Susan Combs
Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

Prepared by:

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City of Lake Jackson

November 17, 2010

ESA-Energy Systems Associates, Inc.
F-4882

SECO
State Energy Conservation Office

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1.0 EXECUTIVE SUMMARY

This **Energy Efficient Partnership Service** is provided to local government facilities as a portion of the state's ***Schools/ Local Government Energy Management Program***; a program sponsored by the **State Energy Conservation Office (SECO)**, a division of the **State of Texas Comptroller of Public Accounts**.

State Energy Conservation Office

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The service assists these public, non-profit institutions to take basic steps towards energy efficient facility operation. Active involvement in the partnership from the entire administration and staff within the agencies and institutions is critical in developing a customized blueprint for energy efficiency for their facilities.

In July 2008, **SECO** received a request for technical assistance from William Yenne, City Manager for the City of Lake Jackson. **SECO** responded by sending ESA **Energy Systems Associates, Inc.**, a registered professional engineering firm, to prepare this preliminary report for the municipality. This report is intended to provide support for the local government as it determines the most appropriate path for facility renovation, especially as it pertains to the energy consuming systems around the facility. It is our opinion that significant decreases in annual energy costs, as well as major maintenance cost reductions, can be achieved through the efficiency recommendations provided herein.

This study has focused on energy efficiency and systems operations. To that end, an analysis of the utility usage and costs for **City of Lake Jackson** was completed by ESA **Energy Systems Associates, Inc.**, (hereafter known as *Engineer*) to determine the annual energy cost index (ECI) and energy use index (EUI) for each campus or facility. A complete listing of the Base Year Utility Costs and Consumption is provided in Section 3.0 of this report.

Following the utility analysis and a preliminary consultation with *Mr. Modesto Mundo, Assistant City Manager,* a walk-through energy analysis was conducted throughout City. Specific findings of this survey and the resulting recommendations for both operation and maintenance procedures and cost-effective energy retrofit installations are identified in Section 6.0 of this report.

<u>We estimate that as much as **$27,300** may be saved annually if all recommended projects are implemented</u>. The estimated installed cost of these projects should total approximately **$193,800**, yielding an average simple payback of **8** years.

SUMMARY:	IMPLEMENTATION COST	ESTIMATED SAVINGS	SIMPLE PAYBACK (yrs)
HVAC ECRM #1 – Community Center	$400 / thermostat	$200 / thermostat	2
HVAC ECRM #2 – RTU Replacement	$138,400	$15,400	9
HVAC ECRM #3 – Civic Center RTU-11 coil	$2,000	$750	2-2/3
Lighting ECRM #1 – T12 to T8 Retrofit	$35,000	$6,800	5
Lighting ECRM #2 – Museum Lighting	$7,600	$2,550	3
Lighting ECRM #3 – Rec Center Basketball Courts	$10,800	$1,800	6
TOTAL PROJECTS	**$193,800**	**$27,300**	**8**

Although additional savings from reduced maintenance expenses are anticipated, these savings projections are not included in the estimates provided above. As a result, the actual Return of Investment (ROI), for this retrofit program has been calculated and shown in Section 7.0 of this report.

Our final "summary" comment is that **SECO** views the completion and presentation of this report as a beginning, rather than an end, of our relationship with **City of Lake Jackson**. We hope to be ongoing partners in assisting you to implement the recommendations listed in this report. Please call us if you have further questions or comments regarding your Energy Management Issues.

*ESA Energy Systems Associates, Inc. James W. Brown (512) 258-0547

2.0 ENERGY ASSESSMENT PROCEDURE

Involvement in this on-site analysis program was initiated through completion of a Preliminary Energy Assessment Service Agreement. This PEASA serves as the agreement to form a "partnership" between the client and the State Energy Conservation Office (SECO) for the purposes of energy costs and consumption reduction within owned and operated facilities. After receipt of the PEASA, an initial visit was conducted by the professional engineering firm contracted by SECO to provide service within that area of the state to review the program elements that SECO provides to local governments and determine which elements could best benefit the municipality. A summary of the *Partner's* most recent twelve months of utility bills was provided to the engineer for the preliminary assessment of the Energy Performance Indicators. After reviewing the utility bill data analysis and consultation with SECO to determine the program elements to be provided to City of Lake Jackson, ESA returned to the facilities to perform the following tasks:

1. Design and monitor customized procedures to control run times of energy consuming systems.
2. Analyze systems for code and standard compliance in areas such as cooling system refrigerants used, outside air quantity, and lighting illumination levels.
3. Develop an accurate definition of system and equipment replacement projects along with installation cost estimates, estimated energy and cost savings and analyses for each recommended project.
4. Develop a prioritized schedule for replacement projects.
5. Assist in development of guidelines for efficiency levels of future equipment purchases.

3.0 ENERGY PERFORMANCE INDICATORS

In order to easily assess the *Partner's* energy utilization and current level of efficiency, there are two key "Energy Performance Indicators" calculated within this report.

1. Energy Utilization Index

The Energy Utilization Index (EUI) depicts the total annual energy consumption per square foot of building space, and is expressed in "British Thermal Units" (BTUs).

To calculate the EUI, the consumption of electricity and gas are first converted to equivalent BTU consumption via the following formulas:

ELECTRICITY Usage

[Total KWH /yr] x [3413 BTUs/KWH] = __________ BTUs / yr

NATURAL GAS Usage

[Total MCF/yr] x [1,030,000 BTUs/MCF] = ________ BTUs / yr

After adding the BTU consumption of each fuel, the total BTUs are then divided by the building area.

EUI = [Electricity BTUs + Gas BTUs] divided by [Total square feet]

2. Energy Cost Index

The Energy Cost Index (ECI) depicts the total annual energy cost per square foot of building space.

To calculate the ECI, the annual costs of electricity and gas are totaled and divided by the total square footage of the facility:

ECI = [Electricity Cost + Gas Cost] divided by [Total square feet]

These indicators may be used to compare the facility's current cost and usage to past years, or to other similar facilities in the area. Although the comparisons will not provide specific reasons for unusual operation, they serve as indicators that problems may exist within the energy consuming systems.

THE CURRENT ENERGY PERFORMANCE INDICATORS FOR:

City of Lake Jackson

Facility	Energy Utilization Index (EUI) BTUs/sf-yr	Energy Cost Index (ECI) $/sf-yr
Recreation Center*	237,378	$4.84
City Hall, Police Station, Library	74,406	$2.22
Museum	82,798	$2.49
Civic Center	72,583	$2.26
Average of All Facilities*	**69,884**	**$2.32**

* Due the atypically high values obtained for the Recreation Center EUI and ECI, they have not been included in the facility average.

