Susan Combs
Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

Prepared by:

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City of Bay City

November 23, 2010

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 July, 2009, **SECO** received a request for technical assistance from *Mr. Richard Knapik*, Mayor of Bay City. **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 Bay City**,** 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. Jim Hendrickson,* 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 **$9,620** may be saved annually if all recommended projects are implemented. The estimated installed cost of these projects should total approximately **$68,500** yielding an average simple payback of **7 1/4** years.

SUMMARY:	IMPLEMENTATION COST	ESTIMATED SAVINGS	SIMPLE PAYBACK
HVAC ECRM #1	$49,000	$6,125	8 Years
Lighting ECRM #1	$16,200	$2,945	5.5 Years
Envelope ECRM #1	$3,300	$550	6 years
TOTAL PROJECTS	**$68,500**	**$9,620**	**7 Years**

The total projected savings is $9,620. 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 8.0 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 Bay City. 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 Bay City, 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:

Bay City

Facility	Energy Utilization Index (EUI) BTUs/sf-yr	Energy Cost Index (ECI) $/sf-yr
City Hall	75,256	$2.67
Police Department	94,278	$2.87
Municipal Court	63,708	$2.83

The district's electricity provider is Gexa Energy. Transmission and Distribution is provided by AEP. A copy of the electric rate schedule is included in Appendix II.

The City supplies its own gas but does not account for, or charge for, the consumption. As a result, the energy usage index (ECI) will be artificially low since there is no accounting for the natural gas energy in the calculation.

City Hall

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
MONTH	YEAR	CONSUMPTION KWH	METERED KW/KVA	CHARGED KW/KVA	COST OF DEMAND	TOTAL ALL ELECTRICAL COSTS $	CONSUMPTION MCF	COSTS $
JANUARY	2010	11,288	Not Applicable to Rate Class			1,641	City Does Not Pay For Gas	
FEBRUARY	2010	11,360				1,511		
MARCH	2010	13,360				1,680		
APRIL	2010	17,120				2,030		
MAY	2010	24,240				2,697		
JUNE	2009	25,120				3,014		
JULY	2009	24,400				2,925		
AUGUST	2009	25,440				2,832		
SEPTEMBER	2009	21,680				2,480		
OCTOBER	2009	16,320				2,006		
NOVEMBER	2009	14,080				1,768		
DECEMBER	2009	11,680				1,548		
TOTAL		216,088	0	0	0	$26,132	0	$0

Annual Total Energy Cost =	$26,132	Per Year	**Energy Use Index:** Total Site BTU's/yr / Total Area (sq.ft.)	75,256 BTU/s.f.yr
Total KWH x 0.003413 =	737.51	x 106		
Total MCF x 1.03 =	0.00	x 106	**Energy Cost Index:**	
Total Other x ____		x 106	Total Energy Cost/yr / Total Area (sq.ft.)	$2.67 $/s.f. yr
Total Site BTU's/yr	737.51	x 106		
Floor area:	9,800	s.f.		

Police Department

OWNER: Bay City **BUILDING:** Police Department

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
MONTH	YEAR	CONSUMPTION KWH	METERED KW/KVA	CHARGED KW/KVA	COST OF DEMAND	TOTAL ALL ELECTRICAL COSTS $	CONSUMPTION MCF	COSTS $
JANUARY	2010	24,320	Not Applicable to Rate Class			2,700	City Does Not Pay For Gas	
FEBRUARY	2010	25,579				2,602		
MARCH	2010	25,579				2,602		
APRIL	2010	25,579				2,602		
MAY	2010	28,100				2,901		
JUNE	2009	28,218				2,891		
JULY	2009	29,779				3,046		
AUGUST	2009	30,441				3,102		
SEPTEMBER	2009	28,047				2,851		
OCTOBER	2009	25,379				2,656		
NOVEMBER	2009	22,153				2,522		
DECEMBER	2009	22,836				2,344		
TOTAL		316,010	0	0	0	$32,819	0	$0

