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Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

Prepared by:

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City of Whitney

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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**.

Program Administrator:	Stephen Ross
Phone:	512-463-1770
Address:	State Energy Conservation Office LBJ State Office Building 111 E. 17th Street Austin. Texas 78774

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 *Judy Nelson*, City Secretary for the City of Whitney. **SECO** responded by sending ESA **Energy Systems Associates, Inc.**, a registered professional engineering firm, to prepare this preliminary report for the school district. This report is intended to provide support for the district as it determines the most appropriate path for facility renovation, especially as it pertains to the energy consuming systems around the facility. It is our opinion that significant decreases in annual energy costs, as well as major maintenance cost reductions, can be achieved through the efficiency recommendations provided herein.

This study has focused on energy efficiency and systems operations. To that end, an analysis of the utility usage and costs for the **City of Whitney,** 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. Judy Nelson,* a walk-through energy analysis was conducted throughout the City. Specific findings of this survey and the resulting recommendations for both operation and maintenance procedures and cost-effective energy retrofit installations are identified in Section 6.0 of this report.

We estimate that as much as **$2,025** may be saved annually if all recommended projects are implemented. The estimated installed cost of these projects should total approximately **$14,375**, yielding an average simple payback of **7-1/4** years.

SUMMARY:	IMPLEMENTATION COST	ESTIMATED SAVINGS	SIMPLE PAYBACK
HVAC ECRM #1	$7,175	$1,025	7 Years
Wastewater ECRM #1	$4,800	$600	8 Years
Lighting ECRM #1	$2,400	$400	6 Years
TOTAL PROJECTS	**$14,375**	**$2,025**	**7-1/4 Years**

The total utility cost for City of Whitney City Hall / Fire Station and Police Department from August 2008 to June 2009 was $16,210. The projected savings of $2,025 would represent a decrease in utility expenditures for the district of 8%. Although additional savings from reduced maintenance expenses are anticipated, these savings projections are not included in the estimates provided above. As a result, the actual Return of Investment (ROI), for this retrofit program has been calculated and shown in Section 7.0 of this report.

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

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

2.0 ENERGY ASSESSMENT PROCEDURE

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

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

3.0 ENERGY PERFORMANCE INDICATORS

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

1. Energy Utilization Index

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

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

ELECTRICITY Usage

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

NATURAL GAS Usage

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

After adding the BTU consumption of each fuel, the total BTUs are then divided

by the building area.

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

2. Energy Cost Index

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

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

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

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

THE CURRENT ENERGY PERFORMANCE INDICATORS FOR:

City of Whitney

Facility	Energy Utilization Index (EUI) BTUs/sf-yr	Energy Cost Index (ECI) $/sf-yr
Police Department	73,928	3.04
City Hall / Fire Station	28,050	1.14

The electricity and gas consumption charts for the City of Whitney City Hall-Police Department and Community Center are as follows:

OWNER: City Of Whitney **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	2009	2,740	n/a	n/a	n/a	362	n/a	n/a
FEBRUARY	2009	2,620	n/a	n/a	n/a	335	n/a	n/a
MARCH	2009	2,641	n/a	n/a	n/a	319	n/a	n/a
APRIL	2009	3,890	n/a	n/a	n/a	441	n/a	n/a
MAY	2009	3,496	n/a	n/a	n/a	410	n/a	n/a
JUNE	2009	5,590	n/a	n/a	n/a	591	n/a	n/a
JULY	2009	4,784	n/a	n/a	n/a	611	n/a	n/a
AUGUST	2008	5,663	n/a	n/a	n/a	800	n/a	n/a
SEPTEMBER	2008	4,386	n/a	n/a	n/a	643	n/a	n/a
OCTOBER	2008	4,080	n/a	n/a	n/a	696	n/a	n/a
NOVEMBER	2008	2,139	n/a	n/a	n/a	423	n/a	n/a
DECEMBER	2008	1,834	n/a	n/a	n/a	515	n/a	n/a
TOTAL		43,863	0	0	0	6,146	0	0

Annual Total Energy Cost = $6,146 Per Year

Total KWH x 0.003413 = 149.70 x 106
Total MCF x 1.03 = 0.00 x 106
Total Other x ____ x 106
Total Site BTU's/yr 149.70 x 106

Floor area: 2,025 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 73,928 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $3.04 $/s.f. yr

