Susan Combs
Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

Prepared by:

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City of Santa Fe

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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**.

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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 October 2009, **SECO** received a request for technical assistance from *Mr. Joe Dickson & Ms. Diana Steelquist*, City Manager for the City of Santa Fe **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 Santa Fe** 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 *Ms. Steelquist,* 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.

We estimate that as much as **$47,530** may be saved annually if all recommended projects are implemented. The estimated installed cost of these projects should total approximately **$8,700**, yielding an average simple payback of **5-1/2** years.

SUMMARY:	IMPLEMENTATION COST	ESTIMATED SAVINGS	SIMPLE PAYBACK
Maintenance & Operations Procedures	$ 0	Not Estimated	n/a
HVAC ECRM #1 - City Hall	$ 18,000	$ 2,000	9
HVAC ECRM #1 - Police Department	$ 15,750	$ 1,750	9
HVAC ECRM #2 - City Hall, PD, and Community Center	$ 600	$ 1,200	0.5
Lighting ECRM #1 - City Hall	$ 2,500	$ 500	5
Lighting ECRM #1 - Police Department	$ 3,050	$ 760	4.01
Lighting ECRM #1 - Community Center	$ 800	$ 160	5
Lighting ECRM #1 - Library	$ 3,730	$ 830	4.49
Lighting ECRM #2 - Community Center	$ 400	$ 400	1
Lighting ECRM #3 - Library Exterior Restrooms	$ 200	$ 200	1
Plumbing ECRM #1 & #2	$ 400	$ 200	2
Special Equipment ECRM #1	$ 1,500	$ 400	3.75
Special Equipment ECRM #2	$ 600	$ 300	2
TOTAL PROJECTS	**$ 47,530**	**$ 8,700**	5.46

The total utility cost for the City of Santa Fe (the four buildings evaluated for this assessment) from May 2009 to April 2010 was $31,222. The projected savings of $8,700 would represent a decrease in utility expenditures for the municipality of 28%. 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 Santa Fe**. 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 Santa Fe, 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 Santa Fe

Facility	Energy Utilization Index (EUI) BTUs/sf-yr	Energy Cost Index (ECI) $/sf-yr
City Hall 5/2009 – 4/2010	**50,332**	**$1.18**
Webber Community Center 5/2009 – 4/2010	**53,742**	**$1.14**
Library 5/2009 – 4/2010	**62,722**	**$1.37**
Police Station 5/2009 – 4/2010	**113,708**	**$2.23**
Average of All Facilities 5/2009 – 4/2010	**70,458**	**$1.49**

The electricity and gas consumption charts for the City of Santa Fe facilities are as follows:

OWNER: The City Of Santa Fe **BUILDING:** City Hall

MONTH	YEAR	ELECTRIC CONSUMPTION KWH	DEMAND METERED KW/KVA	DEMAND CHARGED KW/KVA	COST OF DEMAND	TOTAL ALL ELECTRICAL COSTS $	NAT'L GAS / FUEL CONSUMPTION MCF	NAT'L GAS / FUEL COSTS $
JANUARY	2010	6,020		39		442	3	$47
FEBRUARY	2010	5,240		35		385	4	$64
MARCH	2010	4,210		35		303	2	$31
APRIL	2010	4,760		34		350	1	$22
MAY	2009	6,620		32		496	1	$20
JUNE	2009	7,520		35		1,066	1	$19
JULY	2009	8,720		35		654	1	$20
AUGUST	2009	8,800		35		660	1	$19
SEPTEMBER	2009	6,320		33		474	1	$20
OCTOBER	2009	5,840		29		437	1	$19
NOVEMBER	2009	3,520		26		264	1	$20
DECEMBER	2009	5,880		37		441	1	$23
TOTAL		**73,450**	**0**	**405**	**0**	**$5,972**	**18**	**$324**

Annual Total Energy Cost = $6,296 Per Year

Total KWH x 0.003413 = 250.68 x 106
Total MCF x 1.03 = 18.54 x 106
Total Other x ____ x 106
Total Site BTU's/yr 269.22 x 106

Floor area: 5,349 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 50,332 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $1.18 $/s.f. yr

