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Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

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SECO
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Table of Contents

1.0 EXECUTIVE SUMMARY 3

2.0 ENERGY ASSESSMENT PROCEDURE 5

3.0 ENERGY PERFORMANCE INDICATORS 6

4.0 RATE SCHEDULE ANALYSIS 8

5.0 CAMPUS DESCRIPTIONS 10

A. CITY HALL 10

B. POLICE ADMINISTRATION BUILDING 12

C. MUNICIPAL COURT BUILDING 12

D. COMMUNITY CENTER 14

6.0 RECOMMENDATIONS 16

A. MAINTENANCE AND OPERATIONS PROCEDURES 16

B. CAPITAL EXPENSE PROJECTS 19

C. SUMMARY TABLE 20

7.0 FINANCIAL EVALUATION 21

8.0 GENERAL COMMENTS 22

APPENDICES 23

APPENDIX I - SUMMARY OF FUNDING AND PROCUREMENT OPTIONS 24

SUMMARY OF FUNDING OPTIONS FOR CAPITAL EXPENDITURE PROJECTS 25

SUMMARY OF PROCUREMENT OPTIONS FOR CAPITAL EXPENDITURE PROJECTS 26

APPENDIX II - ELECTRIC UTILITY RATE SCHEDULES 31

APPENDIX III - PRELIMINARY ENERGY ASSESSMENT SERVICE AGREEMENT 36

APPENDIX IV - TEXAS ENERGY MANAGERS ASSOCIATION (TEMA) 38

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**.

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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, 2010, **SECO** received a request for technical assistance from *Mr. Joe Soto*, Mayor of the City of South Houston. **SECO** responded by sending ESA **Energy Systems Associates, Inc.**, a registered professional engineering firm, to prepare this preliminary report for the school district. This report is intended to provide support for the district 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 the **City of South Houston,** 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. Allen Munz,* a walk-through energy analysis was conducted throughout the 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.

We estimate that as much as **$2,980** may be saved annually if all recommended projects are implemented. The estimated installed cost of these projects should total approximately **$11,900**, yielding an average simple payback of **4** years.

SUMMARY:	IMPLEMENTATION COST	ESTIMATED SAVINGS	SIMPLE PAYBACK
HVAC ECRM #1	$6,000	$1,000	6 Years
Lighting ECRM #1	$3,450	$575	6 Years
Controls ECRM #1	$750	$645	14 Months
Controls ECRM #2	$500	$460	13 Months
Envelope ECRM #1	$1,200	$300	4 Years
TOTAL PROJECTS	**$11,900**	**$2,980**	**4 Years**

The total projected savings is $2,980. 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 the **City of South Houston**. 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 school districts and determine which elements could best benefit the district. 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 South Houston, 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. Analyzing 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 South Houston

Facility	Energy Utilization Index (EUI) BTUs/sf-yr	Energy Cost Index (ECI) $/sf-yr
Municipal Court	**78,593**	**2.54**

The electricity and gas consumption charts for the City of South Houston Municipal Court House:

OWNER: **City Of South Houston** **BUILDING:** **Court House**

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	2008	1,787	27	27	$173	$196	6.4	$80
FEBRUARY	2008	2,904	18	18	$140	$319	12.7	$141
MARCH	2008	3,193	18	18	$143	$344	2.1	$39
APRIL	2008	3,670	18	18	$144	$417	0.2	$21
MAY	2008	4,846	18	18	$147	$558	0.1	$20
JUNE	2008	6,173	29	29	$197	$729	0.0	$19
JULY	2008	6,760	26	26	$199	$846	0.0	$19
AUGUST	2008	8,057	29	29	$202	$1,006	0.0	$19
SEPTEMBER	2008	7,897	27	27	$185	$882	0.6	$25
OCTOBER	2007	8,012	26	26	$192	$988	0.0	$19
NOVEMBER	2007	5,591	27	27	$183	$580	0.4	$23
DECEMBER	2007	6,276	27	27	$185	$668	2.0	$38
TOTAL		**65,166**	**290**	**290**	**$2,090**	**$7,533**	**24.5**	**$463**

Annual Total Energy Cost =	$7,996	Per Year	**Energy Use Index:** Total Site BTU's/yr / Total Area (sq.ft.)	78,593	BTU/s.f.yr
Total KWH x 0.003413 =	222.41	x 106			
Total MCF x 1.03 =	25.24	x 106	**Energy Cost Index:**		
Total Other x ____		x 106	Total Energy Cost/yr	$2.54	$/s.f. yr

The district has two electricity providers; Reliant Energy and TXU Energy. Transmission and Distribution is provided by CenterPoint Energy. Copies of the electric rate schedules are included in Appendix II.