OWNER: City Of Whitney **BUILDING:** City Hall / Fire Station

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	2009	2,959	n/a	n/a	n/a	530	7	$62
FEBRUARY	2009	4,079	n/a	n/a	n/a	548	3	$28
MARCH	2009	3,859	n/a	n/a	n/a	519	1	$19
APRIL	2009	5,272	n/a	n/a	n/a	632	0	$16
MAY	2009	4,850	n/a	n/a	n/a	612	0	$15
JUNE	2009	8,082	n/a	n/a	n/a	831	0	$15
JULY	2009	6,127	n/a	n/a	n/a	1,011	0	$15
AUGUST	2008	9,654	n/a	n/a	n/a	1,367	0	$15
SEPTEMBER	2008	7,367	n/a	n/a	n/a	1,099	0	$15
OCTOBER	2008	5,879	n/a	n/a	n/a	1,036	0	$16
NOVEMBER	2008	4,085	n/a	n/a	n/a	808	3	$39
DECEMBER	2008	3,649	n/a	n/a	n/a	745	8	$71
TOTAL		**65,862**		**0**	**0**	**$9,738**	**23**	**$326**

Annual Total Energy Cost = $10,064 Per Year

Total KWH x 0.003413 = 224.79 x 106
Total MCF x 1.03 = 23.18 x 106
Total Other x ____ x 106
Total Site BTU's/yr 247.96 x 106

Floor area: 8,840 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 28,050 BTU/s.f.yr

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

The district has one electricity provider; TXU Energy. Copies of the electric rate schedules are included in Appendix II.

4.0 RATE SCHEDULE ANALYSIS

Electricity:

Average Consumption Savings Determined from Billings:

Total Cost for Electricity Purchased During the Analyzed Billing Cycle: $15,884

Total kWh Consumed During the Analyzed Billing Cycle: 109,725 kWh

Average Cost = Total Cost for Commodity / Total Quantity Consumed: $15,884 / 109,725 kWh

= $0.14476 per kWh

Natural Gas:

Average Consumption Savings Determined from Billings:

Total Cost for Natural gas Purchased During the Analyzed Billing Cycle: $326

Total MCF Consumed During the Analyzed Billing Cycle: 23 MCF

Monthly Customer Charge: $15

Average Savings for the Commodity =

Total Cost – (Customer Charge/month x 12 months/year) / Total MCF Purchased

[$326 – ($15 x 12)] / 23 MCF = $6.35 per MCF

5.0 CAMPUS DESCRIPTIONS

The **City of Whitney**, located in Hill County Texas, owns two buildings and a Wastewater Treatment Plant that were assessed for this report. The buildings include a Police Department and a combined City Hall and Fire Station building. City Hall is generally operated during normal business hours while the Fire Station and Police Department are operated 24 hours a day and 7 days a week. The population of the city is approximately 1,900.

A. Police Department

The Police Department is a metal building on a concrete slab with a low-sloping metal roof. The building encompasses approximately 2,025 square feet.

HVAC & Control System Description:

The building is conditioned with a split system utilizing electric heating and cooling. The condensing unit is pad-mounted at the exterior of the building and the air handling unit (AHU) is located above the ceiling. Air distribution is accomplished by ductwork above the ceiling.

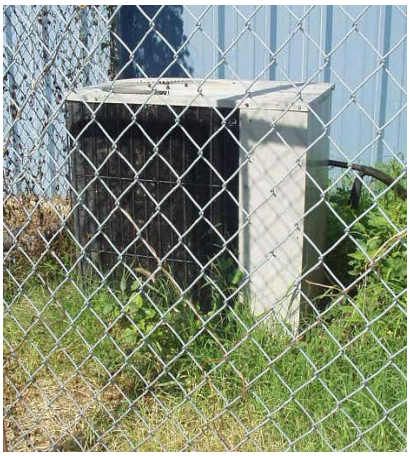


Figure 1 : Weeds at condensing unit.

The condensing unit is nearing the end of its useful life expectancy of 15 years. *We recommend the City replace the split system with a new energy-efficient model.* It was noted during the survey that weeds had grown over the condensing unit as seen in figure 1. Tall grass around the condensing unit minimizes the unit's ability to reject heat to the atmosphere, therefore *we recommend increasing the frequency of trimming the weeds, or enlarging the size of the condensing unit pad so weeds cannot grow immediately around the condensing unit.*

The building is controlled by a conventional, non-programmable thermostat. Given the 24/7 operation hours and the fact that the building itself is not large, this conventional thermostat can provide sufficient control as long as access to the unit from occupants is limited. If the City finds the settings on the unit to be consistently altered (the unit was set at 60°F at the time of the survey, despite the fact that the sign above the unit stated to keep the unit set to 78°F), then *we recommend the City replace the existing thermostat with a new digital model that can lock-out adjustment by the average occupant*.

