61,040				6,489	24	191
July	2007	65,120				7,344	1	18
August	2007	65,920				7,183	0	12
September	2007	61,840				6,850	0	12
October	2007	51,120				5,826	2	33
November	2007	48,960				5,792	32	354
December	2007	43,440				5,426	27	296
<b>TOTAL</b>		<b>707,680</b>				<b>80,853</b>	<b>529.3</b>	<b>5,762</b>

\*\* Estimated Natural Gas Data based on 2008 figures

**Energy Use Index:**  
 Annual Total Energy Cost = 86,615 \$/year      Total site BTU's/Yr ÷ Total Area (SF) = 181 kBTU/SF/year

Total KWH/yr x 0.003413 = 2,415.31 MMBTU/year  
 Total MCF/yr x 1.03 = 545.18 MMBTU/year  
 Total Other x \_\_\_\_\_ = 0.0 MMBTU/year  
 Total Site MMBTU's/yr = 2,960 MMBTU/year

**Energy Cost Index:**  
 Total Energy Cost/Yr ÷ Total Area (SF) = 5.28 \$/SF/year

Electric Utility: Reliant Energy      Gas Utility: CenterPoint Gas

ACCOUNT# 10400511622230001 Electric  
 Gas  
 BUILDING: North Galvesonton County Bldg \*, \*\*\*\* FLOOR AREA: 7,456 County: Galveston

		ELECTRICAL				NATURAL GAS / FUEL		
			DEMAND			TOTAL ALL		
MONTH	YEAR	CONSUMPTION	METERED	CHARGED	COST OF	ELECTRIC	CONSUMPTION	TOTAL
		KWH	KW	KW	DEMAND (\$)	COSTS (\$)	MCF	COSTS (\$)
January	2007	16,000				2,040		
February	2007	17,440				2,197		
March	2007	16,640				2,091		
April	2007	18,640				2,044		
May	2007	23,520				2,396		
June	2007	24,000				2,549		
July	2007	26,080				2,741		
August	2007	26,880				2,808		
September	2007	20,240				2,186		
October	2007	13,280				1,576		
November	2007	10,800				1,345		
December	2007	7,520				1,081		
<b>TOTAL</b>		<b>221,040</b>				<b>25,053</b>		

\* Onsite visit not performed, information based on County information provided.

\*\*\*\* Scheduled for demolition in December 2008.

Annual Total Energy Cost = 25,053 \$/year      Total site BTU's/Yr ÷ Total Area (SF) = 101 kBTU/SF/year

Total KWH/yr x 0.003413 = 754.41 MMBTU/year  
 Total MCF/yr x 1.03 = 0.00 MMBTU/year  
 Total Other x \_\_\_\_\_ = 0.0 MMBTU/year  
 Total Site MMBTU's/yr = 754 MMBTU/year

**Energy Cost Index:**  
 Total Energy Cost/Yr ÷ Total Area (SF) = 3.36 \$/SF/year

Electric Utility: Reliant Energy

Gas Utility: N/A

ACCOUNT# 10400514287720001 Electric  
 Gas  
 BUILDING: Emergency Management Bldg. FLOOR AREA: 23,670  
 County: Galveston

		ELECTRICAL			NATURAL GAS / FUEL			
		CONSUMPTION	DEMAND	CHARGED	COST OF	TOTAL ALL		
MONTH	YEAR	KWH	METERED KW	KW	DEMAND (\$)	ELECTRIC COSTS (\$)	CONSUMPTION MCF	TOTAL COSTS (\$)
January	2007	75,600				9,154		
February	2007	77,440				9,345		
March	2007	74,480				8,871		
April	2007	71,840				7,571		
May	2007	82,560				8,173		
June	2007	78,640				8,187		
July	2007	85,840				9,052		
August	2007	90,960				9,436		
September	2007	80,000				8,399		
October	2007	74,240				7,934		
November	2007	83,040				8,777		
December	2007	84,720				9,609		
<b>TOTAL</b>		<b>959,360</b>				<b>104,507</b>		

**Energy Use Index:**  
 Annual Total Energy Cost = 104,507 \$/year      Total site BTU's/Yr ÷ Total Area (SF) = 138 kBTU/SF/year

Total KWH/yr x 0.003413 = 3,274.30 MMBTU/year  
 Total MCF/yr x 1.03 = 0.00 MMBTU/year  
 Total Other x \_\_\_\_\_ = 0.0 MMBTU/year  
 Total Site MMBTU's/yr = 3,274 MMBTU/year

**Energy Cost Index:**  
 Total Energy Cost/Yr ÷ Total Area (SF) = 4.42 \$/SF/year

Electric Utility: Reliant Energy      Gas Utility: N/A

ACCOUNT# 10400513231680001 Electric  
 Gas  
 BUILDING: Walter Hall Park Service Center\* FLOOR AREA: 2,000 County: Galveston

		ELECTRICAL			NATURAL GAS / FUEL			
		CONSUMPTION	DEMAND	CHARGED	COST OF	TOTAL ALL		
MONTH	YEAR	KWH	METERED KW	KW	DEMAND (\$)	ELECTRIC COSTS (\$)	CONSUMPTION MCF	TOTAL COSTS (\$)
January	2007	2,491				253		
February	2007	2,890				413		
March	2007	3,142				418		
April	2007	3,378				394		
May	2007	3,767				438		
June	2007	3,602				432		
July	2007	3,539				431		
August	2007	3,600				430		
September	2007	3,325				408		
October	2007	2,527				337		
November	2007	2,114				292		
December	2007	1,925				284		
<b>TOTAL</b>		<b>36,300</b>				<b>4,530</b>		

\* Onsite visit not performed, information based on County information provided.

**Energy Use Index:**  
 Annual Total Energy Cost = 4,530 \$/year      Total site BTU's/Yr ÷ Total Area (SF) = 62 kBTU/SF/year

Total KWH/yr x 0.003413 = 123.89 MMBTU/year  
 Total MCF/yr x 1.03 = 0.00 MMBTU/year  
 Total Other x \_\_\_\_\_ = 0.0 MMBTU/year  
 Total Site MMBTU's/yr = 124 MMBTU/year

**Energy Cost Index:**  
 Total Energy Cost/Yr ÷ Total Area (SF) = 2.26 \$/SF/year

Electric Utility: Reliant Energy      Gas Utility: N/A

ACCOUNT# 10400513553760001 Electric  
 Gas  
 BUILDING: Walter Hall Park Community Center\* FLOOR AREA: 9,150 County: Galveston

		ELECTRICAL			NATURAL GAS / FUEL			
		CONSUMPTION	DEMAND	CHARGED	COST OF	TOTAL ALL	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND (\$)	ELECTRIC COSTS (\$)	MCF	COSTS (\$)
January	2007	13,120				1,836		
February	2007	14,240				1,972		
March	2007	13,520				1,864		
April	2007	14,960				1,825		
May	2007	22,480				2,440		
June	2007	20,960				2,376		
July	2007	22,960				2,619		
August	2007	21,200				2,433		
September	2007	15,760				1,898		
October	2007	12,240				1,552		
November	2007	14,320				1,730		
December	2007	12,880				1,702		
<b>TOTAL</b>		<b>198,640</b>				<b>24,246</b>		

\* Onsite visit not performed, information based on County information provided.

**Energy Use Index:**  
 Annual Total Energy Cost = 24,246 \$/year Total site BTU's/Yr ÷ Total Area (SF) = 74 kBTU/SF/year

Total KWH/yr x 0.003413 = 677.96 MMBTU/year  
 Total MCF/yr x 1.03 = 0.00 MMBTU/year  
 Total Other x \_\_\_\_\_ = 0.0 MMBTU/year  
 Total Site MMBTU's/yr = 678 MMBTU/year

**Energy Cost Index:**  
 Total Energy Cost/Yr ÷ Total Area (SF) = 2.65 \$/SF/year

Electric Utility: Reliant Energy Gas Utility: N/A

ACCOUNT# 1008901005614204104100 Electric  
 Gas  
 BUILDING: Bacliff Community Center\* FLOOR AREA: 2,971 County: Galveston

		ELECTRICAL			NATURAL GAS / FUEL			
		CONSUMPTION	DEMAND	CHARGED	COST OF	TOTAL ALL		
MONTH	YEAR	KWH	METERED KW	KW	DEMAND (\$)	ELECTRIC COSTS (\$)	CONSUMPTION MCF	TOTAL COSTS (\$)
January	2007	2,620				450		
February	2007	1,752				341		
March	2007	2,051				371		
April	2007	2,608				382		
May	2007	2,943				425		
June	2007	3,004				411		
July	2007	3,163				426		
August	2007	2,831				397		
September	2007	2,365				362		
October	2007	1,933				331		
November	2007	1,932				341		
December	2007	2,956				446		
<b>TOTAL</b>		<b>30,158</b>				<b>4,684</b>		

\* Onsite visit not performed, information based on County information provided.

