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Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

Prepared by:

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City of Bishop

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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 July, 2010, **SECO** received a request for technical assistance from *Mr. Victor Ramos*, Mayor of the City of Bishop. **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 Bishop,** 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 *Mrs. Cynthia Contreras,* 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 **$775** may be saved annually if all recommended capital investment projects are implemented. The estimated installed cost of these projects should total approximately **$4,000**, yielding an average simple payback of **5-1/4** years.

SUMMARY:	IMPLEMENTATION COST	ESTIMATED SAVINGS	SIMPLE PAYBACK
Envelope ECRM #1	$4,000	$775	5-1/4 Years
TOTAL PROJECTS	**$4,000**	**$775**	**5-1/4 Years**

The total projected savings for capital investment projects is $775. 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 Bishop**. 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 Bishop, 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 Bishop

Facility	Energy Utilization Index (EUI) BTUs/sf-yr	Energy Cost Index (ECI) $/sf-yr
City Hall	74,782	2.47
Police Station	74,912	2.64

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

OWNER: City Of Bishop **BUILDING:** 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	3,897	n/a	n/a	n/a	$535	15.0	$220
FEBRUARY	2010	3,702	n/a	n/a	n/a	$502	8.0	$91
MARCH	2010	3,887	n/a	n/a	n/a	$535	7.0	$89
APRIL	2010	5,452	n/a	n/a	n/a	$702	0.0	$16
MAY	2010	8,346	n/a	n/a	n/a	$1,034	0.0	$16
JUNE	2010	10,792	n/a	n/a	n/a	$1,296	0.0	$16
JULY	2009	11,880	n/a	n/a	n/a	$1,393	0.0	$16
AUGUST	2009	10,920	n/a	n/a	n/a	$1,239	0.0	$16
SEPTEMBER	2009	8,400	n/a	n/a	n/a	$1,024	0.0	$16
OCTOBER	2009	7,336	n/a	n/a	n/a	$887	2.0	$50
NOVEMBER	2009	4,701	n/a	n/a	n/a	$594	2.0	$50
DECEMBER	2009	4,776	n/a	n/a	n/a	$651	18.0	$256
TOTAL		84,089	0	0	$0	$10,392	52.0	$852

Annual Total Energy Cost = $11,244 Per Year

Total KWH x 0.003413 = 287.00 x 106
Total MCF x 1.03 = 53.56 x 106
Total Other x ____ x 106
Total Site BTU's/yr 340.56 x 106

Floor area: 4,554 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 74,782 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $2.47 $/s.f. yr

OWNER: City Of Bishop **BUILDING:** Police 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	2010	4,316	n/a	n/a	n/a	$605	0	$16
FEBRUARY	2010	4,385	n/a	n/a	n/a	$602	0	$16
MARCH	2010	4,654	n/a	n/a	n/a	$591	0	$16
APRIL	2010	5,761	n/a	n/a	n/a	$662	0	$16
MAY	2010	5,699	n/a	n/a	n/a	$658	0	$16
JUNE	2010	5,732	n/a	n/a	n/a	$630	0	$16
JULY	2009	5,878	n/a	n/a	n/a	$617	0	$16
AUGUST	2009	5,260	n/a	n/a	n/a	$569	0	$16
SEPTEMBER	2009	5,342	n/a	n/a	n/a	$579	0	$16
OCTOBER	2009	5,024	n/a	n/a	n/a	$551	0	$16
NOVEMBER	2009	5,804	n/a	n/a	n/a	$637	0	$16
DECEMBER	2009	5,358	n/a	n/a	n/a	$709	0	$16
TOTAL		**63,213**	**0**	**0**	**0**	**$7,410**	**0.0**	**$192**

Annual Total Energy Cost = $7,602 Per Year

Total KWH x 0.003413 = 215.75 x 106
Total MCF x 1.03 = 0.00 x 106
Total Other x ____ x 106
Total Site BTU's/yr 215.75 x 106

Floor area: 2,880 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 74,912 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $2.64 $/s.f. yr

The district has one electricity providers: Direct Energy. Transmission and Distribution is provided by AEP. Copies of the electric rate schedules are included in Appendix II.