Plumbing and Water Heating System Description:

A 40-gallon electric water heater provides hot water to the building. It was noted during the survey that insulation at the water heater is missing from the hot water piping (See Picture to the right). The majority of the energy losses in a hot water system occur through the hot water piping, *therefore, we recommend replacing this insulation.*

Lighting System Description:

The building uses approximately twelve 2-lamp T12 fluorescent fixtures. The T12 lamps and magnetic ballasts are no longer being manufactured after July, 2010. *We recommend installing T8 lamps and electronic ballasts in the existing fixtures will produce about 18% more light than the existing T12 components while offering energy savings of approximately 20%.* This measure will also help the City to comply with Senate Bill 300, in which local government facilities in Texas are required to install the most efficient lamps and ballasts in their existing fixtures.

Building Envelope Description:

It was noted during the survey that the Police Department's front door has damaged or missing weather stripping as seen in Figure 3. This allows air to flow freely between the inside and outside of the building, as well as allow dust and pests to enter the building. *We recommend the weatherstripping be replaced*.

Figure 3 : Missing weatherstripping at front door.

B. City Hall / Fire Station

The City Hall / Fire Station building is a brick-faced building on a concrete slab with a low sloped (almost flat) single ply membrane roof. The building encompasses approximately 8,840 square feet. The building has well-sealed single pane windows with overhangs to reduce solar heat gain. The single-ply roof membrane material has been placed over the old built-up roofing components and there are areas where significant gaps between the new and old materials exist. The gaps are due to objects underneath the membrane material, such as the edges of RTU curbs and plumbing vent terminations, which extend slightly above the old roof material. Great care should be taken when walking on the membrane roof surface adjacent to these sub-surface protrusions to avoid tears in the single-ply membrane.

HVAC & Control System Description:

The building is conditioned by three packaged rooftop units and two natural gas unit heaters in the Fire Truck Bay. It was noted during the survey that condensate from the rooftop units was pooling onto the membrane roof. The City should consider piping the condensate to the nearest roof drain or rain gutter to prolong the life of the roof.

It was noted during the survey that the return air filters were dirty as seen in Figure 4. This reduces the building's air quality and starves the Air Handling Unit for return air. This condition will eventually lead to frozen refrigerant coils as too little air passes across the coil. Comfort in the spaces is sacrificed as supply air is reduced when the filters block air flow in the AHU. *We recommend the district install pleated air filters in all return air grilles and replace the filters regularly.*

Figure 4 : Dirty return grille air filter.

Lighting System Description:
The building uses approximately thirty-two (32) 2-lamp T12 fluorescent strip fixtures and ten each 100 watt incandescent lamp fixtures. As was the case for the City Hall, we recommend the City retrofit the T12 fixtures with T8 lamps and electronic ballasts and the incandescent lamps with compact fluorescent lamps.

It was also noted during the survey that the 18 fixtures in the truck bay were turned on while the bay doors were open. Since opening the bay doors provides sufficient natural lighting for the truck bay during daytime hours, *we recommend turning these lights off when the bay doors are open during the day.*

Building Envelope Description:
It was noted during the survey that the entrance door has damaged or missing weather stripping as seen in figure 2. This allows air to flow freely between the inside and outside of the building. *We recommend the weather stripping be replaced*.

B. Wastewater Treatment Plant

The Wastewater Treatment Plant has one unconditioned building that houses three water pumps; the pumps are scheduled to be replaced with a recently accepted energy grant. The City utilizes three gravity fed aeration pools that process incoming waste over a 21 day cycle. Each of the pools has an aeration motor that floats in the center of each aeration pool. These motors (approximately 15hp each) are older motors and should be replaced with new more energy efficient models.

The City is working in cooperation with Baylor University to design and install a wetland on the discharge side of aeration pool #3 that will improve overall effluent filtration.

6.0 RECOMMENDATIONS

A. MAINTENANCE AND OPERATIONS PROCEDURES

HVAC	•Cut back weeds around condensing unit at Police Department. •Replace dirty filters with new pleated filters at City Hall / Fire Station and increase frequency of filter replacement.
Plumbing	•Repair hot water piping insulation at Police Station water heater.
Lighting	•Turn off lights in Fire Truck Bay when bay doors are open during daytime hours.
Building Envelope	•Check weatherstripping at all exterior doors, replace as needed.