**Energy Use Index:**  
 Annual Total Energy Cost = 4,684 \$/year      Total site BTU's/Yr ÷ Total Area (SF) = 35 kBTU/SF/year

Total KWH/yr x 0.003413 = 102.93 MMBTU/year  
 Total MCF/yr x 1.03 = 0.00 MMBTU/year  
 Total Other x \_\_\_\_\_ = 0.0 MMBTU/year  
 Total Site MMBTU's/yr = 103 MMBTU/year

**Energy Cost Index:**  
 Total Energy Cost/Yr ÷ Total Area (SF) = 1.58 \$/SF/year

Electric Utility: Reliant Energy Gas Utility: N/A

ACCOUNT# 1008901023800771170100 Electric  
 Gas  
 BUILDING: Bacliff JP Office\* FLOOR AREA: 3,128 County: Galveston

		ELECTRICAL			NATURAL GAS / FUEL			
		CONSUMPTION	DEMAND	CHARGED	COST OF	TOTAL ALL		
MONTH	YEAR	KWH	METERED	KW	DEMAND (\$)	ELECTRIC	CONSUMPTION	TOTAL
						COSTS (\$)	MCF	COSTS (\$)
January	2007	3,320				478		
February	2007	2,920				430		
March	2007	3,240				456		
April	2007	4,000				480		
May	2007	4,200				494		
June	2007	4,720				544		
July	2007	4,720				554		
August	2007	4,840				563		
September	2007	3,800				467		
October	2007	2,720				366		
November	2007	3,000				403		
December	2007	2,760				388		
<b>TOTAL</b>		<b>44,240</b>				<b>5,622</b>		

\* Onsite visit not performed, information based on County information provided.

**Energy Use Index:**  
 Annual Total Energy Cost = 5,622 \$/year Total site BTU's/Yr ÷ Total Area (SF) = 48 kBTU/SF/year  
 Total KWH/yr x 0.003413 = 150.99 MMBTU/year  
 Total MCF/yr x 1.03 = 0.00 MMBTU/year  
 Total Other x \_\_\_\_\_ = 0.0 MMBTU/year  
 Total Site MMBTU's/yr = 151 MMBTU/year

**Energy Cost Index:**  
 Total Energy Cost/Yr ÷ Total Area (SF) = 1.80 \$/SF/year

Electric Utility: Reliant Energy Gas Utility: N/A

ACCOUNT# 10400513311910001 Electric  
 Gas  
 BUILDING: LaMarque JP Courts\* FLOOR AREA: 4,650 County: Galveston

		ELECTRICAL			NATURAL GAS / FUEL			
		CONSUMPTION	DEMAND	CHARGED	COST OF	TOTAL ALL		
MONTH	YEAR	KWH	METERED KW	KW	DEMAND (\$)	ELECTRIC COSTS (\$)	CONSUMPTION MCF	TOTAL COSTS (\$)
January	2007	6,240				921		
February	2007	6,040				881		
March	2007	5,760				838		
April	2007	6,560				817		
May	2007	8,480				989		
June	2007	8,000				960		
July	2007	8,120				986		
August	2007	8,760				1,044		
September	2007	7,600				937		
October	2007	6,600				851		
November	2007	5,680				779		
December	2007	6,200				841		
<b>TOTAL</b>		<b>84,040</b>				<b>10,845</b>		

\* Onsite visit not performed, information based on County information provided.

**Energy Use Index:**  
 Annual Total Energy Cost = 10,845 \$/year Total site BTU's/Yr ÷ Total Area (SF) = 62 kBTU/SF/year

Total KWH/yr x 0.003413 = 286.83 MMBTU/year  
 Total MCF/yr x 1.03 = 0.00 MMBTU/year  
 Total Other x \_\_\_\_\_ = 0.0 MMBTU/year  
 Total Site MMBTU's/yr = 287 MMBTU/year

**Energy Cost Index:**  
 Total Energy Cost/Yr ÷ Total Area (SF) = 2.33 \$/SF/year

Electric Utility: Reliant Energy Gas Utility: N/A

ACCOUNT# 10400514175730001 Electric  
4763266 Gas  
 BUILDING: Carbide Park Community Center County: Galveston  
 FLOOR AREA: 15,000

		ELECTRICAL			NATURAL GAS / FUEL			
		CONSUMPTION	DEMAND	CHARGED	COST OF	TOTAL ALL	CONSUMPTION	TOTAL
MONTH	YEAR	KWH	KW	KW	DEMAND (\$)	ELECTRIC COSTS (\$)	MCF	COSTS (\$)
January *	2007	37,800				4,697	12	133
February *	2007	27,300				3,684	10	151
March *	2007	31,200				4,052	12	130
April *	2007	30,300				3,572	10	101
May	2007	38,100				3,857	13	111
June	2007	41,700				4,558	12	108
July	2007	40,800				4,504	8	78
August	2007	36,000				4,105	17	144
September	2007	37,800				4,201	13	157
October	2007	28,500				3,329	12	138
November	2007	33,600				4,110	12	139
December	2007	36,000				4,408	13	152
<b>TOTAL</b>		<b>419,100</b>				<b>49,077</b>	<b>143.4</b>	<b>1,541</b>

\*\* Estimated Natural Gas Data based on 2008 figures

**Energy Use Index:**  
 Annual Total Energy Cost = 50,618 \$/year      Total site BTU's/Yr ÷ Total Area (SF) = 105 kBTU/SF/year

Total KWH/yr x 0.003413 = 1,430.39 MMBTU/year  
 Total MCF/yr x 1.03 = 147.70 MMBTU/year  
 Total Other x \_\_\_\_\_ = 0.0 MMBTU/year  
 Total Site MMBTU's/yr = 1,578 MMBTU/year

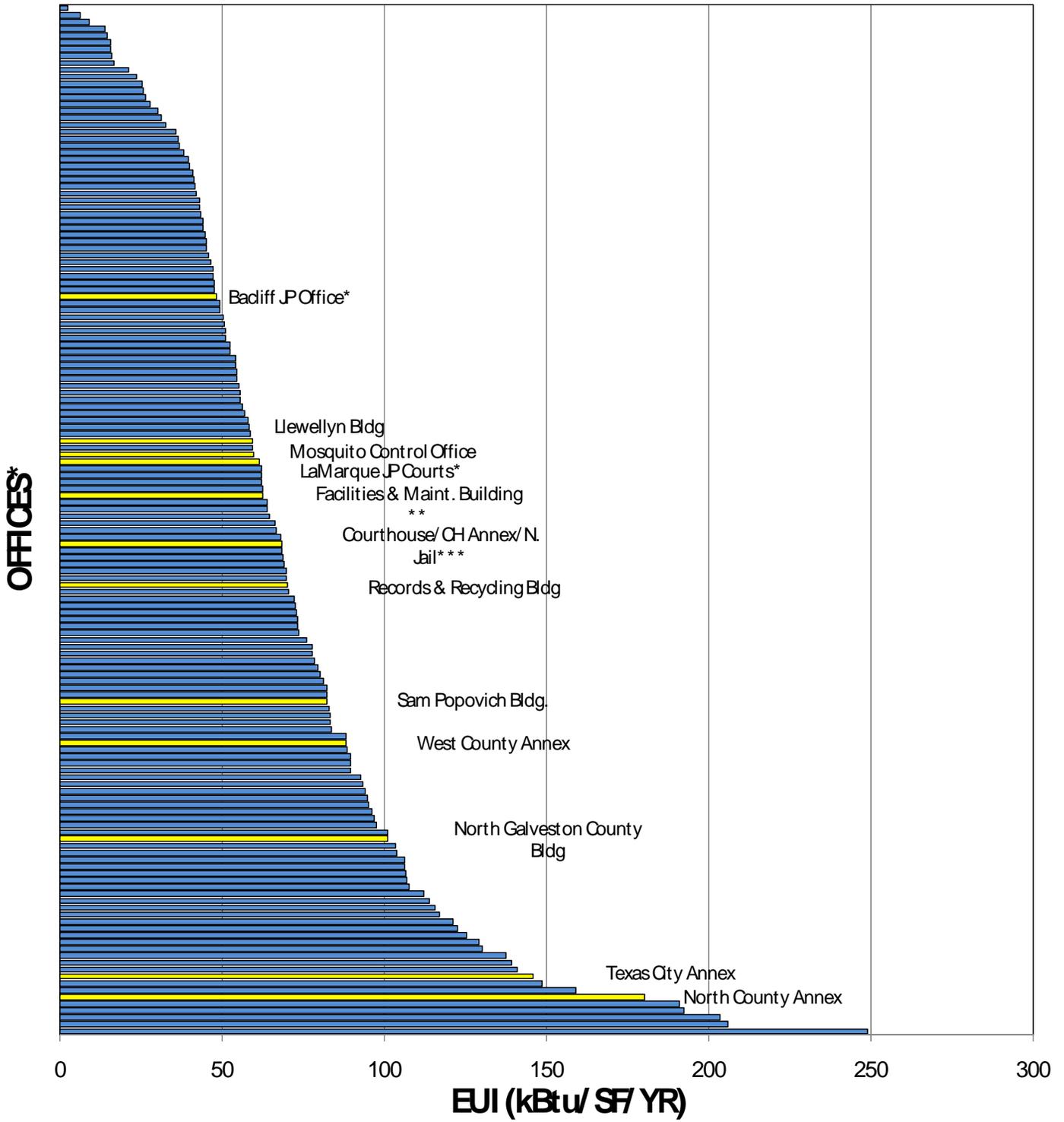
**Energy Cost Index:**  
 Total Energy Cost/Yr ÷ Total Area (SF) = 3.37 \$/SF/year

