Susan Combs
Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

Prepared by:

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Trinity County

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1.0 EXECUTIVE SUMMARY:

This **Energy Efficient Partnership Service** is provided to public school districts and hospitals 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**.

SECO
State Energy Conservation Office

Program Administrator: Stephen Ross
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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 March, 2011, **SECO** received a request for technical assistance from Doug Page, Judge, for **Trinity County.** **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 **Trinity County,** (hereafter known as TRINITY COUNTY) was completed by ESA **Energy Systems Associates, Inc**., (hereafter known as *Engineer*) to determine the annual energy cost index (ECI) and energy use index (EUI) for each campus or facility. A complete listing of the Base Year Utility Costs and Consumption is provided in Section 3.0 of this report.

Following the utility analysis and a preliminary consultation with *Mr. Doug Page, County Judge,* a walk-through energy analysis was conducted throughout the campus. 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 7.0 of this report.

We estimate that as much as **$33,280** may be saved annually if all recommended projects are implemented. The estimated installed cost of these projects should total approximately **$147,700**, yielding an average simple payback of **4-1/2** years.

Table 1: Summary of Recommended Energy Cost Reduction Measures (ECRMs)

SUMMARY:	IMPLEMENTATION COST	ESTIMATED SAVINGS	SIMPLE PAYBACK
HVAC ECRM #1	$70,000	$10,200	6.9 Years
HVAC ECRM #2	$200	$40	5 Year
HVAC ECRM #3	$7,200	$3,600	2 Years
Lighting ECRM #1	$12,500	$2,100	6 Years
Lighting ECRM #2	$1,800	$290	6-1/4 Years
Lighting ECRM #3	$6000	$4,350	1-1/2 Years
Envelope ECRM #1	$50,000	$12,400	4 Years
Electric ECRM #1	$0	$300	0 Years
TOTAL PROJECTS	**$ 147,700**	**$33,280**	**4-1/2 Years**

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 Internal Rate of Return (IRR), for this retrofit program has been calculated and shown in Section 8.0 of this report.

Our final "summary" comment is that **SECO** views the completion and presentation of this report as a beginning, rather than an end, of our relationship with TRINITY COUNTY. 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., A Terracon Company 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 TRINITY COUNTY, ESA returned to the facilities to perform the following tasks:

1. Design and monitor customized procedures to control the run times of energy consuming systems.
2. Analyze systems for code and standard compliance in areas such as cooling system refrigerants used, outside air quantity, and lighting illumination levels.
3. Develop an accurate definition of system and equipment replacement projects along with installation cost estimates, estimated energy and cost savings and analyses for each recommended project.
4. Develop a prioritized schedule for replacement projects.
5. Develop and draft an overall Energy Management Policy.
6. Assist in the 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 TRINITY COUNTY ENERGY PERFORMANCE INDICATORS:

CAMPUS	ENERGY UTILIZATION INDEX (EUI) BTUs/sf-year	COMPARISON TO CITY AVERAGE	ENERGY COST INDEX (ECI) $/sf-year	COMPARISON TO CITY AVERAGE
County Jail	158,818	105%	$3.39	64%
Trinity Tax Office	82,339	6%	$2.54	23%
Trinity Justice of the Peace	65,251	-16%	$2.19	6%
Museum	66,112	-15%	$2.01	-3%
Rock Building	49,034	-37%	$1.36	-34%
Richter ES	42,839	-45%	$0.89	-57%
Average Value:	77,399		$2.06	

Trinity County purchases electricity from Entergy Texas, Inc. The energy history spreadsheets are shown on the next few pages.

The rate schedule analysis for the district is shown in Section 4.0.

A copy of the rate schedule is included in Appendix I

4.0 RATE SCHEDULE ANALYSIS:

ELECTRICITY PROVIDER:

RETAIL ELECTRIC PROVIDER: None Contract price: $0.0668238 per kWh

TRANSMISSION AND DISTRIBUTION UTILITY: Entergy Texas, Inc.