Annual Total Energy Cost = $32,819 Per Year

Total KWH x 0.003413 = 1,078.54 x 106
Total MCF x 1.03 = 0.00 x 106
Total Other x ____ x 106
Total Site BTU's/yr 1,078.54 x 106

Floor area: 11,440 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 94,278 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $2.87 $/s.f. yr

Municipal Court

OWNER: Bay City **BUILDING:** Municipal Court

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
MONTH	YEAR	CONSUMPTION KWH	METERED KW/KVA	CHARGED KW/KVA	COST OF DEMAND	TOTAL ALL ELECTRICAL COSTS $	CONSUMPTION MCF	COSTS $
JANUARY	2010	2,064	Not Applicable to Rate Class			321	City Does Not Pay For Gas	
FEBRUARY	2010	2,495				369		
MARCH	2010	2,828				544		
APRIL	2010	3,160				719		
MAY	2010	3,551				496		
JUNE	2009	4,889				682		
JULY	2009	5,926				810		
AUGUST	2009	5,427				723		
SEPTEMBER	2009	4,447				609		
OCTOBER	2009	3,463				506		
NOVEMBER	2009	2,561				380		
DECEMBER	2009	1,973				319		
TOTAL		42,784	0	0	0	$6,478	0	$0

Annual Total Energy Cost = $6,478 Per Year

Total KWH x 0.003413 = 146.02 x 106
Total MCF x 1.03 = 0.00 x 106
Total Other x ____ x 106
Total Site BTU's/yr 146.02 x 106

Floor area: 2,292 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 63,709 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $2.83 $/s.f. yr

4.0 RATE SCHEDULE ANALYSIS

RETAIL ELECTRIC PROVIDER (REP): GEXA Energy

TRANSMISSION AND DISTRIBUTION (T&D): AEP
Electric Rate: Secondary Service > 10 kW

AEP Rate Schedule as of September 1st, 2010:

I.	TRANSMISSION AND DISTRIBUTION CHARGES:		
	Customer Charge	=	$3.20 per Retail Customer per Month
	Metering Charge	=	$3.68 per Retail Customer per Month
	Transmission System Charge	=	$0.002515 per kWh
	Distribution System Charge	=	$0.015489 per kWh
II.	SYSTEM BENEFIT FUND (SBF)	=	$0.000662 per kWh
III.	TRANSITION CHARGES		
	Transition Charge 1	=	$0.000139 per kWh
	Transition Charge 2	=	$0.000177 per kWh
IV.	NUCLEAR DECOMMISSIONING CHARGE (NDF)	=	$0.000166 per kWh
V.	TRANSITION CHARGE	=	$0.009860 per kWh
VI.	TRANSITION CHARGE	=	$0.020150 per kWh
VII.	TRANSMISSION CHARGE (TUOS)	=	$0.002512 per kWh

Total Monthly Charges per kWh = $ 0.05167

5.0 CAMPUS DESCRIPTIONS

Bay City, located in Matagorda County, Texas, is home to approximately 18,667 people (2000 census). The City owns four buildings that were surveyed for this report. The buildings include the City Hall, the Business Development Center, the Police Department, and the Municipal Court Building. The buildings are generally operated during normal business hours except for the Police Department building which operates 24 hours a day 7 days a week.

Facility	Year Originally Constructed	Approx Square Footage	Basic HVAC Cool/Heat	Basic Lighting System Description	Basic Control System Description
City Hall	1965	9,800	Split System	T12	Wall Mounted Thermostat
Business Development Center	-	4,800	Split System	T12	Wall Mounted Thermostat
Police Department	-	11,440	Split System	T12	Wall Mounted Thermostat
Municipal Court Building	1927	2,292	Split System	T8	Wall Mounted Thermostat

6.0 ENERGY RECOMMENDATIONS:

A. HVAC ECRM 1: RENOVATION OF AGED HVAC EQUIPMENT

It was noted during the survey that several pieces of equipment have reached the end of their useful life expectancy. We recommend this equipment be included in subsequent maintenance budgets to be replaced as planned equipment upgrades in order to avoid the higher cost of emergency replacement when they inevitably fail.