4.0 RATE SCHEDULE ANALYSIS

REP : TXU Energy and Reliant Energy (Varies by Account)

Rate Schedule Demonstrated on TXU Billings:

Customer Charge	=	$15.00
Energy Charge	=	$0.025 per kWh
Power Cost	=	varies

Rate Schedule Demonstrated on Reliant Billings:

Energy Charge (first 3835 kWh)	=	$0.0600 per kWh
Energy Charge (all additional kWh)	=	$0.0350 per kWh
Fuel Cost (varies per month)	=	$0.0771 per kWh

Transmission and Distribution : CenterPoint Energy

Rate Schedule Demonstrated on Billings:

Competition Transition Charge 2	=	$1.18
Franchise Fee Adjustment	=	$17.91 CR
Delivery Point	=	$17.07
Transition Charge	=	$0.40517241 per kVa
Nuclear Decommissioning	=	$0.01206897 per kVa
Transmission Charge Recovery Factor	=	$0.16689655 per kVa
System Benefit Fund	=	$5.33
Transition Charge (TC2)	=	$19.90
Transition Charge (TC3)	=	$7.94
Utility Service Quality	=	$0.01241379 CR
Distribution Charge (DUOS)	=	$3.13275862 per kVa
Transmission Charge (TUOS)	=	$1.10275860 per kVa

Average Savings for consumption determined from billings

= ($0.0600) + ($0.0771) <u>*or*</u> ($0.0350 + $0.0771)

= **$0.1371 per kWh for first 3,385 kWh; $0.1121 for all kWh thereafter**

Average Savings for demand

= ($0.40517241) + ($0.01206897) + ($0.16689655) + ($3.13275862) + ($1.10275860)

= **$4.82 per kVa**

CenterPoint Energy

Rate schedule unavailable: average cost for the commodity determined through utility billings.

Cost for Natural Gas purchased during billing cycle:	$9,177
Gas Service Charge per Meter:	$19.77 per month
	$237.24 per year
Number of Meters:	4

Total Cost of Natural Gas Commodity during billing cycle = $9,177 – (4 meters X $237 per meter) = $8,229

Quantity of Natural gas purchased during billing cycle by NISD: 886 mcf

Average cost per mcf = Total Cost / Quantity Purchased = $8,229 / 886 mcf = $9.29 / mcf

Average Commodity Cost Savings per mcf = $**9.29 / mcf**

5.0 CAMPUS DESCRIPTIONS

The **City of South Houston**, located in Harris County Texas, owns four buildings that were surveyed for this report. The buildings include a City Hall, Police Administration building, Municipal Court building, and Community Center. The buildings are generally operated during normal business hours except for the Police building which operates 24 hours a day 7 days a week and the community center which is occasionally opened for nighttime events. The population of the city is approximately 16,000 persons.

A. CITY HALL

City Hall is a brick-faced building on a concrete slab with a low-slope roof. The building encompasses approximately 4,424 square feet. The City will soon receive grant money to renovate the City Hall HVAC system and implement other energy saving measures. The single-pane windows are well sealed.

HVAC & Control System Description:

The building is conditioned by two split systems utilizing natural gas heating and electric DX cooling. The condensing units are pad-mounted at the exterior of the building. One air handling unit is located in an interior mechanical room while the other is located above the conference room ceiling plenum. Supply air distribution is accomplished by ductwork above the ceiling and return air distribution is passively transferred between spaces and ultimately through a sidewall grill between the mechanical room and adjacent lobby hallway.

Figure 1 : Damaged refrigerant line insulation.