The electricity and gas consumption charts for the City of Lake Jackson facilities are included on the following pages:

OWNER: **Lake Jackson** **BUILDING:** **Rec Center**

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
MONTH	YEAR	CONSUMPTION KWH	METERED KW/KVA	CHARGED KW/KVA	COST OF DEMAND	TOTAL ALL ELECTRICAL COSTS $	CONSUMPTION MCF	COSTS $
JANUARY	2010	173,184	499		2,885	17,762	888	$8,287
FEBRUARY	2010	176,640	480		2,796	17,967	831	$8,389
MARCH	2010	205,824	467		2,780	20,446	774	$8,491
APRIL	2010	231,936	467		2,798	22,699	777	$8,524
MAY	2010	276,480	614		3,668	27,398	864	$9,473
JUNE	2010	274,752	576		3,526	27,104	475	$5,232
JULY	2010	272,256	576		3,476	26,840	415	$2,927
AUGUST	2009	255,408	576		3,337	20,867	305	$2,390
SEPTEMBER	2009	163,344	476		2,554	15,725	250	$2,121
OCTOBER	2009	262,272	584		3,443	23,831	222	$1,987
NOVEMBER	2009	174,336	467		2,549	16,107	205	$2,002
DECEMBER	2009	187,008	480		2,825	17,904	298	$2,817
TOTAL		2,653,440	6,262	0	36,637	$254,650	6,303	$62,640

Annual Total Energy Cost = $317,290 Per Year

Total KWH x 0.003413 = 9,056.19 x 106
Total MCF x 1.03 = 6,492.09 x 106
Total Other x ____ x 106
Total Site BTU's/yr 15,548.28 x 106

Floor area: 65,500 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 237,378 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $4.84 $/s.f. yr

OWNER: **Lake Jackson** **BUILDING:** **City Hall, Police, Library**

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
MONTH	YEAR	CONSUMPTION KWH	METERED KW/KVA	CHARGED KW/KVA	COST OF DEMAND	TOTAL ALL ELECTRICAL COSTS $	CONSUMPTION MCF	COSTS $
JANUARY	2010	75,456	269		1,538	8,026	21	$278
FEBRUARY	2010	73,728	269		1,534	7,874	17	$278
MARCH	2010	78,912	269		1,545	8,328	19	$232
APRIL	2010	88,320	307		1,754	9,347	10	$130
MAY	2010	140,352	326		1,953	14,002	9	$121
JUNE	2010	147,840	346		2,075	14,767	9	$113
JULY	2010	127,680	346		2,035	13,001	10	$89
AUGUST	2009	102,624	308		1,776	10,280	9	$80
SEPTEMBER	2009	90,096	289		1,647	8,919	10	$85
OCTOBER	2009	83,832	279		1,582	8,239	8	$80
NOVEMBER	2009	77,568	269		1,517	7,558	8	$79
DECEMBER	2009	86,592	269		1,563	8,427	9	$99
TOTAL		1,173,000	3,545	0	20,519	$118,767	139	$1,664

Annual Total Energy Cost = $120,431 Per Year

Total KWH x 0.003413 = 4,003.45 x 106
Total MCF x 1.03 = 143.17 x 106
Total Other x ____ x 106
Total Site BTU's/yr 4,146.62 x 106

Floor area: 54,271 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 76,406 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $2.22 $/s.f. yr

OWNER: Lake Jackson **BUILDING:** Museum

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
		CONSUMPTION	METERED	CHARGED	COST OF	TOTAL ALL ELECTRICAL	CONSUMPTION	COSTS
MONTH	YEAR	KWH	KW/KVA	KW/KVA	DEMAND	COSTS $	MCF	$
JANUARY	2010	12,768	96		545	1,649	7	$85
FEBRUARY	2010	14,112	96		549	1,768	3	$45
MARCH	2010	16,512	86		503	1,927	60	$689
APRIL	2010	17,760	86		506	2,036	1	$26
MAY	2010	25,248	86		521	2,692	1	$14
JUNE	2010	24,768	91		552	2,683	1	$14
JULY	2010	25,752	96		562	2,522	1	$15
AUGUST	2009	23,136	96		562	2,366	1	$15
SEPTEMBER	2009	22,176	96		558	2,288	1	$15
OCTOBER	2009	49,728	250		1,373	5,253	2	$28
NOVEMBER	2009	16,704	96		546	1,851	9	$97
DECEMBER	2009	14,688	88		510	1,679	5	$65
TOTAL		263,352	1,263	0	7,287	$28,714	92	$1,108

Annual Total Energy Cost = $29,822 Per Year

Total KWH x 0.003413 = 898.82 x 106
Total MCF x 1.03 = 94.76 x 106
Total Other x ____ x 106
Total Site BTU's/yr 993.58 x 106

Floor area: 12,000 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) 82,798 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) $2.49 $/s.f. yr

OWNER: Lake Jackson **BUILDING:** Civic Center

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
		CONSUMPTION	METERED	CHARGED	COST OF	TOTAL ALL ELECTRICAL	CONSUMPTION	COSTS
MONTH	YEAR	KWH	KW/KVA	KW/KVA	DEMAND	COSTS $	MCF	$
JANUARY	2010	29,376	250		1,347	3,889	62	$709
FEBRUARY	2010	29,952	230		1,251	3,840	62	$705
MARCH	2010	34,368	230		1,260	4,227	0	$0
APRIL	2010	45,504	250		1,383	5,305	1	$15
MAY	2010	67,776	288		1,617	7,450	1	$14
JUNE	2010	70,080	288		1,628	7,659	3	$44
JULY	2010	67,392	288		1,623	7,423	1	$15
AUGUST	2009	70,464	250		1,418	6,906	1	$17
SEPTEMBER	2009	62,400	230		1,300	6,161	1	$16
OCTOBER	2009	49,728	250		1,373	5,254	1	$18
NOVEMBER	2009	34,368	250		1,338	4,029	1	$18
DECEMBER	2009	34,944	250		1,359	4,145	4	$52
TOTAL		596,352	3,054	0	16,897	$66,288	138	$1,623

Annual Total Energy Cost = $67,911 Per Year

Total KWH x 0.003413 = 2,035.35 x 106
Total MCF x 1.03 = 142.14 x 106
Total Other x ____ x 106
Total Site BTU's/yr 2,177.49 x 106

Floor area: 30,000 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) 72,583 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) $2.26 $/s.f. yr

4.0 RATE SCHEDULE ANALYSIS

A. ELECTRICITY PROVIDER

City of Lake Jackson

RETAIL ELECTRIC PROVIDER: Direct Energy

Contract price: $0.0866 per kWh

TRANSMISSION AND DISTRIBUTION UTILITY: Centerpoint Energy

Electric Rate: Secondary Service > 10 kVA

I.	TRANSMISSION AND DISTRIBUTION CHARGES:		
	Customer Charge	=	$5.27 per meter
	Metering Charge	=	$116.89 per IDR meter
	Transmission System Charge	=	$1.4709 per 4CP kW
	Distribution System Charge	=	$3.118137 per Billing kVA
II.	SYSTEM BENEFIT FUND	=	$0.000657 per kVA
III.	TRANSITION CHARGES		
	Transition Charge 1	=	$0.621/kW
	Transition Charge 2	=	$1.181063/kW
	Transition Charge 3	=	$0.148887/kW
IV.	NUCLEAR DECOMMISSIONING CHARGE	=	$0.008909 per Billing kVA
V.	TRANSMISSION COST RECOVERY FACTOR	=	$0.420902/NCP kVA
VI.	COMPETITIVE METERING CREDIT	=	- $15.69/month
VII.	RIDER UCOS Retail Credit	=	-$ 0.016314 per 4CP
VIII.	ADVANCED METERING SYSTEM SURCHARGE	=	$ 3.16/month
IX.	Accumulated Deferred Federal Income Tax Credit	=	$ 0.061131 / kVA
X.	GROSS RECEIPTS TAX	=	As per incorporation rules.

Average Savings for consumption = $0. 0866/kWh + $0.000657/kWh = $0.087257/kWh
Average Savings for demand = $1.4709 + $3.118137 + $0.621 + $1.181063 + $0.148887 + $0.008909 + $0.420902 - $0.016314 + $0.061131 = $7.01/kVA**

** This number is a generalization of average cost per kW because the rate schedule from Centerpoint utilizes three (3) different types of demand for the calculation of the utility bill:

1. NCP kVA: Peak demand during 15 minute interval of current billing cycle
2. 4CP kVA: Average demands of June, July, August and September of previous calendar year; usually only applied to IDR metered accounts
3. Billing kVA: Ratchet demand representing higher of two calculations: 80% of peak demand in last 11 months or current NCP kVA

B. NATURAL GAS PROVIDER

City of Lake Jackson

RETAIL ELECTRIC PROVIDER: Centerpoint Energy

Rate schedule unavailable, average cost determined from utility billings.