4.0 RATE SCHEDULE ANALYSIS

ELECTRICITY PROVIDER:

TRANSMISSION AND DISTRIBUTION (T&D): AEP

Electric Rate: Secondary Service > 10 kW

I.	TRANSMISSION AND DISTRIBUTION CHARGES:		
	Customer Charge	=	$26.52 per meter
	Metering Charge	=	$15.81 per meter
	Transmission System Charge (Non-IDR Meter)	=	$1.793 per NCP kW
	Distribution System Charge	=	$3.314 per Billing kW
II.	SYSTEM BENEFIT FUND	=	$0.000662 per kWh
III.	TRANSITION CHARGES		
	Transition Charge 1	=	$1.035407/kW
	Transition Charge 2	=	$2.464918/kW
IV.	NUCLEAR DECOMMISSIONING CHARGE	=	$0.037224 per Billing kVA
V.	TRANSMISSION COST RECOVERY FACTOR	=	$0.335686/4CP kVA
VI.	COMPETITIVE METERING CREDIT	=	$2.17 per month
VII.	RATE CASE SURCHARGE RIDER #1	=	$0.000047 per kWh
VIII.	RATE CASE SURCHARGE RIDER #2	=	$0.000065 per kWh
IX.	TRUE-UP CASE SURCHARGE RIDER	=	$0.041116 per kW
X.	ENERGY EFFICIENCY RIDER	=	$0.000288 per kWh
XI.	ADVANCED METERING SYSTEM RIDER	=	$2.05 per month

Average Savings for consumption (from billings) = $0.08280 (est.) + $0.0015 + $0.000662 + $0.000047 + $0.000065 + $0.000288 = $0.085362 / kWh

Average Savings for demand = $1.793 + $3.314 + $1.035407 + $2.464918 + + 0.037224 + $0.335686 + $0.041116 = $9.02 / kW**

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

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

CenterPoint Energy

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

Cost for Natural Gas purchased during billing cycle:	$1,044
Gas Service Charge per Meter:	$16.00 per month
	$192 per year
Number of Meters:	2

Total Cost of Natural Gas Commodity during billing cycle = $1,044 – (2 meters X $192 per meter) = $660

Quantity of Natural gas purchased during billing cycle by NISD: 52 mcf

Average cost per mcf = Total Cost / Quantity Purchased = $660 / 52 mcf = $12.69 / mcf

Average Commodity Cost Savings per mcf = $**12.69 / mcf**

5.0 CAMPUS DESCRIPTIONS

The **City of Bishop**, located in Nueces County Texas, owns two buildings and several lift stations that were surveyed for this report. The surveyed buildings include City Hall and the Police Station. The City Hall operates from 8am to 5pm; the Police Station operates 24 hours a day 7 days a week. The population of the city is approximately 3,300 persons.

A. CITY HALL

Figure 1: City Hall Lobby

City Hall is a brick-faced building on a concrete pier and beam slab with a low-slope roof. The building encompasses approximately 4,554 square feet. The City will soon receive grant money to renovate the City Hall lighting system and implement other energy saving measures. The 12' tall perimeter single-pane windows are well sealed, but not fully protected from heat gain by the 5' overhang above them. We *recommend the City consider tinting the windows to reduce the solar heat gained through the windows.* It was noted during the survey that several of the exterior doors had missing or damaged weatherstripping. This allows air and contaminants to pass freely between the interior and exterior of the building. *We recommend the City replace the weatherstripping at all exterior doors as needed.*

HVAC & Control System Description:


Figure 2: Dirty 4" filter

The building is conditioned by two Ruud 2006 7-1/2 ton split systems. The air handlers utilize natural gas heating and electric DX cooling. The filters are 4" thick Honeywell high-efficiency pleated filters. The filters found in the units were extremely dirty; there were no replacements in the building and due to the unusual size of the filters, they are not readily available in town. The high efficiency filters are intended more for healthcare environments than they are for public service facilities; *we recommend the City modify the 4" filter cavity to accommodate a single 1" thick pleated filter and increase the frequency of filter replacement to 60 days or less*. This procedure will provide adequate protection for the equipment and satisfactory indoor air quality at a considerable cost savings to the City.