The condensing units were manufactured in 2007-2008 and are in good working condition. The refrigerant line between the units and the building has damaged insulation as seen in Figure 1. The lack of insulation integrity allows the refrigerant to absorb heat from the ambient air and reduces its ability to absorb heat from the interior space. W*e recommend that the City replace the refrigerant line insulation to improve the operating efficiency of this unit.*

During the survey of the mechanical room, some air leaks were detected where conduit enters the duct insulation, as shown in figure 2, and between the seams of the Air Handling Unit (AHU) cabinet. These leaks reduce the ability for the AHU to deliver conditioned air to the perimeter zones of the building. *We recommend the City seal the ductwork insulation leaks and the seams of the AHU cabinet.*

Figure 2 : Leak in mechanical room ductwork.

It was noted during the survey that most of the return air supplied to the AHU comes through a grill between the mechanical room and adjacent hallway. This configuration does not allow sufficient return airflow to the AHU unless all office doors are opened. Consequently, offices with closed doors become positively pressurized which reduces airflow from their supply ducts. Additionally, the lobby becomes negatively pressurized and must draw in outside air through door and window seams to allow sufficient return airflow to the AHU. This results in uneven temperatures throughout the building. *We recommend relocating the Air Handling Unit above the ceiling and renovating the ductwork to appropriately balance the supply and return airflow in each room.* When renovating ductwork, it is not recommended to use flexible ductwork for distances greater than 6 feet as the ductwork tends to become crimped and block airflow into the spaces.

It was noted during the survey that the thermostat in the conference room is located in a stagnant corner of the room. *We recommend this thermostat be relocated to the wall below the return air grill*. This will put the thermostat in the return air stream and increase its ability to properly sample the room air temperature.

The building is controlled by two conventional thermostats. *We recommend these be replaced by programmable thermostats*. This will allow the building to run on a more efficient HVAC schedule and ensure that all units are turned off each night.

It was also noted that the City uses spun fiberglass filters in the AHU. *We recommend these filters be replaced with pleated filters.* Pleated filters provide improved indoor air quality and greater protection for the HVAC equipment than spun fiberglass filters.

Lighting System Description:

The building uses a combination of T12 and T8 fixtures with most of the T12 fixtures being located in the Water Department office. The T12 lamps and magnetic ballasts are no longer being manufactured and in combination with the energy saving opportunities available, *we recommend retrofitting the T12 fixtures with T8 lamps and electronic ballasts.* In addition, the measure will assist the City to comply with Senate Bill 300, in which local government facilities have been mandated to install the most efficient lamps and ballasts possible in their existing fixtures.

It was also noted during the survey that many of the interior rooms are over-lit as compared to the Illumination Engineering Society of North America's (IESNA's) guidelines for office spaces. *Therefore, we recommend de-lamping fixtures by 1- to 2 lamps to maintain appropriate lighting levels and reduce lighting energy consumption.* Offices spaces are generally considered appropriately illuminated when they demonstrate 30 foot-candles in the general space and 50 foot-candles in the task areas. The offices in City Hall demonstrated between 80 and 160 foot-candles.

There are 5 each 25-watt recessed can lights at the cashier's window. Since these lights are serving areas already supplied with abundant natural daylight and since they produce a significant amount of heat that must be overcome by the HVAC system, *we recommend turning these lights off during daylight hours.* There is another recessed fixture over the sink which *we recommend be replaced with a F17T8 fixture.*

Building Envelope Description:

The building has a number of single pane windows in the inspection department office that allow significant solar heat gain. *We recommend the City install awnings over these windows or have the windows tinted to reduce solar heat gain.*

A natural gas water heater provides hot water to the building. It was noted during the survey that insulation at the water heater is missing from the hot water piping, as shown in figure 3. *The majority of the energy losses in a hot water system occur through the hot water piping, therefore we recommend replacing this insulation.*

Figure 3 : Lack of insulation at hot water piping.

B. POLICE ADMINISTRATION BUILDING

The Police Administration Building is metal building on a concrete slab with a low-sloped roof. The building encompasses approximately 13,000 square feet. The city has initiated plans to build a new police station building. The current building will either be demolished or completely renovated.