Total cost for natural gas at the facilities in the analyzed billing cycle: $67,035

Total quantity purchased during the analyzed billing cycle: 6,672 MCF

Average cost per MCF = Cost of natural gas / quantity purchased = $67,035 / 6,672 MCF

Average cost per MCF = $10.04

5.0 CAMPUS DESCRIPTIONS

The City of Lake Jackson, located in Brazoria County, Texas, operates the following facilities that were assessed for this Report: City Hall, Library, Police Department, and Community Center. The population of the city (2006 census) is approximately 27,614 people.

A. CITY HALL

The City Hall building, located at 25 Oak Drive, is constructed of exposed aggregate concrete tilt-wall construction. The building contains 15,000 square feet of floor area and generally operates during normal 8 to 5 business hours.

The interior space has a combination of tile and carpeted floors, gypsum board walls and acoustical ceilings. The roof has a single ply membrane surface that is free from any indication that water pools on its surface, despite the fact that HVAC condensate is allowed to empty onto the roof surface. *We recommend the City re-route existing condensate drain piping to the roof drains and secure them to anchors that will prevent them from moving in the wind, as was observed at the time of the survey.* The roof appears to remain in good condition, but the condensate drain movement on the roof, and the subsequent release of condensate on the roof, will eventually take their toll and create roof surface problems.

HVAC & Control System Description:

City Hall is conditioned with packaged rooftop units (RTUs) utilizing electric DX cooling and electric heat. The units were installed between 1998 and 2006. None of the units have coil guards installed, yet there was only minimal damage to the coils noted during the survey. City Staff reported that the area does not have frequent hail storms and they are not terribly concerned about danger to the units. However, it would take only one storm to introduce damage to the coil fins on the units and sustaining damage to just 10% of the coil fins can lead to a loss of operating efficiency of up to 30%. *Therefore, we recommend the City revise their HVAC purchasing specifications to require heavy duty coil guards be included with each new unit purchased*.

Due to the age of the air conditioners, there is not an immediate need for replacement of any equipment at City Hall. However, when the units surpass 15 years and approach 20 years of age, we recommend that the City begin to budget for unit replacement because scheduled retrofits are less expensive than emergency replacements that occur when units are allowed to fail.

The units are controlled with conventional thermostats. We recommend the City consider replacing the conventional units with new IP addressable programmable thermostats. These units allow City maintenance staff to monitor and control the HVAC system at any City network computer, if the personnel have the appropriate password credentials. The programmable system will ensure HVAC units are not left operating beyond scheduled occupancy hours.

Lighting System Description:

The majority of the lighting fixtures utilized in the building are four-foot, four-lamp, T12 fixtures. The City has been approved to receive an energy efficiency grant to upgrade their lighting to more efficient T8 components. To maximize the available funds for the project, *we recommend the City retrofit the existing fixtures with low power factor electronic ballasts and T8 lamps.* These components will reduce the power consumption of the lighting system by approximately 25% and still produce the same illumination levels in the spaces produced by the current T12 system.

In addition to the energy savings available with the T8 system, the T12 lamps and magnetic ballasts will no longer be manufactured after 2010 and in combination with the legislative mandate that public facilities install the most efficient lamps and ballasts possible in their existing fixtures (Senate Bill 300), this project will offer many benefits for the City.

There were some areas about which Mr. Mundo requested recommendations for the installation of occupancy sensors and multi-level switching. There were areas noted during the survey, like the conference room, where lights were operating in spaces that were unoccupied at the time of the survey and would benefit from having occupancy sensors. Other areas, like the Council Chambers, were requested to have a base level of light in the space between 8 and 5; dual switching would allow ½ of the lamps to be turned off when the room is unoccupied and still maintain a base level of lighting in the space. *We recommend the dual switched lamps be controlled with an occupancy sensor to automatically lower the light levels as the room becomes unoccupied.*

B. LIBRARY

The Library is located at 250 Circle Way. It is City-owned, but operated by Brazoria County. The building utilizes RTUs like the City Hall, but the units are older and less efficient than the City Hall units (see picture to the right). These units have sustained more damage to their coil fins and *we recommend the fins be cleaned and combed straight to restore operating efficiency to the unit.* The installation of coil guards would reduce the risk that the damage would return to the units.

Nameplate data for the Carrier units was illegible; it is estimated these units were installed in the early 1990s which means that they have reached the end of their anticipated 15-20 useful life. *We recommend these units be scheduled for replacement in the next few years to avoid the unnecessarily higher cost of emergency replacement when the units are allowed to fail on their own.* We estimate that the units are 7-1/2 ton total cooling capacity units.

The units are controlled with a combination of conventional and programmable thermostats. One of the thermostats, the unit located in the back left corner of the Library, was mounted to the wall directly over one of the public access computers. Heat from the computer will promote higher than average temperature sampling in the space and the unit will over-condition the space below the programmed cooling setpoint. *We recommend relocating the computers or installing the thermostat at a different location to allow accurate temperature sampling and conditioning of the space.*

The lighting system at the Library is predominantly T12 linear fluorescent. *We recommend retrofitting these fixtures to T8 components in the same lighting project to be performed at the City Hall.*

C. POLICE DEPARTMENT

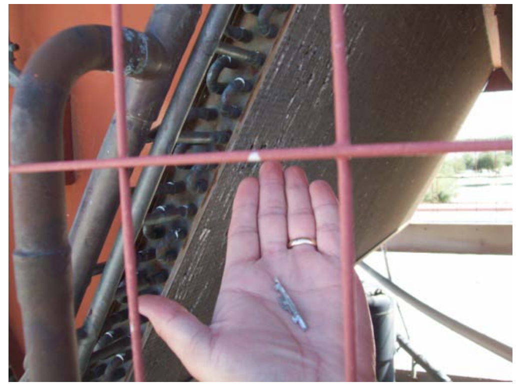
The Police Department is located at 5 Oak Drive. Originally constructed about the same time as City Hall, the facility has undergone an extensive renovation in the last few years. The HVAC system consists of 2005 or newer gas heat rooftop units. The renovation did not extend to the lighting system, however, as the system is predominantly T12 linear fluorescent. *We recommend the fixtures be retrofit with T8 lamps and electronic ballasts.*

D. COMMUNITY CIVIC CENTER

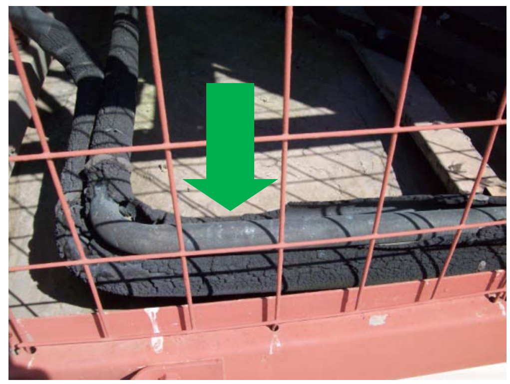
The Civic Center, 333 Highway 332 East, operates Monday to Friday from 8am to 5pm. The facility consists of a 7100 square foot Ballroom, 4500 square foot Terrace Room, an 1100 square foot Senior Center and several smaller spaces.