The building is controlled by two programmable thermostats, but the systems have not been programmed. The City believes the system is programmed to operate at 70°F from 7am to 6pm and have a night setback during the cooling season of 80°F, yet inspection of the programming revealed that the systems are currently set to 73°F and 74°F for each time block programmed into the system. In addition to the systems likely running more hours than necessary, the systems are operating at occupied setpoint because no setback temperatures have been programmed into the system. *We recommend the City program the thermostats to limit the*

operation of the system between 7:30am and 5:00pm, Monday through Friday. The City Hall demonstrated an ECI in Section 4 of $2.47 per square foot for the analyzed billing period. The Police Station, a 24/7 facility, demonstrated an ECI of $2.64 for the same period. This suggests that the HVAC system at the City Hall is currently operating as many hours as the Police Station system and the City Hall is only supposed to be occupied for significantly fewer hours. The programming of the thermostats at City Hall represents the best single energy saving opportunity for the City of Bishop.

Lighting System Description:

The majority of the building uses T12 fluorescent fixtures. In the lobby (visible in Figure 2), many of these fixtures are single-pin, single lamp F96T12 fixtures covered by plastic eggcrate lenses that are mounted approximately 14' above the finished floor of the space. This type of fixture does not project a significant amount of light to the workspace from this height. In the office areas (visible in Figure 3), the fixtures are mostly 2-lamp T12 fixtures mounted in angled architectural coves. The City has recently received grant money to replace the existing lighting system. *We recommend the City replace the existing lobby fixtures with pendant mounted T8 or T5 fixtures that will improve the overall quality of light in the spaces. In the office areas, the fixtures can be simply retrofit with T8 lamps and electronic ballasts if the architectural integrity of the recessed coves is desired to be maintained.*

Figure 3: Office area lighting

It was noted during the survey that several storage and service room areas utilize incandescent fixtures. *We recommend these lamps be replaced with 23-watt compact fluorescent lamps to reduce energy consumption by as much as 75%.* Compact Fluorescent lamps (CFLs) are anticipated to have an 8-10 times longer lifespan than incandescent lamps as well.

B. POLICE ADMINISTRATION BUILDING

The Police Administration Building is brick faced building on a concrete slab with a low-sloped roof. The recently renovated building encompasses approximately 2,880 square feet. During the renovation, the City has upgraded the HVAC system and retrofit the existing T12 fixtures with T8 lamps and electronic ballasts.

C. LIFT STATIONS

The City has eight (8) lift stations located throughout the City of Bishop. Some of these stations have been renovated with high efficiency pumps and electrical panel upgrades. Some of the other lift stations are in need of electrical upgrades to minimize the risk of pump failure in the near future. It should be noted that these measures are not energy saving measures in and of themselves, however, the pumps perform a necessary service and the City cannot allow the pumps to stop operating.

As can be seen in Figure 4, the terminals and other metal components within the panels are corroding. Given that the panels are not contained within a building or structure that houses the lift station pumps themselves (in which case, hydrogen sulfides would be the leading candidate for the cause of the corrosion), we suspect the salt-laden sea breeze air to be the source of the corrosion. We recommend the panels be replaced as needed with NEMA Type 4X panels that will offer protection from corrosive agents in an exterior mounted panel.