Lighting System Description:

The building uses a combination of T12 and T8 fixtures. As is the case for the City Hall, *we recommend retrofitting the T12 fixtures with T8 lamps and electronic ballasts.* The T8 fixtures produce approximately 18% more light while consuming about 20% less energy than the T12 fixture components.

C. MUNICIPAL COURT BUILDING

The Municipal Court Building is a brick-faced building on a concrete slab with a low-slope roof. The building encompasses approximately 3,151 square feet and was constructed in 1967.

HVAC & Control System Description:

The building is conditioned by three split systems utilizing natural gas heating and electric DX cooling. The condensing units are pad-mounted at the exterior of the building and include two Ruud units and one Goodman unit manufactured in 2008, 2003, and 1998, respectively. The Goodman unit is nearing the end of its useful life-expectancy of 15-20 years. The City should plan to replace this unit in about 3-4 years.

Figure 4 : Condensate flooding.

It was noted that there is a significant condensate flooding problem around the condensing units at the back of the building as seen in figure 4. Since some electrical wiring is exposed and susceptible to contact with the pooled condensate water, *we recommend piping the condensate water to a nearby underground drain for safety purposes and to eliminate an area likely favoring mosquito development.*

During the survey, it was noted that some of the return grilles have been sealed off or are partially blocked by boxes. In addition, many of the return grilles have very dirty filters or no filters at all. Dirty air filters starve the Air Handling Units for return air and increase the likelihood a coil will freeze. *We recommend the City open all blocked return grilles, install pleated air filters in all return grilles, and increase the frequency of filter replacement.*

It was also noted during the survey that the building was generally very cold. One of the thermostats was set to 66°F. Since raising the thermostat by 1°F can reduce cooling energy consumption by as much as 3%, *we recommend that the cooling setpoint temperature be raised to 73°F.* Another thermostat was located by the restrooms away from any return grilles. *We recommend relocating this thermostat nearby a return grille.* This will allow the thermostat to make more accurate temperature readings which will improve HVAC system efficiency.

Figure 5 : Missing weatherstripping between doors.

Building Envelope Description:

Some of the building's exterior doors are missing weatherstripping, such as the main entrance shown in figure 5. This allows air to flow freely between the inside and outside of the building. *We recommend the weatherstripping be replaced as needed.*

D. COMMUNITY CENTER

The Community Center is a brick-faced building on a concrete slab with a moderately slope roof. The building encompasses approximately 17,568 square feet.

HVAC & Control System Description:

The building is heated and cooled by three split systems utilizing natural gas heating and electric DX cooling. The condensing units are pad-mounted at the exterior of the building. The condensing units were manufactured in 2001, 2003, and 2005. It was noted during the survey that the coil fins on the condensing units were covered in dirt as shown in figure 6. This reduces the units' efficiency as the dirt inhibits air circulation over the coils. *We recommend these units be cleaned regularly.*

Figure 6 : Coil fins covered in dirt.

It was also noted during the survey that one of the unit's fans was spinning backwards. This can be caused by having two legs of the three phase conductors being connected to the incorrect terminals. *We recommend the City have a HVAC technician inspect the wiring on this unit to ensure the fan is turning the correct direction.* The unit will operate with the fan turning backwards, but the ability of the unit to dissipate heat to the atmosphere is diminished and will not offer comfort in the space conditioned by the unit.

The air handling units (AHUs) in the second floor mechanical room were noted to have very dirty coils. It was also noted that a return air booster fan has been added to the system indicating a shortage of return air to the AHUs. Both of these problems are likely related to poor return air flow to the units. The return air grilles in the building are covered with dirt and no filters were found in the AHUs. *We recommend the City clean all AHU coils and return air grilles. We further recommend the City increase the frequency of filter replacement and utilize pleated filters as a facility standard.* This will increase air flow to the AHUs and improve air quality in the building.

The AHU also has significant leaks of conditioned air at the ductwork connections. The loss of cooled air to the attic reduces the ability for the unit to distribute conditioned air to the perimeter zones. *We recommend the City seal the connections between the air handling unit and supply ductwork.*

The split systems are currently controlled by a mixture of conventional and programmable thermostats. *We recommend replacing the conventional thermostats with new programmable units.* The operating hours for the building can be programmed to eliminate after-hour HVAC operation.