Electric Utility: Reliant Energy      Gas Utility: CenterPoint Gas

# APPENDIX D

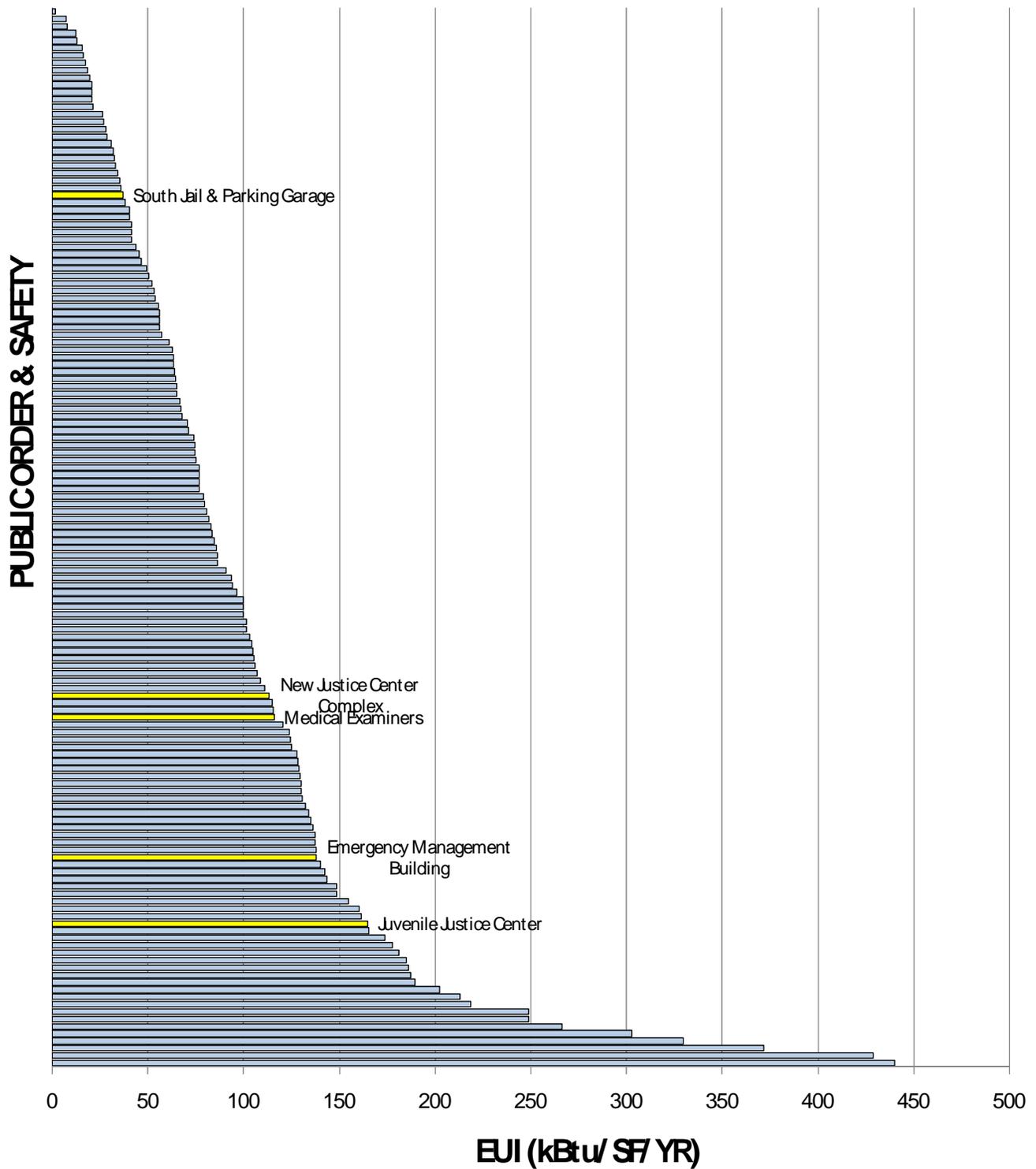
## ENERGY PERFORMANCE COMPARISON

**TEES DATABASE OF LOCAL GOVERNMENT FACILITIES IN TEXAS  
EUI COMPARISON CHART  
FACILITY TYPE: OFFICES**



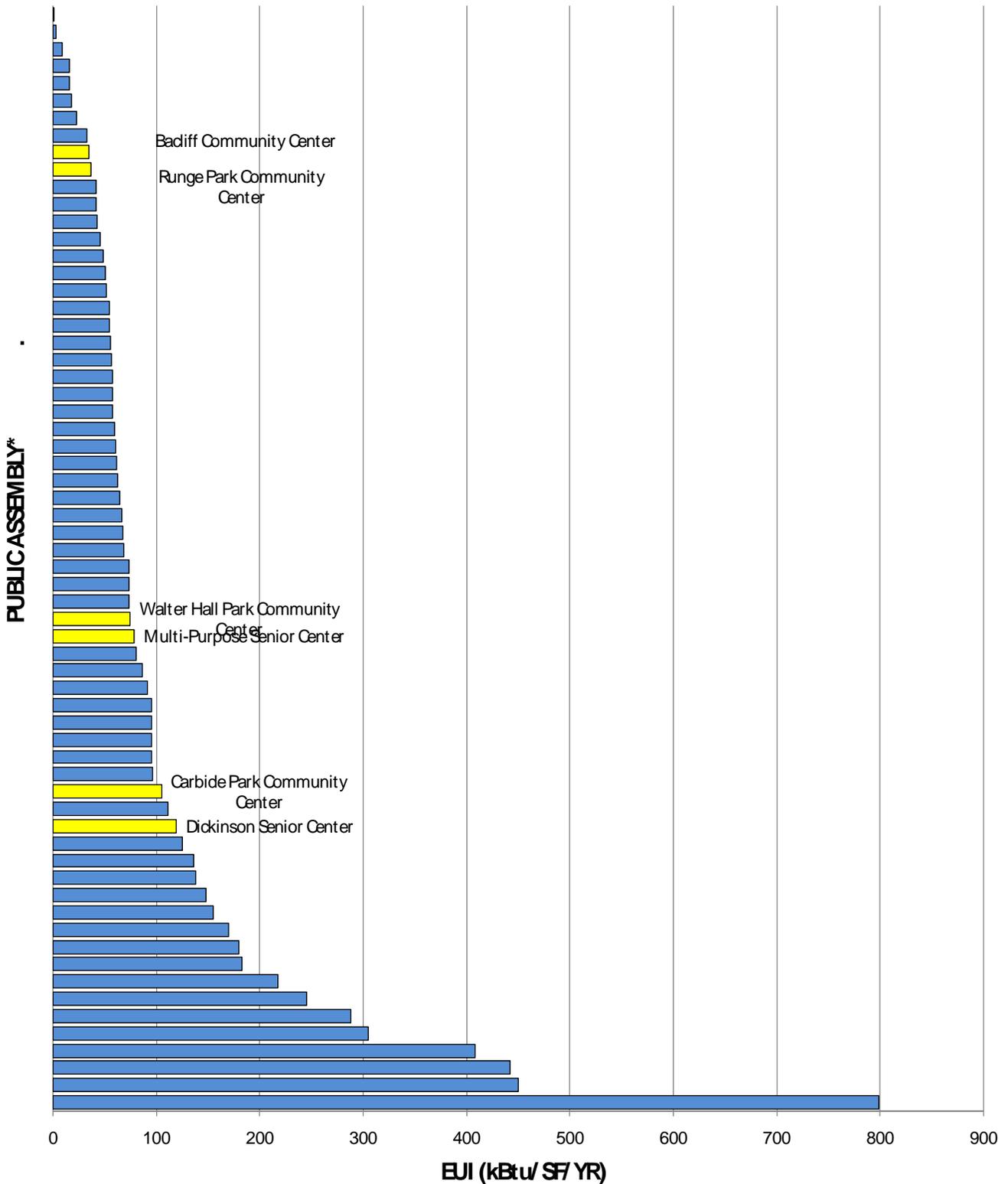
\*Offices (INCL: County Hall, Courthouse, Administrative Offices, Public Works Buildings)