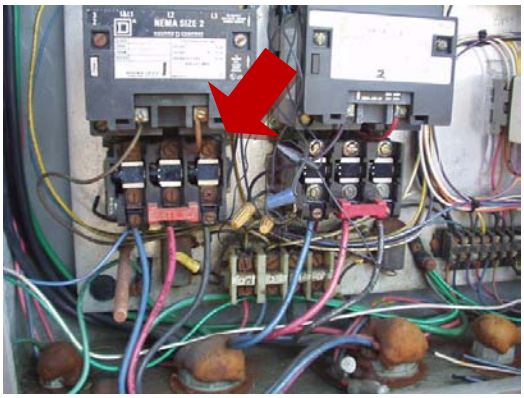


Figure 4: Corroded Lift Station Terminals

Lift Station #3: Currently has one inoperable pump due to electrical difficulties. We recommend the City replace the electrical enclosure, as well as breakers and conductors for both pumps.

Lift Station #2: Currently the only single phase station in the City, this station is cycling through its four capacitors every 2-3 months. Corrosion on the capacitor case suggests it is again the culprit. We recommend the City inspect and replace the seal on the panel to minimize contaminant infiltration.

Lift Station #4: One 7.2 amp 3-pole circuit breaker is the source of frequent maintenance work orders. We recommend this breaker be replaced.

Joyce Lift Station: One of this station's two pumps is inoperable due to a failed 8" check valve. Along with the check valve replacement, the electrical panel needs to be replaced as well.

Main Lift Station: This station requires two new 10" shut-off valves and a new electrical panel to ensure service can be maintained at this location.

6.0 RECOMMENDATIONS

A. MAINTENANCE AND OPERATIONS PROCEDURES

HVAC	•Modify existing filter bank at new furnaces; replace 4" pleated filters with 1"pleated filters at City Hall and change every 60 days or less.
Lighting	•Replace incandescent lamps with compact fluorescent lamps in storage and service areas of City Hall.
Controls	•Re-program the programmable thermostats at City Hall to limit operation of the HVAC System to occupied hours
Building Envelope	•Replace weatherstripping at exterior doors - City Hall

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 City Hall filter banks are utilizing expensive 4" pleated filters. Availability and cost appear to be encouraging the filters to be used for extended periods of time. Slight modifications to the filter racks will allow the system to use 1" pleated filters (less expensive, more readily available). Replacing 1" filters every 60 days or less will still provide good indoor air quality and protection for the units at a reduced cost to the City.

Lighting M&O #1

CFLs are 75% more energy efficient and last 8-10 times longer than incandescent lamps.

Lighting M&O #2

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

Controls M&O #1

The existing programmable thermostats' programming has been deleted. We recommend operating the HVAC system between 7:30am and 5:00pm on Monday to Friday.

Building Envelope M&O #1

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

B. CAPITAL EXPENSE PROJECTS

Envelope

- Install solar film at City Hall Lobby windows.

Envelope ECRM #1 – Install Reflective Solar Film

The building has 12' (approximately) tall single pane windows at the Lobby of City Hall that allow significant amount of solar heat gain in the space, despite the overhang intended to shield the windows. We recommend installing solar film on the lower bank of windows to reduce the heat gain through the windows.

Estimated Installed Cost	=	$ 4,000
Estimated Energy Cost Savings	=	$ 775
Simple Payback Period	=	5-1/4 years

7.0 FINANCIAL EVALUATION

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

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

Proposal:	Perform recommended ECRMs			
Assumptions:				
1. Equipment will last at least 15 years prior to next renovation				
2. No maintenance expenses for first five years (warranty period)				
3. $0 maintenance expense next 5 years				
Cash Flow	**Project Cost**	**Project Savings**	**Maintenance Expense**	**Net Cash Flow**
Time 0	($4,000)		0	($4,000)
Year 1		$ 775	0	$775
Year 2		$ 775	0	$775
Year 3		$ 775	0	$775
Year 4		$ 775	0	$775
Year 5		$ 775	0	$775
Year 6		$ 775	0	$775
Year 7		$ 775	0	$775
Year 8		$ 775	0	$775
Year 9		$ 775	0	$775
Year 10		$ 775	0	$775
			Internal Rate of Return	**14.27%**