The HVAC system, York rooftop units, was installed in 1999. At eleven years old, the units should have between 4 and 9 years of service available for the City before they need to be replaced. The unit labeled RTU-1 has a significant amount of rust and corrosion (see picture to the right). The cabinet panel has deteriorated to the point that pieces of the panel are falling off of the unit. *We recommend the City repair the damaged panel.*

RTU-11 has severely corroded coil fins. The fins are falling off the coil. The fins are designed to increase the surface area of the coil exposed in the air in order to reject a maximum amount of heat to the atmosphere. As the coil fins deteriorate, the unit loses its ability to condition the space. We suspect the deterioration is due to the salt-laden air that comes in from the Gulf of Mexico, just 8 miles south of Lake Jackson. We suspect these coils did not receive the available corrosion protective treatment necessary for condenser equipment installed near the coast. *We recommend the City replace the coil on RTU-11 and revise their purchasing specifications to require advanced corrosion protection on all HVAC units purchased for its facilities.*



As can be seen in the picture to the right, the refrigerant piping on many of the Civic Center units is damaged or missing and should be replaced. Damaged or missing insulation allows the unit to absorb heat from the outdoors which minimizes the unit's ability to absorb heat from the interior space as desired. *We recommend the refrigerant line insulation on all of the Civic Center units be inspected and replaced as necessary.*



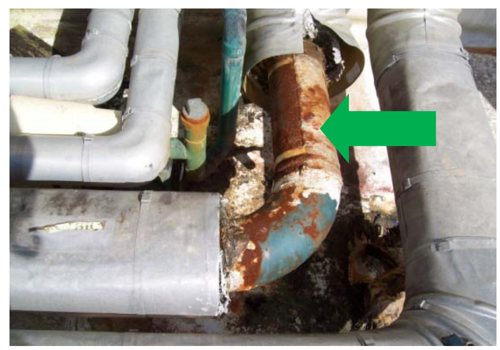
E. MUSEUM

The Museum is a 12,000 square foot building with a large number of displays and interactive booths. The main display is the first stealth plane ever built. The facility has a large number of incandescent and halogen light fixtures, as pictured to the right. Retrofitting these lamps with compact fluorescent or LED lamps can reduce the electrical consumption at the Museum by 75-90%.

The HVAC system for the Museum consists of 1995 RTUs. These units are approaching the end of their 15-20 year anticipated life. We recommend these units be budgeted for replacement within the next 5 years.

F. RECREATIONAL CENTER

The Recreational Center is a 65,500 square foot facility that incorporates basketball and racquetball courts, workout spaces and a natatorium. This facility is by far the highest energy consumer for the City. The majority of this energy is consumed by the natatorium. At the time of the survey, the Pool-Pak air and water conditioning system, an outdoor unit pictured to the right, was found to have enormous quantities of conditioned air leaking from the unit. The panels at the supply cabinet have broken latches and the pressure of the supply air plenum had pushed the panels out 6" at the bottom of the unit. The outside air damper linkage is broken (as evidenced by the alternating open status of the damper vanes) and hundreds of cubic feet of conditioned air was exiting the unit. Under these conditions, it is doubtful the unit could ever achieve setpoint and is likely operating almost 100% of the time at full load. *We recommend the City repair the damaged damper linkage and cabinet panels.*



The majority of the HVAC units at the facility were installed in 2003 and are located on the roof. One of the units was found to have a missing compressor cover panel (see picture to the right). *We recommend the panel be re-installed, or replaced as necessary in order to protect the interior components from infiltration by weather or wildlife.*
Another unit has damaged and missing insulation on the chilled water line serving the unit (picture to the right). *We recommend the insulation be replaced in this location.*

The lighting system at the basketball courts (pictured to the right) consists of up-light metal halide fixtures. These fixtures are designed to reflect light from the ceiling down on to the court. *We recommend the up-light metal halides be replaced with new T5 linear fluorescent high-bay fixtures.* These heavy-duty fixtures will improve the overall light quality and illumination levels in the gymnasium. The fixtures can be installed so that ½ of the lamps operate during low volume or unoccupied periods with the second set of lamps controlled by motion sensor.

6.0 RECOMMENDATIONS

A. MAINTENANCE AND OPERATIONS PROCEDURES

HVAC

- Re-route and anchor condensate drain lines on City Hall roof.
- Add requirement for heavy duty coil guards to HVAC Purchasing Specification.
- Install coil guards to protect coils from damage.
- Replace damaged and missing refrigerant line insulation.
- Replace rusted panels (RTU-1), refrigerant and chilled water line insulation at Civic Center
- Repair Pool Pak panel latches and damper linkages at Rec Center Natatorium
- Relocate computers or thermostat to allow accurate air sampling at the library.

Lighting

- Turn lights off in unoccupied spaces.

Maintenance and Operation procedures (M&O) are strategies that can offer significant energy savings potential, yet require little or no capital investment by the City to implement. Exact paybacks are at times difficult to calculate, but are typically less than one year. The difficulties with payback calculations are often related to the fact that the investigation required to make the payback calculation, (for example measuring the air gap between exterior doors and missing or damaged weather-stripping so that exact air losses may be determined), is prohibitive when the benefits of renovating door and weather-stripping are well documented and universally accepted.

HVAC M&O #1 – Condensate Lines at City Hall

The existing lines are not anchored to the roof and blow around in the wind. Condensate water is dumped on the single ply roof membrane to evaporate; this condition can cause premature roof failure as the roof expands and contracts differently as a result of hot sun and cool condensate in the same area of the roof.

HVAC M&O #2 – Coil Guards – City-wide

Very few of the City's RTUs have coil guards installed. The staff is not concerned with hail damage, but the damage one storm could cause could affect the operating efficiencies of the units and can be prevented with coil guards.

HVAC M&O #3 – Refrigerant Line Insulation
Damaged refrigerant line insulation allows the refrigerant to absorb heat from the exterior and minimizes the ability for the unit to condition the space.

HVAC M&O #4 – Civic Center RTUs
At the time of the survey, it was noted there was some panel damage to RTU-1 and some coil deterioration at RTU-11. These conditions will result in efficiency losses for these units.

HVAC M&O #5 – Natatorium Pool-Pak
At the time of the survey, there were supply plenum panels with broken latches and a broken outside air damper linkage that resulted in severe leaks of conditioned air to the outdoors. Repair of these conditions would result in an instantaneous payback for the material and labor costs to fix the problems.

Lighting System M&O #1 – Turn lights off in unoccupied spaces
It was noted during the survey that many areas had light fixtures operating in unoccupied spaces. Studies have shown that linear fluorescent fixtures result in energy savings if the lights are turned off in unoccupied spaces after just 23 seconds.

B. CAPITAL EXPENSE PROJECTS

HVAC

- Replace conventional thermostats with IP programmable thermostats.
- Replace two 7-1/2 ton RTUs at Library
- Replace corroded coil at Civic Center RTU-11

Lighting

- Retrofit older T12 fixtures with T8 lamps and electronic ballasts at City Hall, Police Station and Library.
- Replace museum incandescent fixtures with LED and compact fluorescent fixtures.
- Install T5 high bay fluorescent fixtures at Rec Center basketball courts.

HVAC ECRM #1 –Community Center

Installing 7-day IP programmable thermostats will allow staff to monitor and control the HVAC units from any City networked computer (with appropriate password privileges).

Estimated Installed Cost	=	$ 400 per thermostat
Estimated Energy Cost Savings	=	$ 200 per thermostat
Simple Payback Period	=	2 years

HVAC ECRM #2 – Replace two 7-1/2 ton units at Library and four RTUs at Museum

These units are 15 years old or older and are nearing the end of their typical expected useful life. These units total approximately 67.5 tons of nominal cooling capacity.