OWNER: The City Of Santa Fe — BUILDING: Webber Center

MONTH	YEAR	ELECTRIC CONSUMPTION KWH	ELECTRIC DEMAND METERED KW/KVA	ELECTRIC DEMAND CHARGED KW/KVA	COST OF DEMAND	TOTAL ALL ELECTRICAL COSTS $	NAT'L GAS / FUEL CONSUMPTION MCF	NAT'L GAS / FUEL COSTS $
JANUARY	2010	5,240		28		375	1	20
FEBRUARY	2010	6,400		28		457	1	16
MARCH	2010	4,720		22		337	1	35
APRIL	2010	4,880		23		348	1	26
MAY	2009	5,560		22		405	1	20
JUNE	2009	6,600		22		482	1	22
JULY	2009	7,200		23		526	1	21
AUGUST	2009	7,800		24		569	1	21
SEPTEMBER	2009	6,360		29		464	1	21
OCTOBER	2009	5,720		27		417	1	21
NOVEMBER	2009	4,720		22		344	1	21
DECEMBER	2009	6,760		30		493	1	20
TOTAL		**71,960**	**0**	**300**	**0**	**$5,217**	**12**	**$265**

Annual Total Energy Cost = $5,482 Per Year

Total KWH x 0.003413 = 245.60 x 106
Total MCF x 1.03 = 12.36 x 106
Total Other x ____ x 106
Total Site BTU's/yr 257.96 x 106

Floor area: 4,800 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 53,742 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $1.14 $/s.f. yr

OWNER: The City Of Santa Fe — BUILDING: Library

MONTH	YEAR	ELECTRIC CONSUMPTION KWH	ELECTRIC DEMAND METERED KW/KVA	ELECTRIC DEMAND CHARGED KW/KVA	COST OF DEMAND	TOTAL ALL ELECTRICAL COSTS $	NAT'L GAS / FUEL CONSUMPTION MCF	NAT'L GAS / FUEL COSTS $
JANUARY	2010	6,840		40		503	0	$0
FEBRUARY	2010	5,560		40		408	0	$0
MARCH	2010	5,240		36		385	0	$0
APRIL	2010	6,000		40		440	0	$0
MAY	2009	12,000		44		899	0	$0
JUNE	2009	12,280		40		920	0	$0
JULY	2009	14,200		40		1,065	0	$0
AUGUST	2009	11,280		48		846	0	$0
SEPTEMBER	2009	8,240		40		618	0	$0
OCTOBER	2009	7,440		40		557	0	$0
NOVEMBER	2009	6,000		40		450	0	$0
DECEMBER	2009	6,400		36		480	0	$0
TOTAL		**101,480**	**0**	**484**	**0**	**$7,571**	**0**	**$0**

Annual Total Energy Cost = $7,571 Per Year

Total KWH x 0.003413 = 346.35 x 106
Total MCF x 1.03 = 0.00 x 106
Total Other x ____ x 106
Total Site BTU's/yr 346.35 x 106

Floor area: 5,522 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 62,722 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $1.37 $/s.f. yr

OWNER:	The City Of Santa Fe				BUILDING:		Police	
		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND			TOTAL ALL		
MONTH	YEAR	CONSUMPTION KWH	METERED KW/KVA	CHARGED KW/KVA	COST OF DEMAND	ELECTRICAL COSTS $	CONSUMPTION MCF	COSTS $
JANUARY	2010	10,640		24		743	16	192
FEBRUARY	2010	9,600		32		657	16	194
MARCH	2010	10,560		24		722	7	88
APRIL	2010	11,560		24		790	1	21
MAY	2009	15,280		32		1,066	1	0
JUNE	2009	15,280		28		1,066	1	17
JULY	2009	18,280		20		1,276	1	17
AUGUST	2009	16,440		40		1,148	1	18
SEPTEMBER	2009	15,200		16		1,061	1	19
OCTOBER	2009	14,440		16		1,007	1	19
NOVEMBER	2009	11,080		16		773	1	24
DECEMBER	2009	12,080		24		843	10	112
TOTAL		**160,440**	**0**	**296**	**0**	**$11,152**	**57**	**$721**

Annual Total Energy Cost =	$11,873	Per Year	**Energy Use Index:** Total Site BTU's/yr / Total Area (sq.ft.)	113,708 BTU/s.f.yr
Total KWH x 0.003413 =	547.58	x 106		
Total MCF x 1.03 =	58.71	x 106	**Energy Cost Index:**	
Total Other x ____		x 106	Total Energy Cost/yr / Total Area (sq.ft.)	$2.23 $/s.f. yr
Total Site BTU's/yr	606.29	x 106		
Floor area:	5,332	s.f.		