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

APPENDIX I: SUMMARY OF FUNDING AND PROCUREMENT OPTIONS

8.0 GENERAL COMMENTS

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

APPENDICES

APPENDIX I - SUMMARY OF FUNDING AND PROCUREMENT OPTIONS

SUMMARY OF FUNDING OPTIONS FOR CAPITAL EXPENDITURE PROJECTS

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

LoanSTAR Program:

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

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

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

Loans on Commercial Market:

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

Leasing Corporations:

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

Bond Issue:

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

SUMMARY OF PROCUREMENT OPTIONS FOR CAPITAL EXPENDITURE PROJECTS

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

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

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

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

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

Solution Center

How to Finance Your Energy Program

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

Selecting a Cost/Benefit Analysis Method

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

Simple Payback Analysis

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

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

Simple Payback

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

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

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

Life-Cycle Cost Analysis

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

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

continued

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

PUBLIC UTILITY COMMISSION OF TEXAS
APPROVED
DEC 23 '09 DOCKET 36928
CONTROL #

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

6.1.1.1.3 SECONDARY VOLTAGE SERVICE GREATER THAN 10 KW

AVAILABILITY

This schedule is applicable to Delivery Service for non-residential purposes 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-phase 60 hertz, at a standard secondary voltage. Delivery Service will be metered using Company's standard meter provided for this type of Delivery Service. Any meter other than the standard meter will be provided at an additional charge. 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 Section 5.7 and 6.1.2 of this Tariff.

MONTHLY RATE

I. Transmission and Distribution Charges:

Customer Charge		
Non-IDR Metered	$3.26	per Retail Customer per Month
IDR Metered	$26.52	per Retail Customer per Month
Metering Charge	$15.81	per Retail Customer per Month
Transmission System Charge		
Non-IDR Metered	$1.286	per NCP kW Billing Demand
IDR Metered	$1.793	per 4CP kW Billing Demand
Distribution System Charge	$3.314	per NCP kW Billing Demand

II. System Benefit Fund: $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

Refer to Section 6.2.2 of the Tariff for additional voltage information.

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.

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.

Refer to Section 5.5.2 of the Tariff for additional information regarding highly fluctuating loads.

Refer to Section 5.5.4 of the Tariff for additional information regarding operational changes significantly affecting Demand.

Refer to Section 5.5.5 of the Tariff for additional information regarding Power Factor.

Transmission service will be furnished by the Transmission Service Providers (TSPs), and not the Company. The Company performs only the billing function for TSPs.

Determination of Billing Demand for Transmission System Charges

Determination of NCP kW

The NCP kW applicable under the Monthly Rate section for transmission system charges for non-IDR metered customers and IDR metered customers without sufficient 4CP kW

demand data shall be the kW supplied during the 15-minute period of maximum use during the billing month.

Determination of 4 CP kW For IDR Metered Customers

If the Billing Meter is an IDR Meter that was installed at the Retail Customer's request, or by Commission rule, the transmission system charges will be calculated using the 4CP billing kW demand as determined in this section. The 4 CP kW demand applicable under the Monthly Rate section shall be the average of the sum 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 4 CP kW 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 demand will be billed at the applicable NCP kW demand rate under the "Transmission System Charge" using the Retail Customer's NCP kW demand.

All Retail Customers with IDR metering, except IDR meters installed by Company for load survey purposes, will be billed Transmission charges on their 4 CP kW demand pursuant to this schedule.

Determination of Billing Demand for Distribution System Charges

Determination of NCP kW Billing Demand

The NCP kW Billing Demand shall be the kW supplied during the 15-minute period of maximum use. The NCP kW Billing Demand applicable to the Distribution System Charge shall be the higher of the NCP kW demand for the current billing month or 80% of the highest monthly NCP kW demand established in the 11 months preceding the current billing month (80% ratchet). The 80% ratchet shall not apply to Retail Seasonal Agricultural Customers.

Determination Of Billing Demand When Meter Readings Cannot be Obtained

When meter readings cannot be obtained due to denial of access, weather, meter failure, tampering, or other event, the Retail Customer's demand will be estimated pursuant to Section 6.2.3.2.