Estimated Installed Cost	=	$ 138,400
Estimated Energy Cost Savings	=	$ 15,400
Simple Payback Period	=	9 years

HVAC ECRM #3 – Replace corroded coil at Civic Center RTU-11

The coil fins on RTU-11 have corroded and are falling off of the coil, minimizing the unit's ability to condition the space.

Estimated Installed Cost	=	$ 2,000
Estimated Energy Cost Savings	=	$ 750
Simple Payback Period	=	2-2/3 years

Lighting ECRM #1 – Retrofit City Hall, Police Station and Library linear fluorescent fixtures

There are approximately 680 T12 fixtures that we recommend be retrofitted with T8 lamps and electronic ballasts. The new components produce equal quantities of light while consuming about 25% less energy.

Estimated Installed Cost	=	$ 35,000
Estimated Energy Cost Savings	=	$ 6,800
Simple Payback Period	=	5 years

Lighting ECRM #2 – Museum

The museum has large quantities of incandescent and halogen light fixtures. LED and compact fluorescent fixtures can reduce the energy consumption in the building by 75-90%.

Estimated Installed Cost	=	$ 7,600
Estimated Energy Cost Savings	=	$ 2,550
Simple Payback Period	=	3 years

Lighting ECRM #3 – Recreation Center Basketball Courts

We recommend the existing basketball up-light metal halides (approximately 36 fixtures) be replaced with new T5 linear fluorescent high-bay fixtures.

Estimated Installed Cost	=	$ 10,800
Estimated Energy Cost Savings	=	$ 1,800
Simple Payback Period	=	6 years

C. SUMMARY TABLE

If the CITY OF LAKE JACKSON was to implement all recommended ECRM projects, the project summary cost would be:

Estimated Installed Cost	=	$ 193,800
Estimated Energy Cost Savings	=	$ 27,300
Simple Payback Period	=	8 years

7.0 FINANCIAL EVALUATION

Financing of these projects may be provided using a variety of methods as Bond Programs, municipal leases, or state financing programs like the SECO LoanSTAR Program.

If the project was financed with in-house funds, the internal rate of return for the investment would be as follows:

Proposal:	Perform recommended ECRMs			
Assumptions:				
1. Equipment will last at least 15 years prior to next renovation				
2. No maintenance expenses for first five years (warranty period)				
3. $1000 maintenance expense next 5 years				
4. $5000 maintenance expense last 5 years				
5. Savings decreases 2% per year after year 5				
Cash Flow	**Project Cost**	**Project Savings**	**Maintenance Expense**	**Net Cash Flow**
Time 0	($193,800)		0	($193,800)
Year 1		$ 27,300	0	$27,300
Year 2		$ 27,300	0	$27,300
Year 3		$ 27,300	0	$27,300
Year 4		$ 27,300	0	$27,300
Year 5		$ 27,300	0	$27,300
Year 6		$ 26,754	($1,000)	$25,754
Year 7		$ 26,208	($1,000)	$25,208
Year 8		$ 25,662	($1,000)	$24,662
Year 9		$ 25,116	($1,000)	$24,116
Year 10		$ 24,570	($1,000)	$23,570
Year 11		$ 24,024	($5,000)	$19,024
Year 12		$ 23,478	($5,000)	$18,478
Year 13		$ 22,932	($5,000)	$17,932
Year 14		$ 22,386	($5,000)	$17,386
Year 15		$ 21,840	($5,000)	$16,840
			Internal Rate of Return	**9.44%**

More information regarding financial programs available to CITY OF LAKE JACKSON can be found in:

APPENDIX I: SUMMARY OF FUNDING AND PROCUREMENT OPTIONS

8.0 GENERAL COMMENTS

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted engineering practices. All estimations provided in this report were based upon information provided to ESA by the District and their respective utility providers. While cost saving estimates have been provided, they are not intended to be considered a guarantee of cost savings. No guarantees or warranties, either express or implied, are intended or made. Changes in energy usage or utility pricing from those provided will impact the overall calculations of estimated savings and could result in different or longer payback periods.

APPENDICES

APPENDIX I - SUMMARY OF FUNDING AND PROCUREMENT OPTIONS

SUMMARY OF FUNDING OPTIONS FOR CAPITAL EXPENDITURE PROJECTS

Several options are available for funding retrofit measures which require capital expenditures.

LoanSTAR Program:

The Texas LoanSTAR program is administered by the State Energy Conservation Office (SECO). It is a revolving loan program available to all public school districts in the state as well as other institutional facilities. SECO loans money at 3% interest for the implementation of energy conservation measures which have a combined payback of eight years or less. The amount of money available varies, depending upon repayment schedules of other facilities with outstanding loans, and legislative actions. Check with Eddy Trevino of SECO (512-463-1876) for an up-to-date evaluation of prospects for obtaining a loan in the amounts desired.

TASB (Texas Association Of School Boards) Capital Acquisition Program:

TASB makes loans to school districts for acquiring personal property for “maintenance purposes”. Energy conservation measures are eligible for these loans. The smallest loan TASB will make is $100,000. Financing is at 4.4% to 5.3%, depending upon length of the loan and the school district’s bond rating. Loans are made over a three year, four year, seven year, or ten year period. The application process involves filling out a one page application form, and submitting the school district’s most recent budget and audit. Contact Cheryl Kepp at TASB (512-467-0222) for further information.

Loans On Commercial Market:

Local lending institutions are another source for the funding of desired energy conservation measures. Interest rates obtainable may not be as attractive as that offered by the LoanSTAR or TASB programs, but advantages include “unlimited” funds available for loan, and local administration of the loan.

Leasing Corporations:

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

Bond Issue:

The may choose to have a bond election to provide funds for capital improvements. Because of its political nature, this funding method is entirely dependent upon the mood of the voters, and may require more time and effort to acquire the funds than the other alternatives.

SUMMARY OF PROCUREMENT OPTIONS FOR CAPITAL EXPENDITURE PROJECTS

State Purchasing:

The General Services Commission has competitively bid contracts for numerous items which are available for direct purchase by school districts. Contracts for this GSC service may be obtained from Sue Jager at (512) 475-2351.

Design/Bid/Build (Competitive Bidding):

Plans and specifications are prepared for specific projects and competitive bids are received from installation contractors. This traditional approach provides the district with more control over each aspect of the project, and task items required by the contractors are presented in detail.

Design/Build:

These contracts are usually structured with the engineer and contractor combined under the same contract to the owner. This type team approach was developed for fast-track projects, and to allow the contractor a position in the decision making process. The disadvantage to the district is that the engineer is not totally independent and cannot be completely focused upon the interest of the district. The district has less control over selection of equipment and quality control.

Purchasing Standardization Method:

This method will result in significant dollar savings if integrated into planned facility improvements. For larger purchases which extend over a period of time, standardized purchasing can produce lower cost per item expense, and can reduce immediate up-front expenditures. This approach includes traditional competitive bidding with pricing structured for present and future phased purchases.

Performance Contracting:

Through this arrangement, an energy service company (ESCO) using in-house or third party financing to implement comprehensive packages of energy saving retrofit projects. Usually a turnkey service, this method includes an initial assessment of energy savings potential, design of the identified projects, purchase and installation of the equipment, and overall project management. The ESCO guarantees that the cost savings generated will, at a minimum, cover the annual payment due over the term of the contract. The laws governing Performance Contracting for school districts are detailed in the Texas Education Code, Subchapter Z, Section 44.901. Senate Bill SB 3035, passed by the seventy-fifth Texas Legislature, amends some of these conditions. Performance Contracting is a highly competitive field, and interested districts may wish to contact Felix Lopez of State Energy Conservation Office, (SECO), at 512-463-1080 for assistance in preparing requests for proposals or requests for qualifications.