4.0 RATE SCHEDULE ANALYSIS

A. ELECTRICITY PROVIDER

Rate Schedule Unavailable: Average cost per kWh determined from utility billings.

Total Cost of Electricity purchased for City of Santa Fe: $29,912

Total kWh of Electricity purchased for City of Santa Fe: 407,330 kWh

Cost / Quantity **= Average Unit Cost** = $29,912 / 407,330 kWh = **$0.07343/mcf**

B. NATURAL GAS PROVIDER

Centerpoint

Rate Schedule Unavailable: Average cost per MCF determined from utility billings.

Total Cost of Natural Gas purchased for City of Santa Fe: $1,310

Total Quantity of Natural Gas purchased for City of Santa Fe: 87 mcf

Cost / Quantity **= Average Unit Cost** = $1,310 / 87 mcf = **$15.05/mcf**

5.0 CAMPUS DESCRIPTIONS

The City of Santa Fe, located in Galveston County, Texas, operates the following facilities that were assessed for this Report: City Hall, Police Department, Weber Community Center, and Library. The population of the city is approximately 9,450 persons.

Figure 1: City Hall exterior

A. CITY HALL

The City Hall building contains facilities for the Council, Mayor, and administration offices. The building is generally operated during normal business hours from 8 am to 5 pm.

City Hall is constructed of stucco over concrete block walls and a low-slope roof. The building has few exterior windows. The building was built in 1970 and contains 5,349 square feet of floor area, according to the Galveston County Appraisal District. On-site personnel report that the building is much older, built in the 1930's, previously used as a grocery store, and renovated in 1995.

HVAC & Control System Description:

City Hall is conditioned by three HVAC units. Two *Lennox Elite Series* split systems and one packaged RTU utilizing electric DX cooling. The *Lennox* systems have pad-mounted condensing units and air handling units (AHUs) are located in the mechanical room. They serve the central and western portions of the building. The RTU services the Council Chambers at the east side of the building.


Figure 2: City Hall pad-mounted condensing unit

The condensing units dated to 1984 and the RTU dated to 1982. These units are beyond their typical expected useful life (EUL) and are much less efficient than units manufactured today. The *Lennox* AHUs are approximately 3-years old, so the condensing units were apparently not replaced at the same time as the AHUs. *We recommend that the older condensing units be replaced with energy-efficient models.*

Some of the refrigerant line insulation (pipe foam) was notably damaged or missing. The damage to the insulation allows the refrigerant to absorb heat from the ambient air and limits its ability to absorb heat from the interior space as intended. If the units will not be immediately replaced, we *recommend that new refrigerant line insulation be added to these units.*

The air conditioning systems are currently controlled by non-programmable thermostats. *We recommend that new 7-day programmable thermostats be installed regardless of whether or* *not the new air conditioners are immediately installed.* The new thermostats can be programmed to the occupancy schedules of the staff and the council meetings.

Evidence of biological growth was observed around the supply air grilles. Although unrelated to energy use, *we recommend that the ducts be cleaned and a mold assessment be performed for concerns relating to indoor air quality.*

<u>Lighting System Description:</u>

The building uses approximately 50 ceiling-mounted fluorescent strip fixtures, each with four T12 lamps and magnetic ballasts. The T12 lamps and magnetic ballasts will no longer be manufactured after 2010 and in combination with the energy saving opportunities available, *we recommend retrofitting T12 system fixtures with T8 lamps and electronic ballasts.*

Figure 3: City Hall interior lighting

Exterior lights operate on a timer. Due to constantly-changing daylight schedules and the need for lighting during heavily-overcast days, *we recommend that the exterior lights be placed on photocells so they operate only during non-sunlit hours.*

<u>Plumbing and Water Heating System Description:</u>

A 30-gallon *A.O. Smith* gas water heater located in the exterior mechanical room provides hot water to the building. Adding insulation around the water heater will provide a small amount of savings due to heat loss, especially during the cold months because this unit is stored in an unconditioned space.