Estimated Cost: $49,000 Estimated Savings: $6,125 Estimated Payback: 8 years

City Hall

The City Hall Building has two 1996 split systems that are nearing the end of their estimated 15 year useful life expectancy. One of the air handlers uses electric heat and one uses gas. *We recommend the City budget to replace both units with energy efficient gas heat units.*

Municipal Court

The Municipal Court Building is served by one Goodman 5-ton and one Goodman 4-ton unit; both are 1996 units that will need to be replaced. *We recommend the City budget to replace these unit in the next few years to avoid the higher cost associated with emergency equipment replacement.*

B. LIGHTING ECRM 1: RETROFIT OF T12 LIGHTING TO T8:

The City Hall, the Business Development Center, and the Police Department are using T12 components in their linear fluorescent lighting fixtures. T12 components produce approximately 18% less light and consume about 20% more energy than the T8 lamps and electronic ballasts that may be retrofit into the existing linear fluorescent fixtures. Senate Bill 300 requires all public entities install the most efficient lamps and ballasts possible in their existing fixtures. *Therefore we recommend the City retrofit the fixtures at these facilities with T8 lamps and electronic ballasts.*

The maintenance staff had communicated to us the desire to replace the existing spline ceiling at the Business Development Center Building break room. Due to possible asbestos suspicious material and the high cost of asbestos abatement, *we recommend leaving the existing ceiling where it is and installing a new ceiling grid with acoustical ceiling tiles one foot below the existing spline ceiling. Then remove the existing surface-mounted T12 light fixtures and replace with new layin fixtures using energy efficient T8 lamps and electronic ballasts.*

Estimated Cost: $16,200 Estimated Savings: $2,945 Estimated Payback: 5.5 years

C. BUILDING ENVELOPE ECRM 1: INSTALL WINDOW AWNINGS AT THE MUNICIPAL COURT:

The Municipal Court Building has 11 exterior windows on the west side of the building. This allows the building to heat up due to a lack of shade protecting the windows. *We recommend the City install awnings over the windows to protect the building from excessive heat gain due to sunlight.*