Figure 7: Ductwork leaking conditioned air

Lighting System Description:

The building uses a combination of T12 and T8 lamps with most T12 lamps being on the second story. W*e recommend retrofitting the T12 fixtures with T8 lamps and electronic ballasts.*

The building has 2 vending machines with no energy controls installed. *We recommend the City consider installing vending misers on this equipment.* Vending misers utilize occupancy sensors to turn off the advertising light fixtures in the units as well as cycle the compressor when no activity is detected in the area. During periods of inactivity, the compressor is cycled to not allow the temperature of the items in the vending machine to exceed a programmed temperature, but also not be required to run 100% of the time.

Figure 8 : Missing weatherstripping under door.

Building Envelope Description:

Some of the building's exterior doors are missing weatherstripping, such as the entrance shown in figure 8. This allows air to flow freely between the inside and outside of the building. *We recommend the weatherstripping be replaced as needed.*

6.0 RECOMMENDATIONS

A. MAINTENANCE AND OPERATIONS PROCEDURES

HVAC

- Replace damaged and missing refrigerant line insulation at the split systems at City Hall.
- Seal leaks in air handling unit cabinet and ductwork at City Hall and Community Center buildings.
- Relocate thermostat to below return air grill at City Hall and Municipal Court building.
- Replace spun fiberglass filters with pleated filters at City Hall.
- Re-pipe condensate to nearby gutter drain at Municipal Court building.
- Open blocked return grilles, install pleated air filters in all return grilles, and have these filters replaced regularly at Municipal Court building.
- Raise thermostat temperature at Municipal Court building.
- Clean condensing units at Community Center.
- Ensure all condensing units are working properly at Community Center.
- Clean all AHU coils and return air grilles at Community Center, install pleated air filters in all return air grilles, and have these filters replaced regularly.

Lighting

- De-lamp office fixtures by 1 to 2 lamps at City Hall.
- Turn off puck lights at City Hall cashier's window during daylight hours.

Building Envelope

- Replace hot water piping insulation at hot water heater in City Hall.
- Replace damaged or missing weatherstripping at Municipal Court and Community Center buildings.

Maintenance and Operation procedures (M&O) are strategies that can offer significant energy savings potential, yet require little or no capital investment by the district 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
It was noted that some of the City Hall condensing units' refrigerant line insulation was damaged or missing. This condition allows the refrigerant to absorb heat from the ambient air and minimizes the ability for the refrigerant to absorb heat from the interior space as desired.

HVAC M&O #2
Significant air leaks were noted at air handling unit cabinets and ductwork in the City Hall and Community Center. Air leaks limit the unit's ability to propel conditioned air through the building. The air handler cabinet and ductwork should be sealed.

HVAC M&O #3
Thermostats in the City Hall and Municipal Court buildings are located out of the direct path of the return air. This limits their ability to accurately read the room temperature. We recommend relocating these thermostats to below a return air grille.

HVAC M&O #4
Pleated filters offer improved indoor air quality and protection for the air handler.

HVAC M&O #5
Condensate at the Municipal Court building is flooding the area near the condensing units. Submerged electrical wiring makes this a potentially dangerous issue. We recommend re-piping the condensate to a nearby gutter drain to eliminate flooding.

HVAC M&O #6
Some of the return air grilles at the Municipal Court building have been blocked by boxes or other obstructions which need to be removed. Pleated air filters also need to be installed at these grilles to improve air quality and prolong air handler life.

HVAC M&O #7
The Municipal Court building thermostat was noted to be set at 66°F. Since raising the thermostat by 1°F can reduce cooling energy consumption by as much as 3%, we recommend that the cooling setpoint temperature be raised to 73°F.

HVAC M&O #8
During the survey, the condensing units at the Community Center were covered with dirt. These units need to be cleaned to prolong their life and improve their ability to transfer heat with the environment.

HVAC M&O #9
It was noted that one of the Community Center condensing unit fans was rotating backwards. We recommend that the City have this condensing unit examined to ensure that it is working properly.