We also recommend adding foam pipe insulation around the hot water supply pipe that leads from the water heater to the fixtures. This will reduce heat loss through the pipe to the cooler air. If the hot water supply exits the water heater at 110° F and the surrounding air is 65° F, this represents a 45° F temperature difference insulated only by the pipe wall thickness.

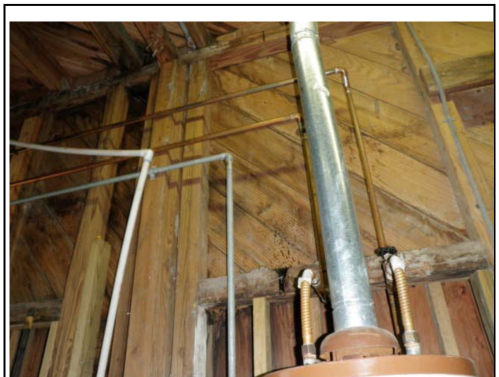


Figure 4: City Hall water heater piping

A freestanding refrigerated drinking fountain is located in the main hallway. The age of the appliance is unknown but it appears to be original. It is likely that the unit operates near 250 watts when running, costing upwards of $55 per year if running for just 5-hours out of the day. This small appliance can consume a large amount of electricity and consideration should be given to the benefit of its continued use. If it building management determine that the unit is not necessary, it should be removed. If a drinking fountain is still desired, it should be placed on a timer so that it does not cool water when the building is not occupied.

B. POLICE DEPARTMENT

The Police Department building is a wood framed structure with painted stucco siding and steep-slope metal roofing. The one- and two-story building was built in 1973 and contains approximately 5,332 square feet of conditioned floor area, according to the Galveston County Appraisal District. Due to staff requirements, the building is operated or occupied 24-hours a day, 7-days a week.

Figure 5: Police Department exterior

It was reported by the on-site maintenance staff that they were not making upgrades to the building because they were anticipating a replacement structure. However, the expected bond to replace the building did not go through and building repairs are now necessary.

HVAC & Control System Description:

The building is heated and cooled by five split-systems utilizing electric DX cooling with pad-mounted condensing units and air handling units (AHUs) located in interior closets. Two of the condensing units had nameplate data indicating age of 21 and 22 years. The other units were 11 (two each) and 5 years old. Approximately 17-tons of nominal cooling capacity is provided to the building. The units beyond 15 years of age are beyond their typical expected useful life (EUL) and are much less efficient than units manufactured today. *We recommend that the older air conditioning units be replaced with energy-efficient models.*

Some of the refrigerant line insulation (pipe foam) was notably damaged or missing. The damage to the insulation allows the refrigerant to absorb heat from the ambient air and limits its ability to absorb heat from the interior space as intended. If the units will not be immediately replaced, w*e recommend that new refrigerant line insulation be added to these units.*

The air conditioning systems are currently controlled by non-programmable thermostats. *We recommend that new 7-day programmable thermostats be installed regardless of whether or not the new air conditioners are immediately installed.* The new thermostats can be conservatively programmed to the general occupancy schedules of the full-time staff. Manual override temperature settings will allow for increased comfort when the building is occupied at unusual times (such as in jail cells or detective offices).

Figure 6: Biological growth around ceiling grille.

Evidence of biological growth was observed around the supply air grilles. Although unrelated to energy use, *we recommend that the ducts be cleaned, damaged ceiling tiles be replaced, and a mold assessment be performed for concerns relating to indoor air quality.*

Lighting System Description:

The building uses approximately 61 ceiling-mounted fluorescent strip fixtures, each with four T12 lamps and magnetic ballasts. Switching to T8 lamps will likely allow for the reduction of one lamp per fixture (three T8 lamps instead of four T12 lamps). The T12 lamps and magnetic ballasts will no longer be manufactured after 2010 and in combination with the energy saving opportunities available, *we recommend retrofitting T12 system fixtures with T8 lamps and electronic ballasts.*

Plumbing and Water Heating System Description:

A 30,000 Btu/hr gas water heater provides hot water to the building. The appliance is located in the kitchen; adding insulation around the water heater will provide a small amount of savings due to heat loss.

A freestanding refrigerated drinking fountain is located in the main hallway. This small appliance can consume a large amount of electricity and consideration should be given to the benefit of its continued use. If it building management determine that the unit is not necessary, it should be removed. If a drinking fountain is still desired, it should be placed on a timer so that it does not cool water when the building is not occupied.