NOTICE

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

APPENDIX III - PRELIMINARY ENERGY ASSESSMENT SERVICE AGREEMENT

RECEIVED JUN 2 2008

REQUEST FOR ENERGY ASSISTANCE

Energy efficiency is increasingly important for our local communities and the state of Texas. It reduces costs, increases available capital, spurs economic growth, improves working, learning and living environments and preserves precious resources. The State Energy Conservation Office (SECO) offers a number of free programs and services to help public agencies establish and achieve their energy efficiency goals.

SECO through its engineering consultants offers public agencies the following free or cost shared energy management services:

- On-Site Energy Assessments Of Facilities — Free
- On-Site Training For Maintenance And Operations Personnel — Free
- Workshops For Energy Managers, Maintenance Personnel And Administrators — Free
- Energy Management Policy Development And Implementation — Free
- Assistance In Identifying Energy Retrofit Funding Sources — Free

Specific responsibilities of the partner and SECO in this agreement:

- Partner will select a contact person to work with SECO and its engineering consultant to establish an energy policy and set realistic energy efficiency goals.
- SECO's contractor will contact partners to assess their energy management needs.
- SECO will provide a report, which identifies no cost/low cost recommendations, capital retrofit projects, potential sources of funding and other needs and opportunities.
- Partner will schedule a time for SECO's contractor to present its findings and recommendations to key decision makers.
- Partner pledges that it is ready and willing to consider implementing the energy saving recommendations.

Acceptance Of Agreement And Request For Energy Management Assistance

Signature: Victor Ramos
Date: May 28, 2008
Name (Mr./Ms./Dr.) Victor Ramos
Title: Mayor
Organization: City of Bishop
Phone: 361-584-2567 ext. 102
Address: PO Box 356
Fax: 361-584-3253
Bishop, Texas 78343
E-mail: bishopmayor@corpus.twcbc.com

Assigned Program Person:

Name: Cynthia L. Contreras
Title: City Secretary
Phone: 361-584-2567 ext. 106
County: Nueces
Fax: 361-584-3253
E-Mail: bishopcitysecretary@corpus.twcbc.com

Please complete and mail or fax to the following SECO Consultant : Texas Energy Engineering Services, Inc. (TEESI), ATTENTION: Saleem Khan, P.E., 1301 Capital Of Texas Highway #B-325, Austin, TX. 78746, Phone 512-328-2533, Fax **512-328-2544**. If you need to contact the State Energy Conservation Office, please call Theresa Sifuentes at **512-463-1896** or you may write to her at: Comptroller Of Public Accounts, State Energy Conservation Office, 111 E. 17th Street, Austin, Texas 78774.

ESA 5/13/10 SRV

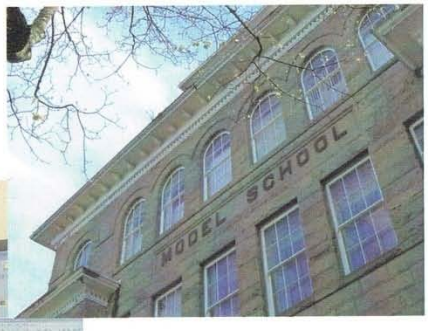
APPENDIX IV - TEXAS ENERGY MANAGERS ASSOCIATION (TEMA)

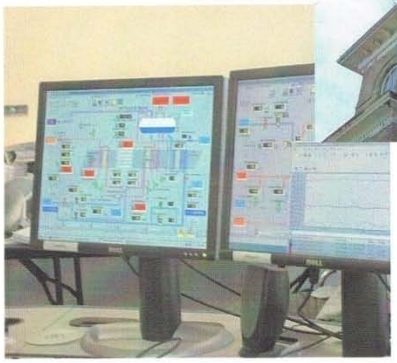
ANNOUNCING!

TEXAS ENERGY MANAGERS ASSOCIATION

TEMA

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