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

Overgrown weeds can reduce the condensing unit's ability to reject heat to the atmosphere. We recommend keeping weeds cut back to allow maximum airflow through the unit.

HVAC M&O #2

Maintaining filters offers improved indoor air quality and protection for the air handler.

Plumbing M&O #1

The Police Station's water heater had damaged or missing hot water pipe insulation. The majority of the energy losses in a hot water system occur in the hot water piping. We recommend this insulation be replaced.

Lighting M&O #1

When the Fire Truck Bay garage doors are open, a significant amount of natural light enters the space. It is unnecessary to turn on lights while these doors open during the daytime.

Building Envelope M&O #1

It was noted there were several exterior doors around the City that suffered from damaged or missing weatherstripping. We recommend that the weatherstripping be replaced as necessary.

B. CAPITAL EXPENSE PROJECTS

HVAC	•Replace split system at Police Department.
Wastewater	•Replace three 15hp aeration motors at Wastewater Treatment Plant.
Lighting	•Replace incandescent lamps with compact fluorescent lamps and retrofit T12 fixtures with T8 lamps and electronic ballasts.

HVAC ECRM #1 – replace condensing unit

We recommend replacing the existing split system for the Police Department. These systems have a typical life expectancy of 15-20 years.

Estimated Installed Cost	=	$ 7,175
Estimated Energy Cost Savings	=	$ 1,025
Simple Payback Period	=	7 years

Wastewater ECRM #1 – replace aeration motors

The aeration motors at the Wastewater Treatment Plant are old and need to be replaced. Newer motors will run more efficiently and reduce the risk of motor failure.

Estimated Installed Cost	=	$ 4,800
Estimated Energy Cost Savings	=	$ 600
Simple Payback Period	=	8 years

LIGHTING ECRM #1 – replace incandescent lamps and retrofit T12 fixtures

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

Estimated Installed Cost	=	$ 2,400
Estimated Energy Cost Savings	=	$ 400
Simple Payback Period	=	6 years

C. SUMMARY TABLE

If the City of Whitney 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	=	$ 14,375
Estimated Energy Cost Savings	=	$ 2,025
Simple Payback Period	=	7-1/4 years

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

1. Lighting ECRM #1	T12 lamps and ballasts are no longer being manufactured. The City should plan on retrofitting these fixtures with T8 lamps and electronic ballasts.
2. HVAC ECRM #1	The split system is at the end of its useful life expectancy and will need to be replaced soon.
3. Wastewater ECRM #1	Replacing the aeration motors will allow the Wastewater Treatment Plant to operate more efficiently and will minimize risk of the old motors breaking down.

7.0 FINANCIAL EVALUATION

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

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

Proposal:	Perform recommended ECRMs			
Assumptions:				
1. Equipment will last at least 15 years prior to next renovation				
2. No maintenance expenses for first five years (warranty period)				
3. $150 maintenance expense next 5 years				
4. $300 maintenance expense last 5 years				
5. Savings decreases 3% per year after year 5				
Cash Flow	**Project Cost**	**Project Savings**	**Maintenance Expense**	**Net Cash Flow**
Time 0	($14,375)		0	($14,375)
Year 1		$ 2,025	0	$2,025
Year 2		$ 2,025	0	$2,025
Year 3		$ 2,025	0	$2,025
Year 4		$ 2,025	0	$2,025
Year 5		$ 2,025	0	$2,025
Year 6		$ 1,964	($150)	$1,814
Year 7		$ 1,904	($150)	$1,754
Year 8		$ 1,843	($150)	$1,693
Year 9		$ 1,782	($150)	$1,632
Year 10		$ 1,721	($150)	$1,571
Year 11		$ 1,661	($300)	$1,361
Year 12		$ 1,600	($300)	$1,300
Year 13		$ 1,539	($300)	$1,239
Year 14		$ 1,478	($300)	$1,178
Year 15		$ 1,418	($300)	$1,118
			Internal Rate of Return	**8.82%**

More information regarding financial programs available to CITY OF WHITNEY 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 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 SCHEDULE

6.1.1.1.3 Secondary Service Greater Than 10 kW

AVAILABILITY

This schedule is applicable to Delivery Service at secondary voltage with demand greater than 10 kW when such Delivery Service is to one Point of Delivery and measured through one Meter.