Water piping at the rear of the building reportedly provides water to the jail cells. The pipes were observed to be leaking and should be repaired to prevent future water loss.

C. WEBER COMMUNITY CENTER

The Community Center is a wood framed structure with a moderately sloped tile roofing. The building was built in 1980 and contains approximately 4,800 square feet, according to the Galveston County Appraisal District.

Figure 7: Community Center exterior

The building is reportedly operated every day around lunch time from Monday through Friday, and it is also available for special events.

HVAC & Control System Description:

The building is conditioned by two split-systems utilizing electric DX cooling with pad-mounted condensing units and air handling units (AHUs) located in the attic. The units were manufactured in 2008, so replacement is not recommended. However, coils were observed to be very dirty, reducing the efficiency of the units. *We recommend that the coils be washed on a regular basis to keep them operating at optimum efficiency.*

The air conditioning systems are currently controlled by non-programmable thermostats. The temperature setpoint is reportedly changed quite dramatically by users of the facility, then not set back when not occupied. Because this building is typically operated only during the lunch hours of each day, it should be programmed to condition the building just before lunch and then cease operation afterwards, saving a significant amount of energy. *We recommend that new 7-day programmable thermostats with lock-out programming be installed.* The new thermostats can be programmed to the building occupancy schedule and locked-out to prevent tampering.

Figure 8: Dirty condensing unit fins at the Community Center.

Lighting System Description:

The building uses approximately 16 ceiling-mounted fluorescent strip fixtures with 2 to 4 T12 lamps per fixture. *We recommend retrofitting T12 system fixtures with T8 lamps and electronic ballasts.*

Seven HID exterior light fixtures are provided at the facility for nighttime security. They are currently on a timer that operates 13-hours per day (6 pm to 7 am). Because of the fluctuations in daylight times and due to the fact that the facility is not operated full time (hence no need for photocells), *we recommend installing an astrological timer clock for the facility that will operate from sunset to sunrise, based on the correct time of the year.* This will reduce the labor-hours required to manually change a conventional timer clock's settings.

Plumbing and Water Heating System Description:

The hot water supply pipes leading from the water heater do not have insulation around the pipes, exposing the thin pipes to the cooler ambient air. *We recommend adding foam pipe insulation around the hot water supply pipes.*

Building Envelope Description:

The hallway connecting the two meeting spaces was significantly warmer than the rest of the building. It was observed that the attic hatch at the ceiling of the hallway was open approximately 1-inch, letting the hot attic air enter the conditioned hallway space. *We recommend sealing and insulating the attic hatch to prevent future heat gain into the conditioned space, which causes the air conditioning system to run longer than necessary.*

Special Equipment Description:

A large gas stove in the kitchen area was observed to have standing pilot lights (meaning a flame is always present). This situation causes an excess amount of heat in the space and therefore, forces occupants to set the air conditioner at 70° F for normal comfort and the system reportedly runs constantly due to the heat load. *Replacing this stove with a newer model that does not have standing pilot lights* will: a) reduce natural gas usage and monthly gas costs; b) reduce the heat load in the kitchen, allowing the air conditioner to run less, extending the life of the air conditioner; and c) a reduction in air conditioner run time will reduce electricity usage and monthly electricity costs.

Vending machines act as a large refrigerator, but the items being cooled are typically not perishable items. Therefore, unless snack items will be served 24 hours a day, turning the vending machine off when not in use for long stretches of time will save on electricity costs and reduce the heat load in the space caused when the machine is running. *We recommend installing a vending miser in the two vending machines to regulate their operating hours to match that of the building occupants* (ie: turn off at night or on hours when no activities are planned).

D. LIBRARY

The Mae S. Bruce Library is a brick-faced building with a structural steel frame, low-slope roof, and concrete slab-on-grade. The building was built in 1982 and contains approximately 5,522 square feet, according to the Galveston County Appraisal District. On-site personnel report that the building was built in 1987 and contains approximately 6,400 square feet.

An exterior, freestanding restroom building is located in the park adjacent to the Library. It was constructed more recently and contains both a men's and women's restroom.