**TEES DATABASE OF LOCAL GOVERNMENT FACILITIES IN TEXAS  
EUI COMPARISON CHART  
FACILITY TYPE: PUBLIC ORDER & SAFETY**



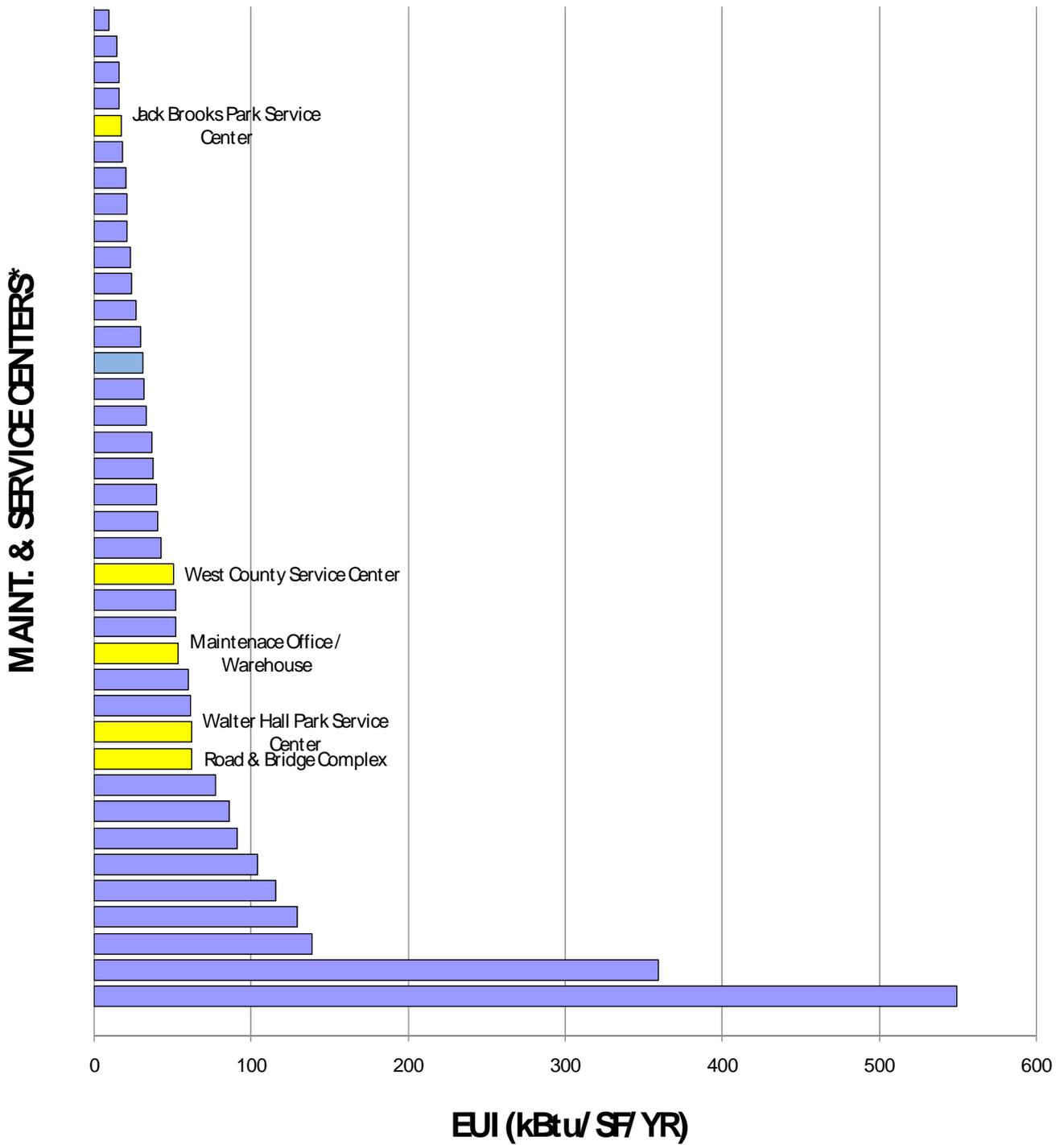
\*Facility Type: Public Order and Safety (Police Dept, Fire Dept, EMS, Correctional Facilities, etc.)

**TEES DATABASE OF LOCAL GOVERNMENT FACILITIES IN TEXAS  
EUI COMPARISON CHART  
FACILITY TYPE: PUBLIC ASSEMBLY**



\*Public Assembly (INCL: Community Centers, Convention Centers, Recreation Centers, etc.)

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



\*Maint. & Service Centers (INCL: Service Centers, Maintenance Warehouses, etc.)

# APPENDIX E

## ENERGY STAR INFORMATION

# The ENERGY STAR® Challenge: Build a Better World 10% at a Time



Many of us are taking steps to improve the energy efficiency of our homes with ENERGY STAR qualified lighting, appliances, electronics, and heating and cooling systems. But what we may not realize is that the buildings in which we work, shop, play, and educate our children use about \$200 billion worth of electricity and natural gas each year.

The U.S. Environmental Protection Agency (EPA) estimates that if the energy efficiency of commercial and industrial buildings in the U.S. improved 10 percent, Americans would save about \$20 billion and reduce greenhouse gases equal to the emissions from about 30 million vehicles. You can join us and help reach this goal!

When lights are left on and the heating and cooling system runs in an unoccupied commercial building, energy is wasted. When this happens, a power plant down the road burns fossil fuels to generate that energy and sends emissions into our environment.

In fact, the energy used by commercial and industrial buildings in the United States is responsible for nearly 50 percent of our national emissions of greenhouse gases that contribute to global climate change.

Thanks to the thousands of businesses and organizations that work with EPA's ENERGY STAR Program, we're already saving billions of dollars a year with strategic energy efficiency practices that reduce operating costs and greenhouse gas emissions without tradeoffs in performance or quality. But we're on a journey of continuous improvement — we can do more.

## Take the ENERGY STAR Challenge!

Whether you're associated with a small school or a large corporation, a local government or a national association, a community hospital or a hotel group, a manufacturing plant or a retailer — you can be part of the ENERGY STAR Challenge and help improve the energy efficiency of America's commercial and industrial buildings by 10 percent or more.

Challenge participants and their members are encouraged to:

- Measure and track energy use.
- Develop a plan for energy improvements.
- Make energy efficiency upgrades.
- Help spread the energy efficiency word to others.

Now is the time to help build a better world and take many of the same steps at work that you are taking at home to protect our environment. The ENERGY STAR Challenge Toolkit can show you how.

## Use the ENERGY STAR Challenge Toolkit to:

- Help you get started on the path toward energy efficiency at work and at home.
- Learn more about energy efficiency for specific building types and how to bring the ENERGY STAR Challenge to your community.
- Access ENERGY STAR brochures, public service announcements, press releases, posters, event ideas, and templates to help spread the word about energy efficiency.

ENERGY STAR® is a government-backed program helping businesses and individuals protect the environment through superior energy efficiency.



LEARN MORE AT  
[energystar.gov](http://energystar.gov)

## Toolkit Materials:



### Get Started!

- **Quick Lists of ENERGY STAR Resources** explain how to help improve energy efficiency in commercial and industrial buildings as well as at home.
- **Create a Challenge Team** offers ideas on who can help create an organized effort in your building, town, school, or company to improve energy efficiency.
- **Bring the Challenge to Your Community** provides a model for establishing a program or campaign to accelerate energy efficiency activities in your community.

### Learn More!

- **Did You Know?** provides a summary of key energy efficiency points and information about the ENERGY STAR Challenge.
- **Fast Facts** provide useful statistics to help understand the important role commercial and industrial buildings play in global climate change.
- **Work with Different Groups in the Community** offers a series of fact sheets that provide information on energy use, energy efficiency opportunities, partnership possibilities, and key leverage points for major groups including: new and existing homes, commercial real estate, healthcare, education, hospitality, supermarkets, industry, small business, congregations, and local governments.

- **Grow with ENERGY STAR** describes the different levels and benefits of participation with ENERGY STAR, beginning with taking the ENERGY STAR Challenge and moving beyond to Partner, earning the ENERGY STAR label, Leader, and then the pinnacle — Partner of the Year.

### Spread the Word!

- **ENERGY STAR InfoCards** help consumers and businesses learn about energy efficiency and ENERGY STAR.
- **Sample News Releases** for the media.
- **Sample Text** provides copy for Web sites, e-mails, newsletters, and more to help you communicate with clients, constituents, employees, and business-to-business networks.
- **Energy Efficiency Presentation** you can use to talk about energy efficiency and your involvement in the ENERGY STAR Challenge.
- **Celebrate with ENERGY STAR** suggests events and ideas to promote the ENERGY STAR Challenge and celebrate energy efficiency.
- **Certificate of Participation** announces your involvement in the ENERGY STAR Challenge and can be displayed to share the good news of your efforts with others.
- **Web Banners** can be easily downloaded to use on Web sites.
- **Posters and other materials** communicate energy efficiency messages and provide information on how to get involved.

### Contact Information

To take the ENERGY STAR Challenge or to access the ENERGY STAR Challenge Toolkit materials online, visit [www.energystar.gov/challenge](http://www.energystar.gov/challenge).

**ENERGY STAR Program**  
U.S. Environmental Protection Agency  
1200 Pennsylvania Avenue, NW  
Mail Code 6202J  
Washington, DC 20460

For more information  
[www.energystar.gov](http://www.energystar.gov)  
or call 1.888.STAR.YES  
(1.888.782.7937).

United States  
Environmental  
Protection Agency  


Office of Air and Radiation  
(6202J) EPA 430-F-07-016  
August 2007

Recycled/Recyclable – Printed with Vegetable Oil Based Inks on Recycled Paper (Minimum 50% Post-consumer Content)

# APPENDIX F

## LOANSTAR INFORMATION

# Texas LoanSTAR Program

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## ***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:**

**Theresa Sifuentes  
SECO, LoanSTAR Program Manager  
(512) 463-1896**

# APPENDIX G

## DESCRIPTION OF SECO PROGRAMS



## Texas State Energy Conservation Office (SECO)

The Texas State Energy Conservation Office (SECO) helps Texas make the most of domestic energy, reduce state and local government energy costs and promote cost-effective, clean-energy technologies. SECO's mission is to maximize energy efficiency while protecting the environment.

**LoanSTAR Revolving Loan Program:** has saved taxpayers more than \$224.6 million through energy-efficiency projects for state agencies, institutions of higher education, school districts, county hospitals and local governments. Borrowers repay loans through cost savings generated by the projects. LoanSTAR-funded projects have also prevented the release of 7,781 tons of nitrogen oxides (NO<sub>x</sub>), 2.3 million tons of carbon dioxide (CO<sub>2</sub>) and 5,339 tons of sulfur dioxide (SO<sub>2</sub>).

**Schools/Local Government Energy Program:** has helped more than 3,500 schools and other units of local government set up and maintain effective energy-efficiency programs. SECO provides facility preliminary energy assessments, energy management training workshops, technical support in designing new facilities and on-site training for student energy awareness projects. Clean energy technologies are demonstrated at public facilities and school districts to increase awareness and address air quality at the community level. Texas schools also employ the computer power management software that puts monitors to "sleep" when not in use. Over 136,000 school computers now use this software, saving 42 million kWh and reducing energy costs by \$3 million annually.

**Energy Education Program:** promotes energy conservation and efficiency through education. The program strives to lay the foundation for environmental stewardship in teachers and students through critical-thinking and problem-solving investigations in Texas Education Agency approved workshops. Over 2,500 teachers have attended these workshops and utilized the materials in their classrooms reaching over 375,000 students. The program also supports fuel cell technical training curriculum development at the college level.