HVAC M&O #10

The cooling coils at the Community Center air handling units are covered in dirt due to insufficient filtering. The coils and return air grilles throughout the building require cleaning. We also recommend installing pleated air filters at all return air grilles and replacing them regularly.

Lighting M&O #1

The lighting in City Hall offices was noted to be exceptionally bright. Removing 1 or 2 lamps from each fixture will reduce energy consumption and lower office brightness to the standard 30 foot-candles in general space and 50 foot-candles in task areas established by the Illumination Engineering Society of North America's (IESNA's) guidelines for office spaces.

Lighting M&O #2

Five puck lights at the City Hall cashier's window should be turned off during daylight hours due to their proximity to natural light from the nearby windows. This will reduce unnecessary energy consumption and heat gain in the space.

Building Envelope M&O #1

The hot water heater at City Hall was noted to be missing insulation on its hot water piping. Since the majority of the energy losses in a hot water system occur through the hot water piping, we recommend replacing this insulation.

Building Envelope M&O #2

Missing weatherstripping at exterior doors allows outside air to flow freely into the building. We recommend all weatherstripping be replaced as needed, particularly at the Municipal Court and Community Center buildings where the weatherstripping was noted to be damaged.

B. CAPITAL EXPENSE PROJECTS

HVAC	•Relocate City Hall air handling unit and furnace above ceiling. Renovate ductwork to balance supply and return air in each room.
Lighting	•Retrofit older T12 fixtures with T8 lamps and ballasts at City Hall, Police Building and Community Center. •Install vending misers at Community Center.
Controls	•Replace conventional thermostats with programmable thermostats at City Hall and Community Center. •Install vending misers at Community Center.
Envelope	•Install solar film or awnings at City Hall inspection center windows.

HVAC ECRM #1 – relocate AHU, renovate ductwork

The Air Handling Unit at City Hall should be relocated above the ceiling to allow for easier maintenance and an improved ductwork configuration throughout the building.

Estimated Installed Cost	=	$ 6,000
Estimated Energy Cost Savings	=	$ 1,000
Simple Payback Period	=	6 years

LIGHTING ECRM #1 – retrofit T12 fixtures

There are T12 fixtures that we recommend be retrofitted with T8 lamps and electronic ballasts. The new components produce approximately 18% more light while consuming about 20% less energy.

Estimated Installed Cost	=	$ 3,450
Estimated Energy Cost Savings	=	$ 575
Simple Payback Period	=	6 years

Controls ECRM #1 – install programmable thermostats

The City Hall and Community Center currently use some conventional non-programmable thermostats. We recommend the City install programmable thermostats for units that operate on a predictable occupancy schedule

Estimated Installed Cost	=	$ 750
Estimated Energy Cost Savings	=	$ 645
Simple Payback Period	=	14 months

Controls ECRM #2 – install vending misers

These devices utilize occupancy sensors to turn off advertising lighting and cycle compressors when no occupancy is detected in the area.

Estimated Installed Cost	=	$ 500
Estimated Energy Cost Savings	=	$ 460
Simple Payback Period	=	13 months

Envelope ECRM #1 – Install Reflective Solar Film or Awnings

The south side of the City Hall building, particularly the inspection department, is exposed to a significant amount of solar heat. We recommend installing awnings to reduce the heat gain through the windows.

Estimated Installed Cost	=	$ 1,200
Estimated Energy Cost Savings	=	$ 300
Simple Payback Period	=	4 years

C. SUMMARY TABLE

If the City of South Houston was to implement all recommended M&O and ECRM projects (where M&O costs do not have an installation cost), the summary payback would be:

Estimated Installed Cost	=	$ 11,900
Estimated Energy Cost Savings	=	$ 2,980
Simple Payback Period	=	4 years

Should the district desire to implement the capital expense projects in stages and not all at once, we recommend the following implementation schedule:

1. Lighting ECRM #1	T12 lamps and ballasts are no longer being manufactured. The City should plan on retrofitting these fixtures with T8 lamps and electronic ballasts.
2. HVAC ECRM #1	Reconfiguring the AHU and ductwork will greatly improve occupancy comfort and energy efficiency in the building.
3. Controls ECRM #1	Programmable thermostats are more energy-efficient than conventional thermostats at controlling air conditioning units.
4. Controls ECRM #2	Vending machine controls will eliminate operation of the advertisement lighting and cycle the compressors during unoccupied hours.
5. Building Envelope ECRM #1	Installing awnings at the City Hall inspection department will reduce the cooling loads on the building and greatly increase comfort.