Solution Center

How to Finance Your Energy Program

Cost and financing issues are pivotal factors in determining which energy-efficiency measures will be included in your final energy management plan. Before examining financing options, you need to have a reasonably good idea of the measures that may be implemented. For this purpose, you will want to perform cost/benefit analyses on each candidate measure to identify those with the best investment potential. This document presents a brief introduction to cost/benefit methods and then suggests a variety of options for financing your program.

Selecting a Cost/Benefit Analysis Method

Cost/benefit analysis can determine if and when an improvement will pay for itself through energy savings and to help you set priorities among alternative improvement projects. Cost/benefit analysis may be either a simple payback analysis or the more sophisticated life cycle cost analysis. Since most electric utility rate schedules are based on both consumption and peak demand, your analyst should be skilled at assessing the effects of changes in both electricity use and demand on total cost savings, regardless of which type of analysis is used. Before beginning any cost/benefit analyses, you must first determine acceptable design alternatives that meet the heating, cooling, lighting, and control requirements of the building being evaluated. The criteria for determining whether a design alternative is "acceptable" includes reliability, safety, conformance with building codes, occupant comfort, noise levels, and space limitations. Since there will usually be a number of acceptable alternatives for any project, cost/benefit analysis allows you to select those that have the best savings potential.

Simple Payback Analysis

A highly simplified form of cost/benefit analysis is called simple payback. In this method, the total first cost of the improvement is divided by the first-year energy cost savings produced by the improvement. This method yields the number of years required for the improvement to pay for itself.

This kind of analysis assumes that the service life of the energy-efficiency measure will equal or exceed the simple payback time. Simple payback analysis provides a relatively easy way to examine the overall costs and savings potentials for a variety of project alternatives. However, it does not consider a number of factors that are difficult to predict, yet can have a significant impact on cost savings. These factors may be considered by performing a life-cycle cost (LCC) analysis.

Simple Payback

As an example of simple payback, consider the lighting retrofit of a 10,000-square-foot commercial office building. Relamping with T-8 lamps and electronic, high-efficiency ballasts may cost around $13,300 ($50 each for 266 fixtures) and produce annual savings of around $4,800 per year (80,000 kWh at $0.06/kWh). This simple payback for this improvement would be

$$\frac{\$13{,}300}{\$4{,}800/\text{year}} = 2.8 \text{ years}$$

That is, the improvement would pay for itself in 2.8 years, a 36% simple return on the investment (1/2.8 = 0.36).

Life-Cycle Cost Analysis

Life-cycle cost analysis (LCC) considers the total cost of a system, device, building, or other capital equipment or facility over its anticipated useful life. LCC analysis allows a comprehensive assessment of all anticipated costs associated with a design alternative. Factors commonly considered in LCC analyses include initial capital cost, operating costs, maintenance costs, financing costs, the expected useful life of equipment, and its future salvage values. The result of the LCC analysis is generally expressed as the value of initial and future costs in today's dollars, as reflected by an appropriate discount rate.

The first step in this type of analysis is to establish the general study parameters for the

continued

How to Finance Your Energy Program *continued*

Financing Mechanisms

Capital for energy-efficiency improvements is available from a variety of public and private sources, and can be accessed through a wide and flexible range of financing instruments. While variations may occur, there are five general financing mechanisms available today for investing in energy-efficiency:

- **Internal Funds.** Energy-efficiency improvements are financed by direct allocations from an organization's own internal capital or operating budget.
- **Debt Financing.** Energy-efficiency improvements are financed with capital borrowed directly by an organization from private lenders.
- **Lease or Lease-Purchase Agreements.** Energy-efficient equipment is acquired through an operating or financing lease with no up-front costs, and payments are made over five to ten years.
- **Energy Performance Contracts.** Energy-efficiency measures are financed, installed, and maintained by a third party, which guarantees savings and payments based on those savings.
- **Utility Incentives.** Rebates, grants, or other financial assistance are offered by an energy utility for the design and purchase of certain energy-efficient systems and equipment.

These financing mechanisms are not mutually exclusive (i.e., an organization may use several of them in various combinations). The most appropriate set of options will depend on the size and complexity of a project, internal capital constraints, in-house expertise, and other factors. Each of these mechanisms is discussed briefly below, followed by some additional funding sources and considerations.

Internal Funds

The most direct way for the owner of a building or facility to pay for energy-efficiency improvements is to allocate funds from the internal capital or operating budget. Financing internally has two clear advantages over the other options discussed below – it retains internally all savings from increased energy-efficiency, and it is usually the simplest option administratively. The resulting savings may be used to decrease overall operating expenses in future years or retained within a revolving fund used to support additional efficiency investments. Many public and private organizations regularly finance some or all of their energy-efficiency improvements from internal funds.

In some instances, competition from alternative capital investment projects and the requirement for relatively high rates of return may limit the use of internal funds for major, standalone investments in energy-efficiency. In most organizations, for example, the highest priorities for internal funds are business or service expansion, critical health and safety needs, or productivity enhancements. In both the public and private sectors, capital that remains available after these priorities have been met will usually be invested in those areas that offer the highest rates of return. The criteria for such investments commonly include an annual return of 20 percent to 30 percent or a simple payback of three years or less.

Since comprehensive energy-efficiency improvements commonly have simple paybacks of five to six years, or about a 12 percent annual rate of return, internal funds often cannot serve as the sole source of financing for such improvements. Alternatively, however, internal funding can be used well and profitably to achieve more competitive rates of return when combined with one or more of the other options discussed below.

Debt Financing

Direct borrowing of capital from private lenders can be an attractive alternative to using internal funds for energy-efficiency investments. Financing costs can be repaid by the savings that accrue from increased energy-efficiency. Additionally, municipal governments can often issue bonds or other long-term debt instruments at substantially lower interest rates than can private corporate entities. As in the case of internal funding, all savings from efficiency improvements (less only the cost of financing) are retained internally.

Debt financing is administratively more complex than internal funding, and financing costs will vary according to the credit rating of the borrower. This approach may also be restricted by formal debt ceilings imposed by municipal

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policy, accounting standards, and/or Federal or state legislation.

In general, debt financing should be considered for larger retrofit projects that involve multiple buildings or facilities. When considering debt financing, organizations should weigh the cost and complexity of this type of financing against the size and risk of the proposed projects.

Lease and Lease-Purchase Agreements

Leasing and lease-purchase agreements provide a means to reduce or avoid the high, up-front capital costs of new, energy-efficient equipment. These agreements may be offered by commercial leasing corporations, management and financing companies, banks, investment brokers, or equipment manufacturers. As with direct borrowing, the lease should be designed so that the energy savings are sufficient to pay for the financing charges. While the time period of a lease can vary significantly, leases in which the lessee assumes ownership of the equipment generally range from five to ten years. There are several different types of leasing agreements, as shown in the sidebar. Specific lease agreements will vary according to lessor policies, the complexity of the project, whether or not engineering and design services are included, and other factors.

Energy Performance Contracts

Energy performance contracts are generally financing or operating leases provided by an Energy Service Company (ESCo) or equipment manufacturer. The distinguishing features of these contracts are that they provide a guarantee on energy savings from the installed retrofit measures, and they provide payments to the ESCo from the savings, freeing the customer from any need of up-front payments to the ESCo. The contract period can range from five to 15 years, and the customer is required to have a certain minimum level of capital investment (generally $200,000 or more) before a contract will be considered.