**State Agencies/Higher Education Program:** ensures that new facilities are designed and built with energy efficiency and water conservation in mind. Projects include administration and maintenance of the Energy and Water Conservation Design Standard for new state buildings and major renovation projects. Other initiatives include development of statewide employee energy awareness through workshops on how energy efficiency and employee behavior can reduce energy use. The program provides educational materials on how to use energy more efficiently through product procurement, innovative technologies and sustainable design practices. This program also provides education and outreach on residential and commercial energy codes statewide. The goal is to demonstrate the clear benefits of energy codes and standards in improving the quality of life, the environment and the safety and health of communities.

**Alternative Fuels Program:** demonstrates the positive environmental impact, technical feasibility and energy efficiency of domestically-produced alternative fuels. The Alternative Fuels Program is designed to assist state agencies, school districts, local government and private fleets to operate more of their fleets on alternative fuels. Initiatives include support for the Clean Cities Program, Clean School Bus USA Program, Mechanics Education Outreach and Air Quality Demonstration Projects.

**Energy Management Services:** a comprehensive energy management program designed to significantly reduce energy and utility expenditures in state-owned facilities. The State of Texas spent over \$216 million in energy and utility expenditures in 2006. Program components include construction of a state-of-the-art energy and utility information management system, a comprehensive analysis of historic and future utility bills, energy procurement at the lowest possible rates and best available terms, and owner's representative services on ongoing and future energy-conservation projects. Institutions of higher education, state university systems and local governments are eligible to participate in the program.

**Innovative Energy Program:** promotes the use of renewable energy and sustainable building practices through technology demonstration, hands-on instruction and renewable energy education. Renewable energy has significant economic, security and reliability benefits and opportunities for Texas communities and individuals as they develop and use these resources. SECO increases public awareness of Texas' vast renewable energy resources and provides the public better access to vendors, financing options, and renewable energy incentives through its educational web site, The Infinite Power of Texas, at [www.infinitepower.org](http://www.infinitepower.org).

**Housing Partnership Program:** promotes the efficient use of energy in low-to-moderate-income housing through partnerships among nonprofit organizations, community action agencies, local governments, utility companies, public housing authorities and social service organizations. The program encourages community and residential involvement in energy-efficiency projects such as housing retrofits, model demonstration projects, technical training assistance and energy education workshops and seminars.

**Pollution Mitigation Program:** assists political subdivisions in the 41 non-attainment counties to reduce electric consumption in their facilities by implementing cost-effective energy efficiency projects. SECO provides technical support and guidance through the Texas Energy Partnership, a joint initiative involving SECO, the U. S. Department of Energy and ENERGY STAR®. Information, planning tools and electronic reporting are offered at [www.texasenergypartnership.org](http://www.texasenergypartnership.org).

**Pantex Program:** The Pantex Nuclear Weapons plant, located in Carson County, is responsible for assembling and disassembling nuclear weapons. The U.S. Department of Energy funds the Texas Agreement in Principle, which SECO has administered since 1990. SECO contracts with a variety of state and local governments to ensure that human health and safety, and the environment, are protected around the plant. The Pantex Program also administers a DOE grant to train local emergency responders along routes that have shipments of radioactive waste going to the Waste Isolation Pilot Plant near Carlsbad, New Mexico, and eventually shipments of spent fuel tentatively scheduled to go to Yucca Mountain in Nevada.

**State Energy Conservation Office**

111 East 17<sup>th</sup> Street

Austin, TX 78774-1440

Phone: (512) 463-1931

Fax: (512) 475-2569

[www.seco.cpa.state.tx.us](http://www.seco.cpa.state.tx.us)

# APPENDIX H

## SAMPLE ENERGY MANAGEMENT POLICY

## SAMPLE ENERGY MANAGEMENT POLICY

*The following document is Energy Management Policy Template. This document should be customized based on the specific needs and requirements of the County.*

## **SAMPLE ENERGY MANAGEMENT POLICY**

### **INTRODUCTION**

An essential element of a successful energy management program is support and commitment from top management. A resolution passed by the governing body alerts employees and the community to the fact that energy conservation is official policy, and paves the way for future programs.

To reduce and control operating costs through energy management, an organization should establish a plan, which defines specific goals and an organizational framework to accomplish them; hence, The County Energy Management Policy.

The County Energy Management Policy is intended to be a dynamic, working document. It will be referred to as the PLAN throughout this document. It should be amended as time, conditions, and experience dictates. To facilitate amendments, each page is to be numbered and dated.

Following is an outline of the main sections of this document:

- ◆ **INTRODUCTION**
- ◆ **ENERGY MANAGEMENT POLICY**
- ◆ **PURPOSE AND GOALS**
- ◆ **ORGANIZATION STRUCTURE/MANPOWER**
- ◆ **ACTION PLAN**
- ◆ **INITIAL SCOPE**

**ENERGY MANAGEMENT POLICY**

The County is committed to operating in the most cost effective, efficient manner while maintaining municipal services at the highest quality possible. A commitment to efficient operation will benefit the community and taxpayers without compromising the safety or efficiency of municipal staff. We recognize the importance of a County energy management function and do hereby delegate the authority and responsibility to develop, operate, and maintain a cost effective Energy Management Program to an Energy Manager and/or Energy Management Staff.

Rapidly rising costs of utilities is a great concern. Unless these costs can be brought under control, funds earmarked for municipal services and programs will need to be diverted to fund increasing operating costs. Many Texas cities have made considerable progress toward controlling these spiraling costs by instituting cost effective Energy Management Programs.

It is our goal to reduce the County's energy consumption by following adoption of this policy. The fulfillment of this plan shall be the joint responsibility of the County's governing board, employees, building officials, and its citizens.

*The County will maintain accurate records of energy consumption and costs on a monthly basis. Energy audits will be conducted annually at each facility and recommendations will be made for updating the Energy Management Program. Guidelines and procedures will be reviewed and approved by the County Manager. Information will be furnished to the media on goals and progress of the Energy Management Program.*

*A method of monitoring and tracking energy costs and consumption shall be implemented. Quarterly energy progress reports will be submitted to the County Manager and distributed accordingly.*

*All planned construction and retrofit work shall be designed with energy as a primary consideration. The energy performance of all new construction and planned retrofits shall be evaluated during the architectural and engineering design phase to ensure energy efficient design and operation.*

*Approved this \_\_\_\_\_ day of \_\_\_\_\_, 2008*

\_\_\_\_\_  
*County Manager*

## **PURPOSE AND GOALS**

### **Purpose**

The County is faced with tight budget constrains and increased demands for municipal services. The purpose of this plan is to reduce the County's energy cost while maintaining a comfortable and safe working environment for County staff.

### **Goals**

The goals of the Energy Management Plan (hereafter referred to as the PLAN) are to:

- ❖ Centralize and coordinate energy management activities;
- ❖ Continue to integrate energy management into facilities planning, new construction, operations, maintenance and renovation activities;
- ❖ Implement activities in the categories identified in the PLAN;
- ❖ Reduce electrical, natural gas, and water consumption County-wide;
- ❖ Evaluate the condition of facility equipment and analyze the effectiveness of upgrading such equipment in order to achieve the highest efficiency possible;
- ❖ Implement and enforce energy conservation policies and procedures.

## **ORGANIZATION STRUCTURE/MANPOWER**

### **Organizational Structure**

A successful Energy Management Program requires the commitment and involvement of all County employees. The specific responsibilities of key individuals/ groups are outlined below:

- ❖ *County Manager*

The County Manager is responsible for approving the PLAN, designating an energy manager and/or engineer, reviewing recommendations of the Energy Management Steering Committee, adopting policy directives regarding construction, maintenance and operation of buildings and other service delivery systems, allocating funding, and providing support staff as needed. The County Manager is also responsible for final review and approvals of all proposed policy directives, funding requests, and requests for line and support staff associated with PLAN.

## SAMPLE ENERGY MANAGEMENT POLICY

### ❖ *Executive Directors of Facilities and Maintenance & Operations*

The **Title of Person in Charge of the Energy Program** is responsible for promotion and implementation of the County's Energy Management Program objectives in the operation and maintenance of existing facilities, and in all construction of new facilities. He/She will assist in the identification and allocation of resources needed for the successful implementation of the PLAN.

### ❖ *Building Managers/Designated Building Officials*

Each building official will be responsible for the energy consumption within their facility and will designate (or function as) the building energy coordinator. The energy coordinator will be expected to:

Develop and implement an energy conservation plan for each respective building or facility. The plan should elicit full staff involvement.

Organize and direct a building action group willing to support implementation of the Energy Management Program plan and search for additional energy cost reduction measures.

### ❖ *County Energy Manager*

The Energy Manager is responsible for day-to-day administration, implementation, and monitoring of the PLAN. He/she will initiate actions and allocation of resources as necessary to achieve the goal as presented in the PLAN. Initiation of activities in the nine main categories under Initial Scope will be the Energy Manager's responsibility, along with annually reviewing and updating the PLAN. He/she will report activities and results **quarterly**, to all members of the energy steering committee. The Energy Manager will receive formal training in the operation of all types of Energy Management Systems installed throughout the County. While coordinating activities with the Facilities Department, the Energy Manager will report directly to the **Title of Person**. The Energy Manager will also serve as a liaison between the Construction and O&M departments, as applicable.

### ❖ *Employees and Staff*

All employees and staff are responsible to assist in the PLAN by providing input to the Energy Management Steering Committee and helping with implementation of operational measures in their areas. There are many free programs offered by the state and federal governments.