TYPE OF SERVICE

Delivery Service will be single or three-phase, 60 hertz, at a standard secondary voltage. Delivery Service will be metered using Company's standard meter provided for this type of Delivery Service, unless Retail Customer is eligible for and chooses a competitive meter provider. Any meter other than the standard meter provided by Company 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 contract arrangements may be required prior to Delivery Service being furnished, pursuant to Section 6.1.2.2 of this Tariff.

MONTHLY RATE

I. Transmission and Distribution Charges:			
	Customer Charge	$3.50	per Retail Customer
	Metering Charge	$18.41	per Retail Customer
	Transmission System Charge		
	Non-IDR Metered	$1.48	per NCP kW
	IDR Metered	$1.99	per 4CP kW
	Distribution System Charge	$3.97	per Distribution System billing kW
II. System Benefit Fund:		$0.000655	per kWh, See Rider SBF
III. Transition Charge:		See Riders TC1 and TC2	per Distribution System billing kW
IV. Nuclear Decommissioning Charge:		$0.044	per Distribution System billing kW, See Rider NDC
V. Transmission Cost Recovery Factor:		See Rider TCRF	
VI. Energy Efficiency Cost Recovery Factor:		See Rider EECRF	
VII. Competitive Meter Credit:		See Rider CMC	
VIII. Advanced Metering Cost Recovery Factor:		See Rider AMCRF	
Other Charges or Credits			
IX. Rate Case Expense Surcharge:		See Rider RCE	per Distribution System billing kW

COMPANY SPECIFIC APPLICATIONS

At Company's option, locations where the electrical installation has multiple connections to Company's conductors, due to Company facilities limitations or design criteria, may be considered one Point of Delivery for billing purposes.

DETERMINATION OF BILLING DEMAND FOR TRANSMISSION SYSTEM CHARGES

DETERMINATION OF NCP kW

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

DETERMINATION OF 4 CP kW

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

DETERMINATION OF BILLING DEMAND FOR DISTRIBUTION SYSTEM CHARGES

DETERMINATION OF BILLING kW

For loads whose maximum NCP kW established in the 11 months preceding the current billing month is less than or equal to 20 kW, the Billing kW applicable to the Distribution System Charge shall be the NCP kW for the current billing month.

For all other loads, the Billing kW applicable to the Distribution System Charge shall be the higher of the NCP kW for the current billing month or 80% of the highest monthly NCP kW established in the 11 months preceding the current billing month (80% ratchet).

The 80% ratchet shall not apply to Retail Seasonal Agricultural Customers.

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 Whitney, 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: Chuck T Upton (vacant city administrator) Date: 10/7/09

Name (Mr./Ms./Dr.): Mr. Chuck T. Upton Title: City Administrator

Organization: City of Whitney Phone: 254/694 2261

Street Address: 115 W. Jefferson Fax: 254/694-5332

Mailing Address: PO Box 2050 E-Mail: wpdchief@txun.net

Whitney, TX 76692 County: Hill

Contact Information: whitneycity@txun.net City Secretary

Name (Mr./Ms./Dr.): Chuck Upton Judy Nelson Title: City Administrator

Phone: 254 694-2261 Ext. 21 Fax: 254/694-5332

E-Mail: wpdchief@txun.net County: Hill

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: 512-463-1698. Fax 512-475-2569.

ESA 5/13/10 SLW

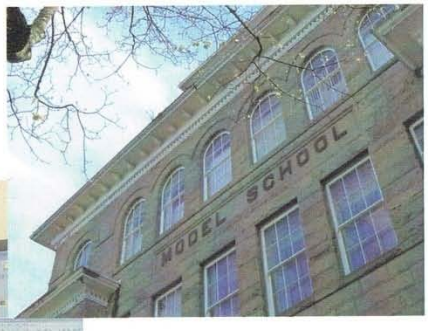
APPENDIX IV - TEXAS ENERGY MANAGERS ASSOCIATION (TEMA)

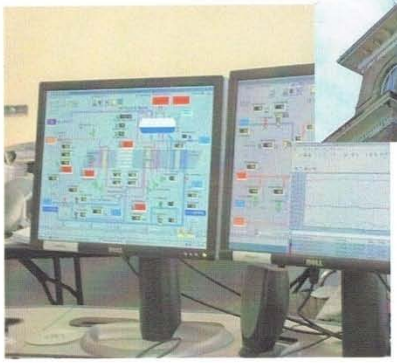
ANNOUNCING!

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