Estimated Cost: $3,300 Estimated Savings: $550

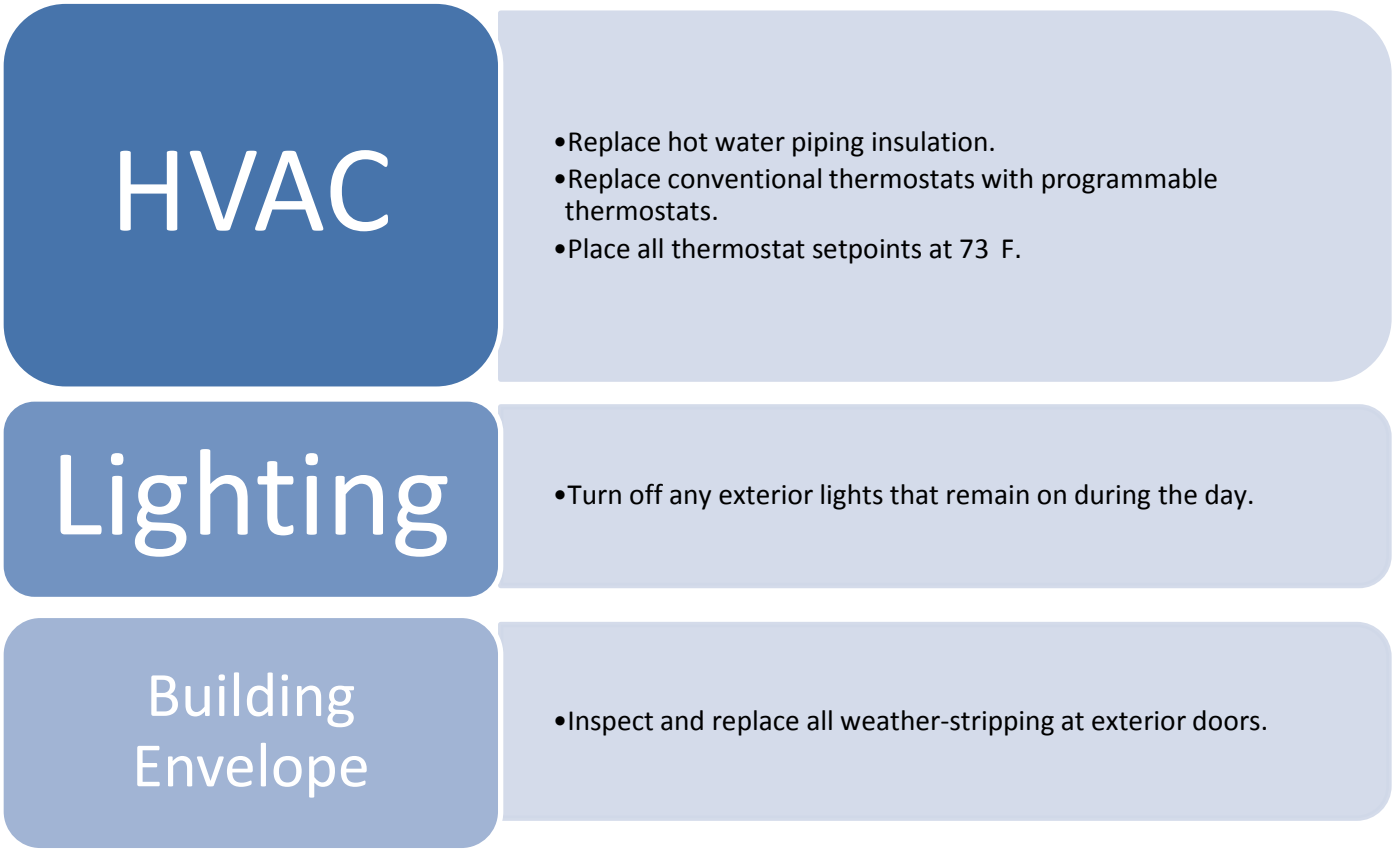
Estimated Payback: 6 years

D. SUMMARY TABLE

If Jackson County were to implement all recommended ECRM projects, the summary payback would be:

Estimated Installed Cost	=	$ 68,500
Estimated Energy Cost Savings	=	$ 9,620
Simple Payback Period	=	7-1/4 years

7.0 MAINTENANCE AND OPERATION RECOMMENDATIONS:



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

The water heater at the City Hall Building was noted to be missing a significant portion of insulation on the 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*.

HVAC M&O #2

It was noted that the City was using conventional thermostats to control the air conditioning at the City Hall and the Business Development Center. Dependent upon manual occupant operation, it is likely these units are left operating beyond normal occupancy hours. *We recommend replacing the existing thermostats with programmable units that can be matched to the occupancy hours for each of the buildings.*

HVAC M&O #3

We recommend the City adjust all thermostats to ensure they are operating at a cooling setpoint of 73°F. According to the Texas Department of Energy, you can expect a savings of as much as 1% for each degree increase in cooling setpoint during cooling season.

Lighting M&O #1

It was noted at the time of our survey, which was conducted mid morning, that an exterior light at the City Hall was still on. We recommend inspecting the light sensor for damage or any cause that would suggest why this light is operating during the day. It is possible that leaves or other debris is covering the light sensor and preventing it from accurately detecting the sunlight.

Building Envelope M&O #1

We recommend the City inspect and replace any damaged or missing weather-stripping at exterior door locations. Having quality weather-stripping on all exterior doors will minimize conditioned air from escaping the building and keep undesired outside air and insects from entering.