HVAC & Control System Description:

City Hall is heated and cooled by pad-mounted package and split systems utilizing electric DX cooling. The air handling units (AHUs) are located in an interior mechanical room. Distribution is by conventional ducted supply vents and a plenum return. All the air conditioners appear to be newer models that would not require replacement.

Lighting System Description:

The building uses ceiling-mounted fluorescent strip fixtures with T12 lamps and magnetic ballasts in the main Library area (approximately 73 each); T8 lamps and electronic ballasts in the Computer Lab; incandescent flood lights at the lobby and entrance (approximately 8 each); and T8 lamps in the exterior restrooms. The T12 lamps and magnetic ballasts will no longer be manufactured after 2010 and in combination with the energy saving opportunities available, *we*

Figure 9: Light on during the day at the Community Center.

recommend retrofitting the remaining T12 system fixtures with T8 lamps and electronic ballasts. Replacing the incandescent flood lamps with CFL bulbs will also provide energy savings.

The exterior restrooms have wall switches that operate the T8 fixtures. The lights were on when we visited the restrooms and the on-site maintenance staff reports that they are typically on 24-hours a day because users of the restroom do not turn them off. *We recommend installing occupancy sensors for the switching so the lights cannot be left on.*

Exterior wall-mounted light fixtures utilize HID bulbs. One of the fixtures was observed to be on during the daytime site visit. *We recommend installing (or repairing, if already installed) photocells on these fixtures so that they do not operate during daylight hours.*

Plumbing and Water Heating System Description:

A small, ceiling-hung electric water heater located in the mechanical room provides hot water to the building. Adding insulation around the water heater will provide a small amount of savings due to heat loss. The hot water supply pipes leading from the water heater do not have insulation around the pipes, exposing the thin pipes to the cooler ambient air. *We recommend adding foam pipe insulation around the hot water supply pipes*.

Building Envelope Description:

It was noted during the survey that the weatherstripping at the rear exterior doors was in need of replacement.

6.0 RECOMMENDATIONS

A. MAINTENANCE AND OPERATIONS PROCEDURES

Lighting	• Control exterior lights with timeclock or photocell, replace old photocells as required.
HVAC	• Comb and wash condensing unit fins when dirty. • Replace damaged and missing refrigerant line insulation. • Continue to switch "off" air conditioners or turn up the temperature when not in use during the cooling months. • Clean biological growth from ducts and around grilles.
Building Envelope	• Seal gap at attic hatch of the Community Center. • Replace weatherstriping where missing or damaged at exterior doors.
Plumbing	• Unplug or disconnect the cooling feature of electric water fountains. • Fix water leaks.

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.

Lighting System M&O #1
Exterior lights at the City Hall and Library currently operate on timers (or the photocells at the Library are defective) and were lit during daylight hours. Equipping these fixtures to photocells so they operate only at nighttime hours will save energy.

HVAC M&O #1
Condensing units with damage to, or dirt covering just 10% of the coil fins can lose as much as 30% of their operational efficiency as the units lose their ability to dissipate heat to the atmosphere. Combs to straighten damaged fins cost less than $10 and can usually restore most or all of the lost efficiency. Dirty filters also reduce efficiency and replacement with a new filter

will increase airflow and provide quicker cooling. Coils at the Community Center were especially dirty.

HVAC M&O #2
Damaged refrigerant line insulation (City Hall and Police Department) exposes the refrigerant line to the outside air, allowing it to absorb heat that reduces the efficiency of the system.

HVAC M&O #3
The best way to save energy with an air conditioning system is to turn it off when not in use. The next best energy-saving measure is to increase the temperature during cooling months and decrease the temperature during heating months.

HVAC M&O #4
Although not an energy issue, removing organic growth (potential mold or mildew) from the air conditioning system will lead to better occupant health. See the Police Station and City Hall.

Envelope M&O #1
Sealing and insulating the attic hatch at the Community Center will allow the air conditioners to cool the space quicker, saving on energy costs and equipment run-time.

Envelope M&O #2
The exterior rear door at the Library was observed to have missing or damaged weather-stripping. We recommend that any weatherstripping be replaced as necessary.

Plumbing M&O #1
Disconnecting the electricity from an electric water cooler (at the Police Station and City Hall) will provide less heat generated from the appliance and lower utility bills (savings noticed annually). If ice cold water is not necessary, or if the water cooler is not used, this should be considered. If the water cooler is still required, a timer should be installed so that it does not run when the building is not occupied.