Electric Rate: Secondary Service > 10 kVA

I. TRANSMISSION AND DISTRIBUTION CHARGES:

Customer Charge	=	$41.09 per month
Billing Load Charge	=	$4.77 per kW
Energy Charge	=	$0.02214 per kWh

Average Savings for consumption = $0.0668238/kWh + $0.02214/kWh = $0.0889638/kWh
Average Savings for demand = $ 4.77/kW

5.0 CAMPUS DESCRIPTIONS:

Trinity County consists of numerous buildings which are located the County; in and throughout the cities of Groveton, Trinity, Apple Springs, and Pennington. The energy survey focused on five of the Buildings:

Table 2: Facilities Analyzed For This Report

Facility	Year originally Constructed	Approximate Square Footage	Basic HVAC Cool/Heat	Basic HVAC Air Distribution	Basic Lighting System Description	Basic Control System Description
Rock Building	1937	4,000	Split systems & window units	FCU with Elec Heat	T12	Non programmable T-stats
Jail	1936	3,000	Split systems	FCU with Elec Heat	T12	Non programmable T-stats
Museum	1936	1,500	Split systems & window units	FCU with Elec Heat	T12	Non programmable T-stats
Tax office-Trinity	1960?	800	Window units	Fan in unit	T12	Non programmable T-stats
Justice Center-Trinity	1960?	600	FCU with Elec Heat	FCU with Elec Heat	T12	Non programmable T-stats

Note: FCU = Fan Coil Unit;

The selection of buildings represented the conditions of the average building throughout the county, and much of the recommendations for each location and be extended across the entire county.

6.0 ENERGY RECOMMENDATIONS:

HVAC ECRM 1: RENOVATION OF AGED HVAC EQUIPMENT

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

Rock Building

This facility is currently conditioned with a combination of split systems and window units. The split systems were in good shape. The window units looked to be older. The building HVAC design looks piecemeal, with units being added as necessary through the years. The upstairs cooling system is deficient with the temperatures routinely exceeding 85F in the summer. Currently the building receives its outside air through uncontrolled infiltration. New design should include outside air ducts, gas heat, and programmable thermostats for better performance.

Estimated Cost: $30,000 Estimated Savings: $4,500 Estimated Payback: 6.7 Years

Jail

The Jail is conditioned with split systems. Currently the main office is under-cooled due to the addition of the bank of computers and the additional heat load that has resulted in the space. The equipment conditioning the upstairs holding cells runs all day, every day. There is a desire by the staff to have the thermostats for the upstairs area moved downstairs so they can turn them off. This is a bad idea, since, when running, they units would be reacting to the downstairs temperatures and not the area it is servicing. These units are reaching the end of their useful life and should be considered for replacement. A better solution for the upstairs control would be to connect the unit to a programmable thermostat and an occupancy sensor. When someone is present the unit will run. When there is no movement in the area for a while, the units turn off. These controls can be installed remotely and with protection to prevent prisoners from damaging or tampering with the equipment.

Estimated Cost: $30,000 Estimated Savings: $4,500 Estimated Payback: 6.7 Years

Tax Office

The tax office is run by 3 window units, of which one is very old. The courthouse unit was running with one in the building. These need to be replaced with units that are more efficient. A central split system would be a better option because of its capability to dehumidify better because of the thicker evaporator coil design.

Estimated Cost: $10,000 *Estimated Savings: $1,200* *Estimated Payback: 8.3 Years*

County wide (3 locations):
Estimated Cost: $70,000 Estimated Savings: $10,200 Estimated Payback: 6.9 Years

HVAC ECRM 2: INSULATION OF SPLIT SYSTEM PIPING

It was noted during the survey, that the museum split system refrigerant piping had damaged or missing insulation. This should be replaced and other systems inspected for similar conditions.

Estimated Cost: $200 *Estimated Savings: $40* *Estimated Payback: 5 Years*

HVAC ECRM 3: INSTALL PROGRAMABLE THERMOSTATS

It was noted during the survey that air conditioning units are not under any HVAC system control beyond the conventional thermostats currently installed with the system. *We recommend installing IP Addressable Programmable Thermostats in these buildings.* These devices will allow the district personnel with appropriate password credentials to monitor and program these units at any district network computer and will limit operation of the HVAC equipment to scheduled occupancy hours. Currently, units are running continuously.

Estimated Cost: $400/ stat Estimated Savings: $200 Estimated Payback: 2 Years

County wide (18 thermostats):

Estimated Cost: $7,200 Estimated Savings: $3,600 Estimated Payback: 2 Years

Lighting ECRM 1: RETROFIT OF T12 LIGHTING TO T8:

All five locations were noted to utilize T12 components in their linear fluorescent lighting fixtures. T12 components produce approximately 18% less light and consume about 20% more energy than the T8 lamps and electronic ballasts that may be retrofit into the existing linear fluorescent fixtures. Senate Bill 300 requires Texas government buildings to install the most efficient lamps and ballasts possible in their existing fixtures. *Therefore, we recommend the City retrofit the fixtures at these facilities with T8 lamps and electronic ballasts.*

Estimated Cost: $12,500 Estimated Savings: $2,100 Estimated Payback: 6 years

Lighting ECRM 2: REPLACE INCANDESCENT EXIT FIXTURES WITH LED FIXTURES

The Jail was noted to have numerous incandescent exit fixtures in the buildings. Most incandescent exit fixtures have two each 15-watt lamps and consume 30 watts per fixture, 8,760 hours per year. Therefore, each fixture consumes 263 kWh per year. LED exit fixtures consume less than 5 watts per fixture and reduce electrical consumption to 44 kWh per year.