Under an energy performance contract, the ESCo provides a service package that typically includes the design and engineering, financing, installation, and maintenance of retrofit measures to improve energy-efficiency. The scope of these improvements can range from measures that affect a single part of a building's energy-using

Types of Leasing Agreements

Operating Leases are usually for a short term, occasionally for periods of less than one year. At the end of the lease period, the lessee may either renegotiate the lease, buy the equipment for its fair market value, or acquire other equipment. The lessor is considered the owner of the leased equipment and can claim tax benefits for its depreciation.

Financing Leases are agreements in which the lessee essentially pays for the equipment in monthly installments. Although payments are generally higher than for an operating lease, the lessee may purchase the equipment at the end of the lease for a nominal amount (commonly $1). The lessee is considered the owner of the equipment and may claim certain tax benefits for its depreciation.

Municipal Leases are available only to tax-exempt entities such as school districts or municipalities. Under this type of lease, the lessor does not have to pay taxes on the interest portion of the lessee's payments, and can therefore offer an interest rate that is lower than the rate for usual financing leases. Because of restrictions against multi-year liabilities, the municipality specifies in the contract that the lease will be renewed year by year. This places a higher risk on the lessor, who must be prepared for the possibility that funding for the lease may not be appropriated. The lessor may therefore charge an interest rate that is as much as 2 percent above the tax-exempt bond rate, but still lower than rates for regular financing leases. Municipal leases nonetheless are generally faster and more flexible financing tools than tax-exempt bonds.

Guaranteed Savings Leases are the same as financing or operating leases but with the addition of a guaranteed savings clause. Under this type of lease, the lessee is guaranteed that the annual payments for leasing the energy-efficiency improvements will not exceed the energy savings generated by them. The owner pays the contractor a fixed payment per month. If actual energy savings are less than the fixed payment, however, the owner pays only the small amount saved and receives a credit for the difference.

How to Finance Your Energy Program *continued*

Bulk Purchasing. Large organizations generally have purchasing or materials procurement departments that often buy standard materials in bulk or receive purchasing discounts because of the volume of their purchases. Such organizations can help reduce the costs of energy-efficiency renovations if their bulk purchasing capabilities can be used to obtain discounts on the price of materials (e.g., lamps and ballasts). While some locales may have restrictions that limit the use of this option, some type of bulk purchasing can usually be negotiated to satisfy all parties involved.

Project Transaction Costs. Certain fixed costs are associated with analyzing and installing energy measures in each building included in a retrofit program. Each additional building, for example, could represent additional negotiations and transactions with building owners, building analysts, energy auditors, equipment installers, commissioning agents, and other contractors. Similarly, each additional building will add to the effort involved in initial data analysis as well as in tracking energy performance after the retrofit. For these reasons, it is often possible to achieve target energy savings at lower cost by focusing only on those buildings that are the largest energy users. One disadvantage with larger buildings is that the energy systems in the building can be more difficult to understand, but overall, focusing on the largest energy users is often the most efficient use of your financial resources.

Direct Value-Added Benefits. The primary value of retrofits to buildings and facilities lies in the reduction of operating costs through improved energy-efficiency and maintenance savings. Nevertheless, the retrofit may also directly help address a variety of related concerns, and these benefits (and avoided costs) should be considered in assessing the true value of an investment. A few examples of these benefits include the improvement of indoor air quality in office buildings and schools; easier disposal of toxic or hazardous materials found in energy-using equipment; and assistance in meeting increasingly stringent state or Federal mandates for water conservation. Effective energy management controls for buildings can also provide a strong electronic infrastructure for improving security systems and telecommunications.

Economic Development Benefits. In addition to direct savings on operating costs and the added-value benefits mentioned above, investments in energy-efficiency can also support a community's economic development and employment opportunities. Labor will typically constitute about 60 percent of a total energy investment, and about 50 percent of equipment can be expected to be purchased from local equipment suppliers; as a result, about 85 percent of the investment is retained within the local economy. Additionally, funds retained in urban areas will generally be re-spent in the local economy. The Department of Commerce estimates that each dollar retained in an urban area will be re-spent three times. This multiplier effect results in a three-fold increase in the economic benefits of funds invested in energy-efficiency, without even considering the savings from lower overall fuel costs.

For more information contact the Rebuild America Clearinghouse at 252-459-4664 or visit www.rebuild.gov

Rebuild America
U.S. Dept. of Energy

APPENDIX II - ELECTRIC UTILITY RATE SCHEDULE

CenterPoint Energy Houston Electric, LLC
Applicable: Entire Service Area

CNP 8017

6.1.1.1.3 SECONDARY SERVICE GREATER THAN 10 KVA

AVAILABILITY
This schedule is applicable to Delivery Service for non-residential purposes at secondary voltage with demand greater than 10 kVA when such Delivery Service is to one Point of Delivery and measured through one Meter.

TYPE OF SERVICE
Delivery Service will be single or three-phase, 60 hertz, at a standard secondary voltage. Delivery Service will be metered using Company's standard Meter provided for this type of Delivery Service. Any Meter other than the standard Meter will be provided at an additional charge and/or will be provided by a Meter Owner other than the Company pursuant to Applicable Legal Authorities. Where Delivery Service of the type desired is not available at the Point of Delivery, additional charges and special contract arrangements may be required prior to Delivery Service being furnished, pursuant to Section 6.1.2.2, Construction Services, in this Tariff.

MONTHLY RATE

I. Transmission and Distribution Charges:

	Standard Class	Subclass Exception	
Customer Charge	$5.27	$0.00	per Retail Customer per Month
Metering Charge			
Non-IDR Metered	$31.86	$17.07	per Retail Customer per Month
IDR Metered	$116.89	$116.89	per Retail Customer per Month
Transmission System Charge			
Non-IDR Metered	$1.1027	$1.1027	per NCP kVA
IDR Metered	$1.4709	$1.4709	per 4CP kVA
Distribution System Charge	$3.118137	$3.118137	per Billing kVA

The following charges are applicable to both the Standard Class and the Subclass Exception

II.	**System Benefit Fund:**	See Rider SBF
III.	**Transition Charge:**	See Schedules TC, TC2, TC3 and SRC
IV.	**Nuclear Decommissioning Charge:**	See Rider NDC
V.	**Transmission Cost Recovery Factor:**	See Rider TCRF

VI.	**Excess Mitigation Credit:**		Not Applicable
VII.	**State Colleges and Universities Discount:**		See Rider SCUD
VIII.	**Competition Transition Charge:**		See Rider CTC
IX.	**Competitive Metering Credit:**		See Rider CMC
X.	**Other Charges or Credits:**		
	A. Municipal Account Franchise Credit (see application and explanation below)	$(.002207)	per kWh
	B. Rate Case Expenses Surcharge		See Rider RCE
	C. Rider UCOS Retail Credit		See Rider RURC
	D. Advanced Metering System Surcharge		See Rider AMS
	E. Accumulated Deferred Federal Income Tax Credit		See Rider ADFITC

COMPANY SPECIFIC APPLICATIONS

DETERMINATION OF BILLING DEMAND FOR TRANSMISSION SYSTEM CHARGES

Determination of NCP kVA The NCP kVA applicable under the Monthly Rate section shall be the kVA supplied during the 15 minute period of maximum use during the billing month.

Determination of 4 CP kVA The 4 CP kVA applicable under the Monthly Rate section shall be the average of the Retail Customer's integrated 15 minute demands at the time of the monthly ERCOT system 15 minute peak demand for the months of June, July, August and September of the previous calendar year. The Retail Customer's average 4CP demand will be updated effective on January 1 of each calendar year and remain fixed throughout the calendar year. Retail Customers without previous history on which to determine their 4 CP kVA will be billed at the applicable NCP rate under the "Transmission System Charge" using the Retail Customer's NCP kVA.