Plumbing M&O #2
Water leaks behind the Police Station should be repaired.

B. CAPITAL EXPENSE PROJECTS

HVAC	•Replace older air conditioning systems with new, more energy efficient models. •Install 7-day programmable thermostats.
Lighting	•Retrofit older T12 fixtures with T8 fixtures. •Replace incandescent bulbs with CFL bulbs. •Install astrological timer clock for nighttime security lights. •Install occupancy sensor switches.
Plumbing	• Install insulating blanket around water heaters. • Install pipe insulation around hot water supply pipes.
Special Equipment	•Replace old stove that has a standing pilot light. •Install vending miser at vending machines.

HVAC ECRM #1 – City Hall

There two units beyond 30 years old that will fail soon. These units total approximately 8.0 tons of nominal cooling capacity. If replaced this year, the project budget would likely be the following:

Estimated Installed Cost	=	$ 18,000
Estimated Energy Cost Savings	=	$ 2,000
Simple Payback Period	=	9 years

HVAC ECRM #1 – Police Department

There two units beyond 30 years old that will fail soon. These units total approximately 7.0 tons of nominal cooling capacity. If replaced this year, the project budget would likely be the following:

Estimated Installed Cost	=	$ 15,750
Estimated Energy Cost Savings	=	$ 1,750
Simple Payback Period	=	9 years

HVAC ECRM #2 – City Hall, Police Station, and Community Center

Installing 7-day programmable thermostats will provide added comfort and savings for the facility.

Estimated Installed Cost	=	$ 600
Estimated Energy Cost Savings	=	$ 1,200
Simple Payback Period	=	0.5 year

LIGHTING ECRM #1 – City Hall

There are approximately 50 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. If the fixtures are replaced with T8 ballasts and bulbs, the energy savings could be the following:

Estimated Installed Cost	=	$ 2,500
Estimated Energy Cost Savings	=	$ 500
Simple Payback Period	=	5 years

LIGHTING ECRM #1 – Police Station

There are approximately 61 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. If the fixtures are replaced with T8 ballasts and bulbs, the energy savings could be the following:

Estimated Installed Cost	=	$ 3,050
Estimated Energy Cost Savings	=	$ 760
Simple Payback Period	=	4 years

LIGHTING ECRM #1 – Community Center

There are approximately 16 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. If the fixtures are replaced with T8 ballasts and bulbs, the energy savings could be the following:

Estimated Installed Cost	=	$ 800
Estimated Energy Cost Savings	=	$ 160
Simple Payback Period	=	5 years

LIGHTING ECRM #1 – Library

There are approximately 73 T12 fixtures that we recommend be retrofitted with T8 lamps and electronic ballasts. The building also has 8 flood lights that could be replaced with CFL bulbs.

Estimated Installed Cost	=	$ 3,730
Estimated Energy Cost Savings	=	$ 830
Simple Payback Period	=	4.5 years

LIGHTING ECRM #2 – Community Center

Installing an astrological clock timer will reduce the number of hours per day the lights function, especially now with a 13-hour “on” schedule during the summer.

Estimated Installed Cost	=	$ 400
Estimated Energy Cost Savings	=	$ 400
Simple Payback Period	=	1 year

LIGHTING ECRM #3 – Library Exterior Restrooms

The occupancy sensor at the exterior restrooms will correct the problem of occupants leaving the lights on when exiting the restroom.

Estimated Installed Cost	=	$ 200
Estimated Energy Cost Savings	=	$ 200
Simple Payback Period	=	1 year

PLUMBING ECRM #1 & 2

Adding insulation both around the water heating appliance and around the hot water supply pipes that exit the water heater and go to the building's plumbing fixtures will greatly reduce heat loss through thin pipe walls and minimal appliance insulation installed at the factory.

Estimated Installed Cost	=	$ 400 (all facilities)
Estimated Energy Cost Savings	=	$ 200
Simple Payback Period	=	2 years

SPECIAL EQUIPMENT ECRM #1

Replace the commercial grade gas stove at the Community Center with a newer model that does not have a standing pilot light.