## SAMPLE ENERGY MANAGEMENT POLICY

### ❖ *Energy Management Steering Committee*

The Energy Management Steering Committee will include representatives from a cross section of the County. The steering committee will serve as a review board to evaluate all energy management recommendations before adoption and implementation. The steering committee will meet **quarterly or semiannually** to review the County's energy cost and consumption. Regular meetings will ensure the County's goals are being met prior to the end of the year.

### **ACTION PLAN**

An effective energy management effort must be organized and integrated. The following are essential elements of the County Energy Management Plan:

- ◆ Data Gathering;
- ◆ System Analysis / Definition of Corrective Measures;
- ◆ Energy Cost Reduction Measure (ECRM) Evaluation;
- ◆ Identification of Funding Mechanisms;
- ◆ Implementation;
- ◆ Publicity / Communication and Incentive Systems;
- ◆ Training; and
- ◆ Monitoring Program Effectiveness

Each element is discussed briefly below:

#### **Data Gathering**

- ❖ To hit the target in the County energy management efforts, it is imperative to know where to aim. The purpose of this step is to inventory energy using systems and gather, organize, and analyze information on energy use, cost, and availability in order to focus on corrective projects with the most potential.

Major energy using systems to be inventoried include:

Buildings, and  
Athletic field and other outdoor lighting

Energy consumption and cost will be tabulated monthly using billed / metered data for each major component of each system for a base year prior to PLAN initiation. Since this is a massive task with massive amounts of data to gather, it needs to be phased in concurrently with other PLAN activities starting with the building database.

## SAMPLE ENERGY MANAGEMENT POLICY

Data will be organized as follows:

Buildings:

- 1) Square footage
- 2) Monthly consumption (kWh, KW, MCF, Gallons, etc.) and costs.

Municipal Utilities & Lighting (i.e., Water treatment, Wastewater treatment, Street Lighting, Sports Lighting, etc., as applicable;

- 1) Pump ratings & quantities, by location,
- 2) Lamp types & quantities, by location
- 3) Operating hours and costs by location.

The Energy Manager will gather this data with input from department heads, accounting personnel, and gas and electrical utilities.

The purpose of the data-gathering phase is to provide a baseline for later comparison, to monitor program effectiveness; identify major energy and water users; and identify any billing problems. The existing computer-based energy accounting system should prove invaluable in this effort.

Applicable utility rate schedules should be collected and reviewed as part of this step. Rate analyses should be conducted to ensure that County facilities are on the applicable rate schedules resulting in the lowest total facility energy costs. Assistance from the *Energy Provider* and consultants can be utilized in conducting billing rate analyses.

### **System Analysis/Definition of Corrective Measures**

- ❖ Concurrent with inventorying and studying the energy use characteristics of major energy using systems, conduct preliminary field surveys of large energy users within each system. The purpose of the preliminary field surveys is to identify M&Os and capital intensive Energy Cost Reduction Measures (ECRMs) that could be implemented to reduce energy consumption and to collect initial data required for further analysis. The product of the preliminary field surveys will be a report describing physical and operational characteristics of the systems surveyed, along with lists of recommended M&Os and ECRMs for each component. The preliminary field surveys will be conducted under the direction of the County's Energy Manager with outside assistance as necessary.

### **ECRM Evaluation**

- ❖ This step will be conducted by County personnel with outside assistance as needed. It will include a detailed analysis of materials required, labor and material costs, and potential energy cost saving for ECRM. Interactions between ECRMs will be analyzed and simple paybacks calculated.
- ❖ The Energy Manager will present the findings of the engineering studies to the ***Title of Person*** for review. Projects with payback periods of six years or less will receive special consideration for implementation.

### **Identification of Funding Mechanisms**

- ❖ An energy management line item should be included in the County budget to take care of low cost, maintenance, and operational items that require immediate attention. Any utility rebates and a percentage of the recouped over-billings should go into this budget.
- ❖ All potential funding mechanisms should be identified and evaluated including:
  - ◆ Low interest state loans (LoanSTAR);
  - ◆ Federal and state grants and loans;
  - ◆ Low interest loans from private lenders;
  - ◆ Performance Contracting;
  - ◆ Shared savings programs;
  - ◆ Internal funding mechanisms; and
  - ◆ Bond issue funds.

### **Implementation**

- ❖ Implementation involves selecting a funding mechanism, submitting paperwork to secure ECRM funding, monitoring the ECRMs through funding, design, and construction, monitoring the progress of M&O implementation.

### **Publicity / Communication and Incentive System**

- ❖ Good communication is one of the key elements in overall program effectiveness. The Energy Manager must strive to keep the lines of communication open from building operators up to the County Manager and back down again. Contractors involved in ECRM implementation must also have a conduit into the communication channel.

## SAMPLE ENERGY MANAGEMENT POLICY

- ❖ A good energy accounting system / mechanism should be used to monitor cost savings and to compare base year consumption with current year consumption. An energy incentive plan should be developed consisting of personnel awards, organizational awards, preferred parking, and/or other forms of recognition as appropriate.
- ❖ The successes of the program should also be communicated to the public through suitable media to show what the County is doing to reduce costs to taxpayers.

### **Training**

- ❖ Energy management methods and technology are constantly improving. Training will be conducted periodically to keep abreast of the latest developments in the field. The following sessions are conducted as deemed necessary:
  - ◆ In house training to be conducted for relevant maintenance and custodial staff;
  - ◆ On site training for controls systems;
  - ◆ Off site training as set by need in a particular technology; and training of County personnel shall be provided by qualified County staff with an outside assistance as necessary. Energy awareness programs will be implemented by County staff to improve efficiency of usage.

### **Monitoring Program Effectiveness**

- ❖ The program monitoring process should be used to keep the Energy Management program on track by:
  - ◆ Making improvements where data suggest deficiencies;
  - ◆ Revising goals where revisions seem warranted;
  - ◆ Pursuing new alternative as indicated
- ❖ The monitoring process involves distinct types of efforts:
  - ◆ Monitoring individual activities in terms of quality of implementation
  - ◆ Monitoring overall program effectiveness in terms of savings.
- ❖ The following tools will be used for monitoring:
  - ◆ Energy tracking savings data;
  - ◆ Individual project metering when appropriate
  - ◆ Interviews with key personnel.

## INITIAL SCOPE

The Energy Manager shall concentrate on the following items during the initial implementation phase of this Energy Management Policy. Following is a checklist and a description of work for each item.

- ◆ Maintenance and Operation Measures (M&Os) for Building and Equipment;
- ◆ Computer Energy Accounting System;
- ◆ Energy Cost Reduction Measures (ECRMs);
- ◆ New Building Design and Construction;
- ◆ Purchasing;
- ◆ Recreation Area, Parking Lots, and Security Lighting;
- ◆ Alternative Energy Sources;
- ◆ Energy Management Systems (EMS); and
- ◆ Water Management

### **Maintenance and Operation Measures (M&Os) for Buildings and Equipment**

- ❖ Inventory all major Heating, Ventilation, and Air Conditioning equipment by facility and record location, capacity/size, manufacturer, model number, and electrical data. Assign an I.D. number to each piece of equipment and note location on fire evacuation route floor plan.
- ❖ Establish a system for preventive maintenance of equipment within the Building Maintenance Department.
- ❖ Inventory building equipment (lighting, HVAC, etc.) operating hours, and implement a program to turn off equipment during unoccupied periods and to reduce light levels as appropriate.
- ❖ Inventory high energy usage equipment (electric boilers, ovens, etc.) by facility record location, capacity / size, manufacturer, model number, electrical data.
- ❖ Survey Building Envelope by facility and record existing condition for all items that can leak air into or out of any building. The surveyor should use 8 1/2 x 11 fire evacuation floor plan to note problem areas such as loose fitting windows, cracks around doors and envelope penetrations by pipe and conduits. The maintenance department shall follow the surveyor and make corrections.
- ❖ Provide for training of M&O staff both in-house and through outside seminars to maintain skills and develop new skills as required.

## SAMPLE ENERGY MANAGEMENT POLICY

- ❖ Establish a County-wide uniform temperature set point for all HVAC units. For example **74°F Cool / 68°F Heat**, during occupied hours and **80°F Cool / 55°F Heat**, during unoccupied hours. Having a standard setpoint will help staff members keep HVAC runtimes to a minimum.

### **Computer Energy Accounting System**

- ❖ Energy Cost Reduction Measures (Collect-required base year input data for all energy using systems.
- ❖ Monitor monthly and annual energy consumption and cost by energy using system component and fuel type.
- ❖ Utilize energy tracking data to monitor energy program effectiveness and to establish an incentive program.

### **Energy Cost Reduction Measures (ECRMs)**

- ❖ Identify potential ECRMs for each major County facility (in-house, engineering firm and utility company).
- ❖ Analyze ECRM cost effectiveness.
- ❖ Pursue funding as appropriate.

### **New Building Design and Construction**

- ❖ Conduct training for architects, engineers, contractors, and building inspectors.
- ❖ Ensure compliance by holding pre-design meetings with Architectural / Engineering Firms and pre-construction meetings with Contracting Firms.
- ❖ Monitor compliance by reviewing plans and specifications; reviewing shop drawings and catalog cuts; inspection construction in progress.
- ❖ Review HVAC test and balance data, and conduct final inspection with punch list.
- ❖ Utilize the services of an energy engineering design firm to provide energy related design assistance to the lead A / E firm on new construction projects.

## SAMPLE ENERGY MANAGEMENT POLICY

- ❖ Ensure proper maintenance and operation of energy using equipment in new buildings by required adequate documentation of all systems and control strategies, specifying minimum content of M&O manuals; specifying contractor requirements for cleaning and adjusting equipment prior to occupancy; specifying on-site vendor training for M&O staff; and requiring as-built drawings.