8.0 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	($68,500)		0	($68,500)
Year 1		$ 9,620	0	$9,620
Year 2		$ 9,620	0	$9,620
Year 3		$ 9,620	0	$9,620
Year 4		$ 9,620	0	$9,620
Year 5		$ 9,620	0	$9,620
Year 6		$ 9,331	($150)	$9,181
Year 7		$ 9,043	($150)	$8,893
Year 8		$ 8,754	($150)	$8,604
Year 9		$ 8,466	($150)	$8,316
Year 10		$ 8,177	($150)	$8,027
Year 11		$ 7,888	($300)	$7,588
Year 12		$ 7,600	($300)	$7,300
Year 13		$ 7,311	($300)	$7,011
Year 14		$ 7,023	($300)	$6,723
Year 15		$ 6,734	($300)	$6,434
			Internal Rate of Return	**9.63%**

More information regarding financial programs available to BAY CITY can be found in:

APPENDIX I: SUMMARY OF FUNDING AND PROCUREMENT OPTIONS

9.0 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

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

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 - ELECTRIC UTILITY RATE SCHEDULES

AEP TEXAS CENTRAL COMPANY
TARIFF FOR ELECTRIC DELIVERY SERVICE
Applicable: Entire System
Chapter: 6 Section: 6.1.1
Section Title: Delivery System Charges
Revision: Fifth Effective Date: December 30, 2009

6.1.1.1.2 SECONDARY VOLTAGE SERVICE LESS THAN OR EQUAL TO 10 KW

AVAILABILITY

This schedule is applicable to Delivery Service for non-residential purposes at secondary voltage with demand less than or equal to 10 kW when such Delivery Service is to one Point of Delivery and measured through one Meter and is not for shared or resale purposes.

TYPE OF SERVICE

Delivery Service will be single-phase, 60 hertz, at a standard secondary voltage. Delivery Service will be metered using Company's standard watt-hour meter provided for this type of Delivery Service. Any other metering option(s) will be provided at an additional charge. Where Delivery Service of the type desired is not available at the Point of Delivery, additional charges and special arrangements may be required prior to Delivery Service being furnished, pursuant to Sections 5.7 and 6.1.2 of this Tariff.

MONTHLY RATE

I. Transmission and Distribution Charges:

Customer Charge	$3.20	per Retail Customer per Month
Metering Charge*	$3.68	per Retail Customer per Month
*Charge does not apply to unmetered service		
Transmission System Charge	$0.002512	per kWh
Distribution System Charge	$0.015489	per kWh
II. System Benefit Fund Charge:	$0.000662	per kWh See SBF 6.1.1.4
III. Transition Charge:	See Riders TC 6.1.1.2.1.1 and TC-2 6.1.1.2.2.1	
IV. Nuclear Decommissioning Charge:	See Rider NDC 6.1.1.5.1	
V. Transmission Cost Recovery Factor:	See Rider TCRF 6.1.1.6.2.1	
VI. Excess Mitigation Credit:	Not Applicable	

VII. State Colleges and Universities Discount: See Rider SCUD 6.1.1.6.1

VIII. Competitive Metering Credit: See Rider CMC 6.1.1.6.6

IX. Other Charges or Credits:

A. Rate Case Surcharge Rider See Rider RCS-2 6.1.1.6.8

B. True-up Case Surcharge Rider See Rider TCE 6.1.1.6.7

C. Energy Efficiency Rider See Rider EECRF 6.1.1.6.4.1

D. Advanced Metering System Rider See Rider AMSCRF 6.1.1.6.9

COMPANY-SPECIFIC APPLICATIONS

Service will normally be metered at the service voltage. For more information, refer to the Meter Installation and Meter Testing Policy, Section 6.2.3.3 of the Tariff. Three-phase service may be provided if Retail Customer has permanently installed, and in regular use, motor(s) which qualify according to Section 6.2.3.4, or at the Company's sole discretion, the load is sufficient to warrant three-phase service.

The Point of Delivery must be agreed to by the Company and any installation of equipment by the Retail Customer must comply with Section 6.2.3.3 of the Tariff.

Transmission Service will be furnished pursuant to ERCOT rules and regulations by the Transmission Service Providers (TSPs), and not the Company. The Company provides only the billing function for TSPs.

DETERMINATION OF DEMAND

Should Retail Customer's energy consumption exceed 1000 kWh for three months during any twelve month period or exceed 2000 kWh for any single month, the Company may install a demand meter upon which time demand will be measured. Should the metered demand exceed 10 kW, Retail Customer's account will automatically be changed to the applicable tariff schedule for billing.