Estimated Cost: $1800 Estimated Savings: $290 Estimated Payback: 6-1/4 Years

Lighting ECRM 3: OCCUPANCY SENSOR INSTALLATION

There were several areas of the facilities that were noted to have artificial light fixtures operating during unoccupied periods. The first line of defense for the district to eliminate unnecessary fixture operation is to conduct staff training to turn lights off as the last occupant leaves the room. Studies have shown that linear fluorescent fixtures, the type of fixture most often found in classrooms, offer energy savings 23 seconds after they have been turned off when considering the startup current required to turn the fixtures back on when the occupants return. If the training is unsuccessful in changing the behavior of the occupants, then automatic means of turning off the lights, most commonly occupancy sensors, can be employed to perform the task. One such location that this strategy is available is the upstairs area of the jail. There are twelve 60 Watt incandescent light fixtures in this space that were noted to be on during unoccupied periods; we recommend installing occupancy sensors to ensure the lights are off when nobody is in the space.

Estimated Cost: $600/area Estimated Savings: $435 Estimated Payback: 17 months

County wide (10 areas):
Estimated Cost: $6,000 Estimated Savings: $4,350 Estimated Payback: 17 months

Envelope ECRM 1: Replace single pane windows

The windows at all locations were single pane. The Rock building and Jail were made in the 1930s. They create two problems. First, they leak. There were obvious gaps where air can freely pass. Second, they are single pane. Single pane, especially older windows, does not slow down the transfer of heat into a building. We recommend replacing the windows.

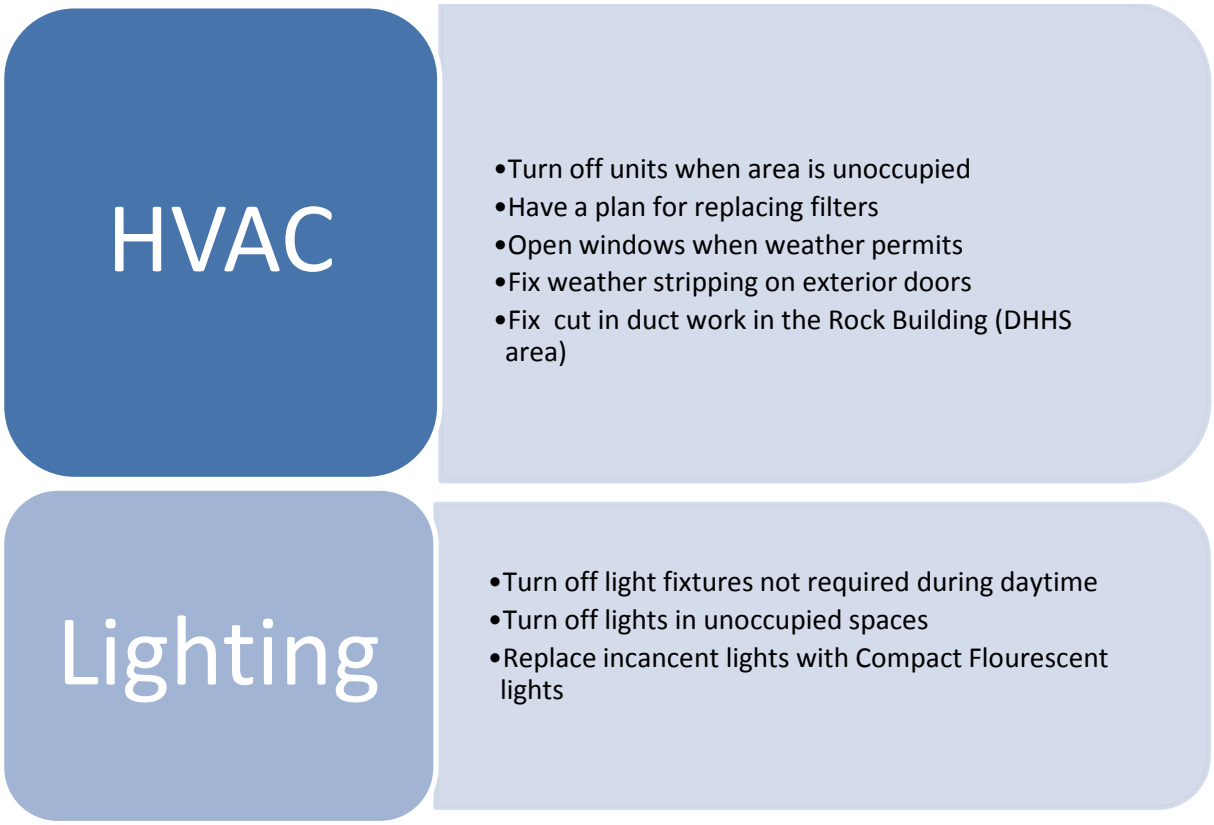
Estimated Cost: $50,000 Estimated Savings: $12,400 Estimated Payback: 4 Years