### **Purchasing**

- ❖ Evaluate the long-term energy costs, in addition to initial cost, in purchasing energy using equipment. Apply life cycle costing techniques whenever possible.
- ❖ Establish energy efficiency standards for the purchase of common items; i.e. fluorescent lamps, ballast, electrical motors, direct expansion (DX) air-conditioners, water heaters, and small gas furnaces.
- ❖ Take advantage of the State Purchasing contract to get the best prices on energy efficient equipment.

### **Recreation Areas, Parking Lots, and Security Lighting**

- ❖ Convert existing incandescent and mercury vapor lighting to metal halide or high-pressure sodium as appropriate. Specify these high efficiency light sources on new projects.

### **Alternative Energy Sources**

- ❖ Pursue cost effective applications of alternative energy sources including active and passive solar design, daylight, and alternative fuels.

### Energy Management Systems (EMS)

- ❖ Optimize operation of any existing energy management systems.
- ❖ Conduct continuous monitoring of building HVAC system operations, using EMS.
- ❖ Utilize EMS diagnostic features for equipment maintenance.
- ❖ Evaluate & implement EMS controls at all facilities, as appropriate.

**Water Management**

- ❖ Investigate the use of water conserving faucets, showerheads, and toilets in all new and existing facilities.
- ❖ Utilize water-previous materials such as gravel, crushed stone, open paving blocks or previous paving blocks for walkways and patios to minimize runoff and increase infiltration.
- ❖ Employ Xeriscaping, quality landscaping that conserves water and reduces the need for supplemental irrigation.
- ❖ Utilize drip irrigation systems for watering plants in beds and gardens.
- ❖ Install controls to prevent irrigation when the soil is wet from rainfall.
- ❖ Implement leak detection and repair programs.
- ❖ Provide separate metering for the irrigation and HVAC systems usage monitoring, if applicable.

END

APPENDIX I

SECO WATER EFFICIENCY  
GUIDELINES

**STATE ENERGY CONSERVATION OFFICE  
SUGGESTED WATER EFFICIENCY GUIDELINES  
FOR BUILDINGS AND EQUIPMENT  
AT TEXAS STATE FACILITIES**

The 77<sup>th</sup> Legislature directed the State Energy Conservation Office to develop a set of water efficiency standards for state agencies. This document represents SECO's response to that request.

We wish to thank the Texas Water Development Board and the City of Austin Water Conservation Office for their assistance in preparing these guidelines.

The following is a guideline that should be followed for new buildings and facilities and purchase of any new or used equipment by the State. These guidelines would also apply when purchasing new or used equipment to replace existing equipment, or for making major modifications to existing systems or equipment that equals more than half the original purchase price of the equipment. These should also be used as guides for upgrading existing equipment. A system approach should be used when examining water use in this sector. The goal shall be to balance water, wastewater, energy, and related costs to achieve the lowest lifecycle cost when purchasing new equipment or making modifications to existing equipment.

**Irrigation Requirements**

Automatic irrigation systems should comply with the following guidelines. These guidelines should be noted on a plan drawn by the agency, licensed irrigator or licensed landscape architect.

1. Adjustable flow controls valves on circuit remote control valves. Pressure regulation component(s) shall be required where static pressure exceeds manufacturer's recommended operating range (30-60 psi). This component(s) may be installed at the valve or at the head.
2. Valves and circuits shall be separated based on water use, (hydro-zoned) so that turf and shrub areas, sun and shade areas, as well as high and low runoff areas may be watered separately.
3. The minimum precipitation rate that can be applied by any zone of conventional irrigation should be in accordance with State regulations established by the Texas Natural Resource Conservation Commission. Sprinkler heads shall have matched precipitation rates within each control valve circuit.
4. Serviceable check valves shall be required where elevation differential may cause low head drainage adjacent to paving areas.
5. Sprinkler head spacing shall be designed for head-to-head coverage or heads shall be spaced as per manufacturer's recommendations and adjusted for prevailing winds. The system shall be designed for minimum run-off. There shall be no direct over spray onto impervious areas (i.e. paving and structures).
6. All automatic irrigation systems shall be equipped with a controller capable of dual or multiple programming. Controllers should have multiple cycle start capacity and flexible calendar program, including the capability of day of week or day interval watering. All automatic irrigation systems shall be equipped with a rain sensor shut-off device.
7. Irrigation construction plans shall include a water budget. A water budget should include:

- a) Estimated monthly water use (in gallons per application) and the area (in square feet) irrigated.
  - b) Precipitation rates for each valve circuit.
  - c) Monthly irrigation schedule for the plant establishment period (first three months) and recommended yearly watering schedule, including seasonal adjustments.
  - d) Location of emergency irrigation system shut-off valve.
8. All in-ground irrigation systems shall have backflow prevention device installed that meet local code.
  9. In addition to local requirements, all irrigation systems must comply with the Texas Natural Resource Conservation Commission rules and regulations.
  10. Where available, reclaimed water will be used for all purposes allowed by rules established by the Texas Natural Resource Conservation Commission, if the reclaimed water is less costly than potable water or other water currently being used by the purposes that reclaimed water can be use.
  11. Sources of water such as water from foundation and basement sump pump discharges, air conditioner condensate, captured stormwater or rainwater, and other sources should be explored and used as long as local plumbing codes are followed.

**Landscape Design Standards** (Based on the Landscaping Guidelines adopted by the General Services Commission pursuant to SB 814, 73<sup>rd</sup> Legislature)

1. Irrigated turf areas and planting beds should be limited to as small an area as possible.
2. Areas that are irrigated shall have at least six inches of a good quality soil in the areas to be watered.
3. Plants having similar water needs shall be grouped together and shall be selected based on use, soil and sun/shade conditions, adaptability to geographic and climatic conditions, and upon ability to survive, once established, on normal rainfall or minimal irrigation.
4. Irrigated turf shall be used sparingly and only in circumstances where other landscaping media will not satisfy the site's needs.
5. Turf and overhead sprinklers should not be placed along curbs and in parkways and planning islands less than 6 feet wide.
6. All new construction projects shall include specifications for soil analysis and amendments, such as compost, in type and quantity necessary to enhance plant growth and maximize water retention. All landscape planting selections must be appropriate for the soil as analyzed and amended.
7. In planted areas, mulches of two inches or more shall cover most soil surfaces to minimize soil moisture evaporation.
8. Turf shall be limited to 90% of landscaped areas.
9. Turf grass selection shall be determined by facility need and geographic location. Use of different types of turf for distinctive purposes is encouraged. Turf types that can be maintained on natural rainfall is encouraged.

**Plumbing Fixtures and Practices**

1. All water closets shall comply with state plumbing standards as administered by the Texas Natural Resource Conservation Commission.
2. Faucet aerators in public lavatories and hand washing facilities shall have a flow rate of no more than 1.0 gallons per minute. All other faucet aerators shall comply with state plumbing standards as administered by the Texas Natural Resource Conservation Commission.
3. Faucets in high use restrooms shall be self-closing or shall be equipped with on-off sensors.
4. Showerheads for lockers, dorms, and other non-medical purposes shall use no more than 2.0 gallons per minute. All other showerheads shall comply with state plumbing standards as administered by the Texas Natural Resource Conservation Commission.
5. All water fountains shall be self-closing.
6. All hot water lines shall be insulated.
7. All water pipes subject to freezing shall be insulated.
8. Special plumbing fixtures other than the ones mentioned above should be chosen based on their water and energy efficiency and functionality.
9. All major new buildings, cooling towers, and irrigation systems shall be separately metered and records kept to determine use.
10. Signage requesting that leaks and other plumbing problems be promptly reported shall be placed in each restroom, shower facilities, kitchen, laundry, pool, and other high water use areas. The signage shall also have the phone number where to report such problems.

**Heating, Ventilation, & Air Conditioning Equipment**

1. Cooling towers and boiler chemical contracts shall specify the cycles of concentration to be achieved. The cycles of concentration should be set to match local water chemistry but shall exceed at least four cycles unless the blowdown from the tower is being beneficially reused for landscape irrigation or other uses.
2. Steam condensate shall be returned to the boiler unless volumes are too low to justify condensate return loops. In the latter case, the condensate shall be reused beneficially wherever possible.
3. Condensate from the air conditioner cooling coils should be captured and used for cooling tower makeup or other purposes where feasible. Building design should be considered that would help facilitate the easy capture of condensate by convenient location of air handling units.
4. Cooling tower side stream filtration shall be investigated when new systems are purchased.

**Water Treatment Equipment**

1. If water softening is used, regeneration shall be controlled by actual hardness or by a flow volume control that is based on the hardness of the water to be softened. Softeners that use timers for recharging are prohibited.

2. If reverse osmosis or nano-filtration is used, reject waste volumes shall be reused for landscape irrigation or other beneficial purposes.

#### **Refrigeration Equipment**

1. Once through cooling of any refrigeration equipment is prohibited. Refrigeration equipment (i.e. refrigerators, walking coolers, ice cream and yogurt machines, and similar equipment) of 10 tons per hour or less shall be air-cooled or be fed with water from a closed cooling water loop.
2. Ice flake machines should be used instead of ice cubes makers whenever possible. Ice flakes require less water to produce. If ice cube makers are used, they shall be air-cooled and use no more than 20 gallons per 100 pounds of ice produced based on the Air-conditioning & Refrigeration Institute's annual Directory of Certified Automatic Commercial Ice-Cube Machines and Ice Storage Bins.