Estimated Installed Cost	=	$ 1,500
Estimated Energy Cost Savings	=	$ 400
Simple Payback Period	=	3.75 years

SPECIAL EQUIPMENT ECRM # 2

Install a vending miser at the vending machines to reduce operating hours.

Estimated Installed Cost	=	$ 600
Estimated Energy Cost Savings	=	$ 300
Simple Payback Period	=	2 years

C. SUMMARY TABLE

If CITY OF SANTA FE 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	=	$ 47,530
Estimated Energy Cost Savings	=	$ 8,700
Simple Payback Period	=	5-1/2 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:

3. $500 maintenance expense next 5 years				
4. $1000 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	($47,530)		0	($47,530)
Year 1		$ 8,700	0	$8,700
Year 2		$ 8,700	0	$8,700
Year 3		$ 8,700	0	$8,700
Year 4		$ 8,700	0	$8,700
Year 5		$ 8,700	0	$8,700
Year 6		$ 8,526	($500)	$8,026
Year 7		$ 8,352	($500)	$7,852
Year 8		$ 8,178	($500)	$7,678
Year 9		$ 8,004	($500)	$7,504
Year 10		$ 7,830	($500)	$7,330
Year 11		$ 7,656	($1,000)	$6,656
Year 12		$ 7,482	($1,000)	$6,482
Year 13		$ 7,308	($1,000)	$6,308
Year 14		$ 7,134	($1,000)	$6,134
Year 15		$ 6,960	($1,000)	$5,960
			Internal Rate of Return	**14.90%**

More information regarding financial programs available to CITY OF SANTA FE 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

3

How to Finance Your Energy Program *continued*

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 - PRELIMINARY ENERGY ASSESSMENT SERVICE AGREEMENT

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 SANTA FE, 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: 10-19-2009

Name (Mr./Ms./Dr.): MR. JOE DICKSON Title: CITY MANAGER

Organization: City of Santa Fe Phone: 409-925-6412

Street Address: 12002 HIGHWAY 6 Fax: 409-316-1941

Mailing Address: P.O. BOX 950 E-Mail: JOE@CI.SANTA-FE.TX.US

SANTA FE, TX 77510 County: GALVESTON

Contact Information:

Name (Mr./Ms./Dr.): MS. DIANA STEELQUIST Title: DIRECTOR OF COMMUNITY SERVICES

Phone: 409-925-6412 Fax: 409-316-1941

E-Mail: DIANA@CI.SANTA-FE.TX.US County: GALVESTON

Please sign and mail or fax to: Theresa Sifuentes, Local Governments and Municipalities Program Administrator, State Energy Conservation Office, 111 E. 17th Street, Austin, Texas 78774. Phone: 512-463-1896. Fax 512-475-2569.

ESA 5/13/10
SR ✓

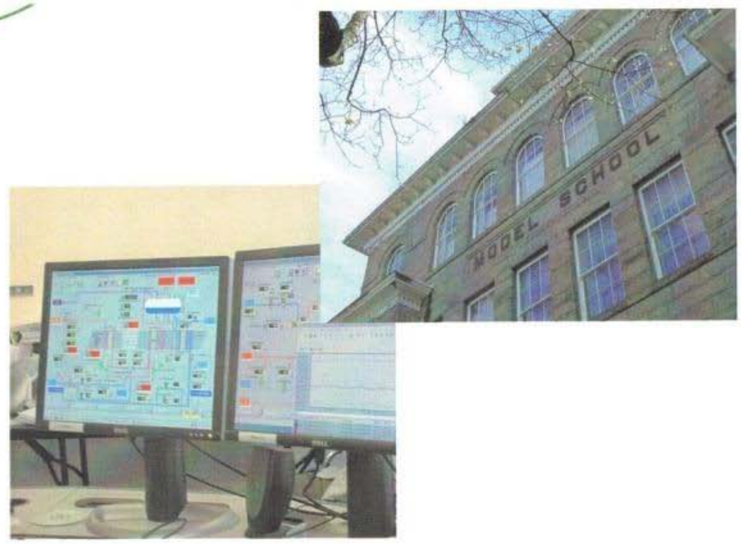
APPENDIX III - TEXAS ENERGY MANAGERS ASSOCIATION (TEMA)

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.

Texas Energy Managers Association

SECO
State Energy Conservation Office

APPENDIX IV - UTILITY CHARTS ON CD