UNMETERED SERVICE

Unmetered Service may be available, at the Company's sole discretion, for Customer-owned fixed lighting loads that are controlled by a photo electric controller, and for situations when Metering Equipment may be subject to vandalism, for public safety, or for aesthetic reasons, provided the Retail Customer's electric load can be reasonably estimated or predicted from the nameplate of the installed equipment. The Company and Retail Customer must agree on an estimate of constant monthly kWh and hours of

operation to be used for billing purposes. The Company may require estimated loads of over five (5) kW to be metered.

Unmetered service will be supplied only at single phase, 60 hertz, and will be supplied at one of the Company's standard secondary voltages. Refer to Section 6.2.2 of the Tariff for additional voltage information.

Unmetered Service is also available for non-residential electric connection service for Retail Customer-owned outdoor lighting systems, roadway sign lighting, traffic control signals, and flashing or timed traffic signals where all facilities are owned and maintained by the Retail Customer and when the service conductors are the only facilities needed to complete the electric connection. Any facilities required in addition to the service conductors will be assessed in accordance with the Facilities Extension Policy, Sections 5.7 and 6.1.2.2.1 of the Tariff.

The monthly kWh for billing purposes will be constant as agreed to by the Company and Retail Customer until such time as additional Points of Delivery and additional loads or Customer-owned lighting facilities are installed.

The Company will require a written agreement listing the locations of each point of service, the Connected Load and the total kWh to be used for billing. Written request/notice will be required in advance of any additions, deletions, or changes in the Connected Load served under this schedule. It is the Retail Customer's obligation to inform Company of any additions or reductions in load. All billing adjustments reflecting reductions in load will be effective with the date of receipt of notice by Company, and the Company shall not be required to adjust any billings rendered prior to receiving such notice.

The kWhs for the Retail Customer's electric load will be the total kW as determined from the manufacturer's rated input wattage of the electrical load or the actual test load, whichever is greater, times the estimated hours of operation per month. The same value will be used each month for billing purposes.

NOTICE
This rate schedule is subject to the Company's Tariff and Applicable Legal Authorities.

APPENDIX III - PRELIMINARY ENERGY ASSESSMENT SERVICE AGREEMENT

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 Bay City, Texas, 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: Richard Knapik Date: July 23, 2009

Name (Mr./Ms./Dr.) Richard Knapik Title: Mayor

Organization: City of Bay City, Texas Phone: (979) 245-2137

Street Address: 1901 5th. Street, Bay City, Texas 77414 Fax: 979 323-1627

Mailing Address: _____ E-Mail: rknapik@cityofbaycity.org

_____ County: Matagorda County

Contact Information:

Name (Mr./Ms./Dr.): Jim HENDRICKSON Title: IT Dept

Phone: 979-323-1636 Fax _____

E-Mail: jhendrickson@cityofbaycity.org County: Matagorda

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: 512-463-1696. Fax 512-475-2569.

ESA 5/13/10

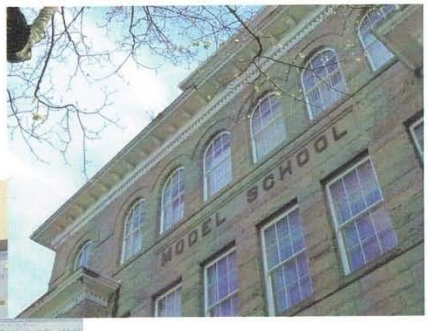
APPENDIX IV - TEXAS ENERGY MANAGERS ASSOCIATION (TEMA)

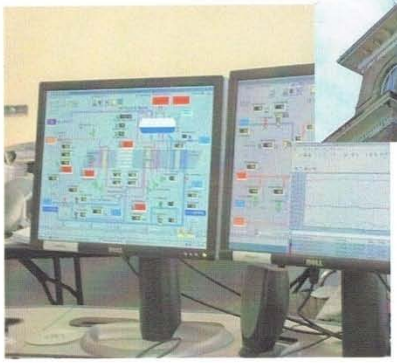
ANNOUNCING!

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