#### **Warewashing**

1. New warewashing equipment shall use less than 1.2 gallons of fresh water per rack based on National Sanitation Foundation information.
2. Conveyor-type dishwashers shall have electronic eye sensor system so that the machine only operates when there are dishes present on the conveyor belt, not continuously. If the conveyor is continuously running, expecting another load of dishes, water and chemicals are also spraying, to clean the ware that is not even there. This is a waste of energy, water, and chemicals.

#### **Garbage Disposals**

1. Manually scrap dishes into a garbage can or scrap basket to reduce the need for pre-rinse and/or pre-rinse time.
2. Manual pre-wash units shall have shut-off's that turn the water off when the operator lets go of the nozzle.
3. Garbage grinders and disposals should not be use where manually scrapping and the use of a scrapping basket with the pre-wash spray can be efficiently done.
4. All garbage disposals shall be equipped with solenoids that shut water flow to the disposal off when not in use.
5. All garbage disposals shall be air-cooled.
6. A scrapping system, a complete pre-rinsing and disposing system, that can increase efficiency in some kitchens. A recirculated water plume in the salvage basin allows the ware to be simultaneously soaked and rinsed, increasing scrapping efficiency and because the water is recirculated, new water does not need to be added. Waste falls from the salvage basin into a collection basket.
7. Where volume of use makes it feasible, install a recirculating "pot scrubbing" or Jacuzzi-style sink to loosen up foodstuff rather than under a stream of running water.
8. A fresh-water trough system, used for scrapping and pre-rinse, can use up to 14 gallons a minute and is not recommended. The amount of pressure and water needed to keep the waste

moving down the trough to the disposal or scrap basket is not efficient. A recirculating trough system, with water flow controls can cut water use in half. However, recirculating pre-rinse and scrapping basins are more water efficient than trough systems in general. If possible do not even use a trough.

### **Steamers**

1. Steamers shall be of the self-contained, boilerless type that does not have a direct connection to a water supply.
2. Steamers that are connected directly to a water line, at the best, have a continuous blowdown of a quarter of a gallon per minute, but most continuously dump much more. They are significantly less energy efficient and require soft water with no more than 60 parts per million of total dissolved solids or require that very large volumes of water be continuously passed through to the sewer for water quality control.

### **Clothes Washing Equipment**

1. Commercial clothes washing equipment such as those found in central laundry facilities shall use no more than 1.6 gallons per pound washed.
2. Clothes washers shall have double dump valves and equipment of 150 pounds capacity or greater shall be equipped so that the final rinse water can be returned for use in the first flush wash.
3. Smaller residential type clothes washers intended for personal use by clients or inmates shall have a water use factor of 9.5 gallons per cubic foot of washer volume or less. This is a different standard from the one cited for commercial laundries above. Information for this can be obtained Oregon Residential Tax Rebate Program at the following web site <http://www.energy.state.or.us>.

### **Pumps**

Water pumps shall have mechanical seals unless prohibited by code.

### **Metering**

1. All buildings intended for daily occupation or for water using equipment operation shall be metered separately and records of its water use maintained by that agency.
2. If any one, single activity or piece of equipment at a facility accounts for more than 20% of the total water use at that facility, it shall be metered separately and records of its water use maintained by that agency.
3. Any water use that does not create waste water should be metered separately to better align waste water costs with actual usage.

### **Vehicle Washing**

1. New softeners installed at carwash facilities shall not use timers to determine when to recharge. Recharge cycles shall be controlled by instruments that measure volume of water treated or the actual quality of the water being softened

2. Reverse osmosis or nano-filtration reject water shall be reused beneficially for vehicle washing.
3. Chamois wringer shall have self-closing valves on their faucets

**In-bay:** Hand held spray wash equipment including spray wands and foaming brushes shall use no more than 3.0 gallons of water per minute and shall be equipped with trigger shutoffs. The shutoffs shall have weep holes or other devices to allow for drainage and pressure surges. All pressure wash equipment shall be equipped with unloader valves.

**Conveyor, drive-through, and rollover type car washes:** Equipment for automobiles and small truck and vans shall use no more than 15 gallons per vehicle. Washes designed specifically for buses and tractor-trailer rigs shall use no more than 40 gallons per vehicle washed. All such equipment shall be equipped with re-circulation or reuse equipment.

### **Bench Mark Indices<sup>1</sup>**

For Texas, the amount of outdoor water will vary with location ranging from 20 inches per year in Far East Texas to 48 inches a year in Far West Texas. For the San Antonio to Dallas line, the demand is about 36 inches per year or about 22 gallons per square foot of use. Many state facilities do not water the whole campus and when they do, they use under that amount. Most schools do not irrigate in Texas. For your use, the conversion from inches to gallons per square foot is 0.623 gallons of water per inch per square foot. In other words, if a campus irrigates 10,000 square feet at a rate of 40 inches a year, they will use  $(10,000 \times 40 \times 0.623 = )$  249,200 gallons a year.

As for the numbers above, they represent the low end from an American Water Works Association study completed in 2000. The range of use we see in public facilities can be significantly higher. For example, in a study of over 300 schools in Texas, the water use ranged from two gallons per student per day to over 130 gallons per student per day. The high number was from a school that has now made **MAJOR** repairs to a basket case of a plumbing system. High schools should be at the high end of the table above, while most elementary schools can use under 10 gallons per student per day.

#### Office Buildings

End Use/Benchmark Measure	N***	Efficiency Benchmark Range*
<b>INDOOR USE</b>		
Gal./sf/year	62	9 - 15
Gal./employee/day	72	9 - 16
<b>COOLING USE**</b>		
Gal./sf/year	49	8.5 - 22
<b>IRRIGATION USE**</b>		
Inches per year	47	26 - 50
<b>TOTAL WATER USE**</b>		
Gal./sf/year	62	26 - 35

\* Developed from combined methods (field studies, audit data, and modeling results).

\*\* Appropriate benchmarks will depend upon local climate.

\*\*\*Sample size.

<sup>1</sup> Information provided by Bill Hoffman, City of Austin, Water Conservation Department (2001).  
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Schools

End Use/Benchmark Measure	N***	Efficiency Benchmark Range*
<b>INDOOR USE</b>		
Gal./sf/year	142	8 - 16
Gal./school day/student	141	3 - 15
<b>COOLING USE**</b>		
Gal./sf/year	35	8 - 20
<b>IRRIGATION USE**</b>		
Inches per year	132	22 - 50
<b>TOTAL WATER USE**</b>		
Gal./sf/year	142	40 - 93

\* Developed from combined methods (field studies, audit data, and modeling results).

\*\* Appropriate benchmarks will depend upon local climate.

\*\*\* Sample size.

Bench mark indices continued

Food Service

End Use/Benchmark Measure	N***	Efficiency Benchmark Range*
<b>INDOOR USE</b>		
Gal./sf/year	142	8 - 16
Gal./school day/student	141	3 - 15
<b>COOLING USE**</b>		
Gal./sf/year	35	8 - 20
<b>IRRIGATION USE**</b>		
Inches per year	132	22 - 50
<b>TOTAL WATER USE**</b>		
Gal./sf/year	142	40 - 93

\* Developed from combined methods (field studies, audit data, and modeling results).

\*\* Appropriate benchmarks will depend upon local climate.

\*\*\* Sample size.

**APPENDIX J**

**REQUEST FOR ASSISTANCE**



# REQUEST FOR ENERGY ASSISTANCE



Energy efficiency is increasingly important for our local communities and the state of Texas. It reduces costs, increases available capital, spurs economic growth, improves working, learning and living environments and preserves precious resources. The State Energy Conservation Office (SECO) offers a number of free programs and services to help public agencies establish and achieve their energy efficiency goals.

**SECO through its engineering consultants offers public agencies the following free or cost shared energy management services:**

- On-Site Energy Assessments Of Facilities Free
- On-Site Training For Maintenance And Operations Personnel Free
- Workshops For Energy Managers, Maintenance Personnel And Administrators Free
- Energy Management Policy Development And Implementation Free
- Assistance In Identifying Energy Retrofit Funding Sources Free

**Specific responsibilities of the partner and SECO in this agreement:**

- Partner will select a contact person to work with SECO and its engineering consultant to establish an energy policy and set realistic energy efficiency goals.
- SECO's contractor will contact partners to assess their energy management needs.
- SECO will provide a report, which identifies no cost/low cost recommendations, capital retrofit projects, potential sources of funding and other needs and opportunities.
- Partner will schedule a time for SECO's contractor to present its findings and recommendations to key decision makers.
- Partner pledges that it is ready and willing to consider implementing the energy saving recommendations.

### *Acceptance Of Agreement And Request For Energy Management Assistance*

Signature: _____	Date: _____
Name (Mr./Ms./Dr.) _____	Title: _____
Organization: _____	Phone: _____
Address: _____	Fax: _____
_____	E-mail: _____

**Assigned Program Person:**

Name: <u>CHARLES S LANGFORD</u>	Title: <u>FLEET MANAGER</u>
Phone: <u>409-765-2640</u>	County: <u>GALVESTON CO</u>
Fax: <u>409-770-5132</u>	E-Mail: <u>CHARLES.LANGFORD@CO.GALVESTON.TX.US</u>

**Please complete and mail or fax to the following SECO Consultant :** Texas Energy Engineering Services, Inc. (TEESI), ATTENTION: Suleem Khan, P.E., 1301 Capital Of Texas Highway #B-325, Austin, TX. 78746, Phone 512-328-2533, Fax 512-328-2544. If you need to contact the State Energy Conservation Office, please call Theresa Sifuentes at 512-463-1896 or you may write to her at: Comptroller Of Public Accounts, State Energy Conservation Office, 111 E. 17<sup>th</sup> Street, Austin, Texas 78774.