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. $150 maintenance expense next 5 years				
4. $300 maintenance expense last 5 years				
5. Savings decreases 3% per year after year 5				
Cash Flow	**Project Cost**	**Project Savings**	**Maintenance Expense**	**Net Cash Flow**
Time 0	($11,900)		0	($11,900)
Year 1		$ 2,980	0	$2,980
Year 2		$ 2,980	0	$2,980
Year 3		$ 2,980	0	$2,980
Year 4		$ 2,980	0	$2,980
Year 5		$ 2,980	0	$2,980
Year 6		$ 2,891	($150)	$2,741
Year 7		$ 2,801	($150)	$2,651
Year 8		$ 2,712	($150)	$2,562
Year 9		$ 2,622	($150)	$2,472
Year 10		$ 2,533	($150)	$2,383
Year 11		$ 2,444	($300)	$2,144
Year 12		$ 2,354	($300)	$2,054
Year 13		$ 2,265	($300)	$1,965
Year 14		$ 2,175	($300)	$1,875
Year 15		$ 2,086	($300)	$1,786
			Internal Rate of Return	**22.40%**

More information regarding financial programs available to CITY OF SOUTH HOUSTON 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, expressed 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:

They 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

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

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 SCHEDULES

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

RECEIVED JUN 0 2008

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) through its engineering consultants will analyze electric, gas and other utility data and work with The City of South Houston, 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 the Partner is ready and willing to consider implementing the energy savings recommendations.

Principals 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 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 identify no cost/low cost recommendations, Capital Retrofit Projects, potential sources of funding.
- Partner will schedule a time for SECO's contractor to make a presentation of the assessment findings and recommendations to key decision makers.

Acceptance Of Agreement

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

Signature: _____ Date: 05/22/2008

Name (Mr./~~Ms/Dr~~): Joe Soto Title: Mayor

Entity: City of South Houston Phone: 713-947-7700

Street Address: 1018 Dallas Street Fax: _____

Mailing Address: P.O. Box 238 E-mail: _____

South Houston TX 77587

CONTACT INFORMATION:

R.W. Patrick & Associates, Inc.

Name (Mr./~~Ms/Dr~~): Allen Munz Title: City Engineers

Phone: 713-941-4812 Ext. 307 Fax: 713-941-4817

E-Mail: allen@rwpatrick.com

Please Sign and mail or fax to the following SECO Consultant : Texas Energy Engineering Services, Inc. (TEESI), ATTENTION: Saleem 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. 17th Street, Austin, Texas 78774.

ESA 5/13/10 SF

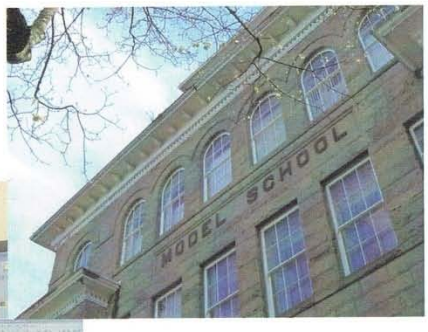
APPENDIX IV - TEXAS ENERGY MANAGERS ASSOCIATION (TEMA)

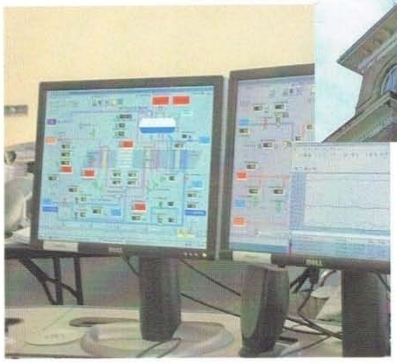
ANNOUNCING!

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