DETERMINATION OF BILLING DEMAND FOR DISTRIBUTION SYSTEM CHARGES

Determination of Billing kVA The Billing kVA applicable to the Distribution System Charge shall be the higher of the NCP kVA for the current billing month or 80% of the highest monthly NCP kVA established in the 11 months preceding the current billing month (80% ratchet). The 80% ratchet shall not apply to seasonal agricultural Retail Customers.

OTHER PROVISIONS

Secondary Service Greater Than 10 kVA. This Rate Schedule is applicable only to Retail Customers whose peak demand for the current month is greater than 10 kVA, as measured in the fifteen minute period of highest demand, or whose peak demand exceeded 10 kVA in any of the previous eleven months, and that otherwise qualify under this Rate. This Rate Schedule is applicable to Delivery Service provided for Electric Power and Energy supplied by Retail Customer's REP for Temporary service subject to provisions of Section 6.1.2.2, Construction Services. The Electric Power and Energy delivered may not be re-metered or sub-metered by the Retail Customer for resale except pursuant to lawful sub-metering regulations of Applicable Legal Authorities. Retail Customer's previous metered usage under this or any other Rate Schedule will be used, as needed, in determining the billing determinants under the Monthly Rate section.

Subclass Exception. The Subclass Exception is applicable only to Retail Customers who otherwise qualify for the Secondary Service Greater Than 10 kVA rate schedule and either: (1) whose highest NCP kVa for the most recent 12 months is equal to or less than 50 kVA; or (2) whose highest NCP kVa for the most recent 12 months is greater than 50 kVA but less than or equal to 400 kVA and whose load factor was less than or equal to 10% for each of the most recent 12 months. The most recent 12 months ends with and includes the current month. The monthly load factor is determined as follows:

load factor = billing kWh for the month/ (NCP kVA X number of days in billing period X 24)

Service Voltages. Company's standard service voltages are described in 6.2.2, Standard Voltages and in the Company's Service Standards.

Municipal Account Franchise Credit. A credit equal to the amount of franchise fees included in the Transmission and Distribution Charges will be applied to municipal accounts receiving service within the incorporated limits of such municipality which imposes a municipal franchise fee upon the Company based on the kWh delivered within that municipality and who have signed an appropriate Franchise Agreement.

CenterPoint Energy Houston Electric, LLC
Applicable: Entire Service Area

CNP 8017

Adjustment To The Charges Applied To Retail Customer's Demand Measurement If data to determine the Retail Customer's *Demand Measurement* becomes no longer available, the Company will determine a *Conversion Factor* which will be used as an adjustment to all per unit charges that will then be applied to the *New Demand Measurement*. *Demand Measurement* shall include the Billing kVA, the 4 CP kVA, NCP kVA or any other demand measurement required for billing under this Rate Schedule or any applicable rider(s) or any other applicable schedule(s). *New Demand Measurement* shall be the billing determinants which replace the *Demand Measurement*. The *Conversion Factor* will apply to unit prices per kVA such that when applied to the *New Demand Measurement*, the revenue derived by the Company under demand based charges shall be unaffected by such lack of data.

This adjustment may become necessary because of changes in metering capabilities, such as, Meters that record and /or measure kW with no ability to determine kVA or Meters which meter data in intervals other than 15 minutes. This adjustment also may become necessary due to changes in rules, laws, procedures or other directives which might dictate or recommend that Electric Power and Energy, electric power related transactions, wire charges, nonbypassable charges and/or other transactions measure demand in a way that is inconsistent with the definitions and procedures stated in the Company's Tariff. This adjustment is applicable not only in the instances enumerated above but also for any and all other changes in *Demand Measurement* which would prevent the Company from obtaining the necessary data to determine the kVA quantities defined in this Rate Schedule, applicable Riders and other applicable schedules.

The Conversion Factor shall render the Company revenue neutral to any change in *Demand Measurement* as described above.

NOTICE
This Rate Schedule is subject to the Company's Tariff and Applicable Legal Authorities.

APPENDIX III - PRELIMINARY ENERGY ASSESSMENT SERVICE AGREEMENT

SECO
State Energy Conservation Office

Local Governments and Municipalities

Preliminary Energy Assessment
Service Agreement

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

Description of the Service

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

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

Principles of the Agreement

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

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

Acceptance of Agreement

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

Signature: [signature] Date: 8/20/10

Name (Mr./Ms./Dr.) William P. Yenne Title: City Manager

Organization: City of Lake Jackson Phone: (979) 415-2500

Street Address: 25 Oak Drive Fax: (979) 297-8823

Mailing Address: Lake Jackson, TX 77566 E-Mail: wyenne@lakejacksontx.gov

County: Brazoria

Contact Information:

Name (Mr./Ms./Dr.): Modesto Mundo Title: Assistant City Manager

Phone: (979) 415-2405 Fax: (979) 297-8823

E-Mail: mmundo@lakejacksontx.gov County: Brazoria

Please sign and mail or fax to: Stephen Ross, **Local Governments and Municipalities** Program Administrator, State Energy Conservation Office, 111 E. 17th Street, Austin, Texas 78774. Phone: 512-463-1770. **Fax 512-475-2569.**

AND ALSO to your SECO Contractor: Energy Systems Associates, Attn: Yvonne Huneycutt. Phone: 512-258-0547. **Fax: 512-388-3312**

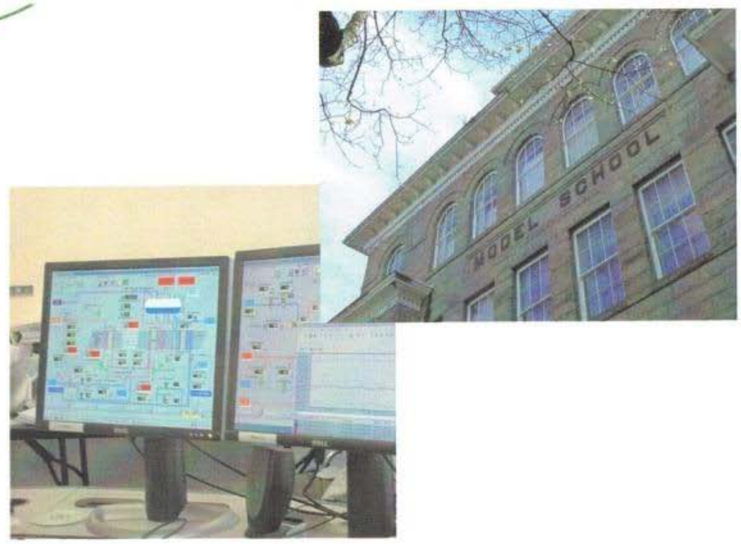
APPENDIX IV - TEXAS ENERGY MANAGERS ASSOCIATION (TEMA)

ANNOUNCING!

TEMA

TEXAS ENERGY MANAGERS ASSOCIATION

A PROFESSIONAL ASSOCIATION FOR THOSE RESPONSIBLE FOR ENERGY MANAGEMENT IN TEXAS PUBLIC FACILITIES



- Networking
- Sharing Knowledge and Resources
- Training Workshops
- Regional Meetings
- Annual Conference
- Certification
- Legislative Updates
- Money-Saving Opportunities

WWW.TEXASEMA.ORG

Check the website for Membership and Association information.

SECO
State Energy Conservation Office

APPENDIX V - UTILITY CHARTS ON CD