Electrical ECRM 1: REMOVE PLUG LOAD FROM OFFICES.

During the tour, it was noticed that many offices had plug loads that were for personal use. These items included microwaves, mini-fridges, space heaters, plug in candles, coffee machine and lamps. These items were found numerous times and were left running without regard. Many personal refrigerators had nothing in them and lamps were left operating when no one was in the room. Refrigerators can be centralized and shared to reduce the electrical usage. Prohibiting personal appliances would be a good item to include in the energy conservation plan.

Estimated Cost: $0 Estimated Savings: $300 Estimated Payback: 0 Years

7.0 MAINTENANCE AND OPERATION RECOMMENDATIONS



Maintenance and Operation procedures 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 always less than one year. The difficulties with payback calculation 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 weatherstripping so that exact air losses may be determined, is time and cost prohibitive when the benefits of renovating door and weather weatherstripping are well documented and universally accepted.

HVAC M&O

At Trinity County, the HVAC M&O opportunities revolve around turning off HVAC equipment when the building is unoccupied. This can be done by a person going around after everyone goes home or using programmable thermostats.

While the filters were clean when our tour occurred, it is imperative that the filters be replaced on a normal interval. We recommend the district replace each HVAC filter with a pleated filter every 60-90 days.

Many locations had operable windows. Whenever the ambient conditions allow, open them and let the fresh air in.

Numerous exterior doors did not have weatherstripping. This allows the free flow of conditioned air to the exterior. For example, a narrow 1/4-inch gap beneath a conventional entry door is equal in size to a 3-inch-square hole in your door. Replace or fix any weatherstripping that is not stopping airflow.

There was a cut in the ductwork at the Rock Building. Repair the hole so the equipment can run properly.

Lighting M&O

Some areas of the buildings noted in Section 6.0 of the report had light fixtures that were not required to be operating during the day or fixtures that were left operating in unoccupied spaces. The least expensive remedy to these issues is to train staff to not turn on fixtures not needed during daytime hours and to turn off fixtures in unoccupied spaces. Failure of the behavioral modification training will require the district to invest capital into automatic controls for the fixtures. The fixture shown was on in the unoccupied holding cell of the Jail. Also the fixture is incandescent and should be replaced with a compact fluorescent fixture to further reduce electrical consumption.

8.0 FINANCIAL EVALUATION

Financing of these projects may be provided using a variety of methods such 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. $5,000 maintenance expense next 5 years			
4. $10,000 maintenance expense next 5 years			
5. Savings decreases 5% per year after year 5			
Cash Flow	**Project Cost**	**Project Savings**	**Maintenance Expense**	**Net Cash Flow**
Time 0	($147,700)		0	($147,700)
Year 1		$ 33,280.00	0	$33,280
Year 2		$ 33,280.00	0	$33,280
Year 3		$ 33,280.00	0	$33,280
Year 4		$ 33,280.00	0	$33,280
Year 5		$ 33,280.00	0	$33,280
Year 6		$ 31,616.00	($5,000)	$26,616
Year 7		$ 29,952.00	($5,000)	$24,952
Year 8		$ 28,288.00	($5,000)	$23,288
Year 9		$ 26,624.00	($5,000)	$21,624
Year 10		$ 24,960.00	($5,000)	$19,960
Year 11		$ 23,296.00	($10,000)	$13,296
Year 12		$ 21,632.00	($10,000)	$11,632
Year 13		$ 19,968.00	($10,000)	$9,968
Year 14		$ 18,304.00	($10,000)	$8,304
Year 15		$ 16,640.00	($10,000)	$6,640
			Internal Rate of Return	**17.09%**

More information regarding financial programs available to Trinity County can be found in:

APPENDIX I: SUMMARY OF FUNDING AND PROCUREMENT OPTIONS

9.0 GENERAL COMMENTS

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

APPENDICES

APPENDIX I - SUMMARY OF FUNDING AND PROCUREMENT OPTIONS FOR CAPITAL EXPENDITURE PROJECTS

SUMMARY OF FUNDING OPTIONS FOR CAPITAL EXPENDITURE PROJECTS

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

LoanSTAR Program:

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

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

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

Loans on Commercial Market:

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

Leasing Corporations:

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

Bond Issue:

The Board 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 Eddy Trevino of State Energy Conservation Office, (SECO), at 512-463-1896 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

ENTERGY TEXAS, INC.
Electric Service

SCHEDULE GS

Sheet No.: 9
Effective Date: 5-2-11
Revision: 16
Supersedes: GS Effective 8-15-10
Schedule Consists of: Two Sheets

GENERAL SERVICE

I. APPLICABILITY

This rate is applicable under the regular terms and conditions of the Company to Customers who contract for not less than 5 kW or not more than 2,500 kW of electric service to be used for general lighting and power.

II. NET MONTHLY BILL

A. Customer Charge $41.09 per month

B. Billing Load Charge
All kW per month $ 4.77 per kW

C. Energy Charge

All kWh used $ 0.02214 per kWh*

*Plus the Fixed Fuel Factor per Schedule FF and all applicable riders.

D. Delivery Voltage Adjustment

The Delivery Voltage below represents the voltage of the line from which service is delivered and metered or the voltage used in determining the facilities charge under Schedule AFC, whichever is less. When service is metered at a voltage other than the Delivery Voltage, metered quantities will be adjusted by 1.5% for each transformation step to the Delivery Voltage.

Delivery Voltage	Adjustment
Secondary	No adjustment
Primary (2.4KV-34.5KV)	($0.58) per kW of Billing Load
69KV/138KV	($1.15) per kW of Billing Load

E. Minimum Charge

The monthly minimum charge will be the sum of the Customer Charge, the Billing Load Charge and the Delivery Voltage Adjustment. Where the installation of excessive new facilities is required or where there are special conditions affecting the service, Company may require, in the Contract, a higher minimum charge and/or Facilities Agreement pursuant to Schedule AFC, to compensate for the additional costs.

(Continued on reverse side)

III. **METERING, PHASE AND VOLTAGE OF SERVICE**

Service under this rate schedule will be rendered at the Company's standard phase and voltage available at the point of service. Customer will pay a facilities charge as set forth in Schedule AFC for any applicable nonstandard or duplicative facilities.

Where the Customer elects to take service at the available line voltage (greater than Secondary), metering will be installed at that voltage and Customer will receive the applicable Voltage Adjustment pursuant to § II (D) above. In such cases, Customer may elect to have Company install the necessary transformation facilities to provide service at a lower voltage and Customer will then pay facilities charges pursuant to Schedule AFC. At Company's option, metering may then be at Secondary and Customer's metered quantities will be adjusted pursuant to § II (D) above.

Where service is of extremely fluctuating or intermittent type, Company may specify shorter intervals of load measurement than 30-minute intervals.

IV. **POWER FACTOR ADJUSTMENT**

Where Customer's power factor of total service supplied by Company is such that 80% of measured monthly maximum kVA used during any 30-minute interval exceeds the corresponding measured kW, Company will use 80% of such measured maximum kVA as the number of kW for all purposes that measured maximum kW load is specified herein. However, where Customer's power factor is regularly 80% or higher, Company may at its option omit kVA metering equipment or remove same if previously installed.

V. **DETERMINATION OF BILLING LOAD**

The kW of Billing Load will be the greatest of the following:

(A) The Customer's maximum measured 30-minute demand during any 30-minute interval of the current billing month, subject to § III, and IV above; or

(B) 50% of the first 500 kW of Contract Power plus 75% of all additional kW of Contract Power as defined in § VI; or

(C) 5 kW.

VI. **DETERMINATION OF CONTRACT POWER**

Unless Company gives Customer written notice to the contrary, Highest Contract Power and Contract Power will be as defined below:

Highest Contract Power - the greater of (i) the highest Billing Load established during the billing months of June through September since service to Customer began under the currently effective contract or (ii) the contracted kW specified in the currently effective contract.

Contract Power

(A) For existing accounts with contracts for service for loads existing prior to August 15, 2010 - the greater of (i) 60% of the Highest Contract Power established prior to August 15, 2010, or (ii) the highest load established under V (A) above during the billing months of June - September during the 12 months ending with the current month.

 (Continued on next page)

ENTERGY TEXAS, INC.
Electric Service

SCHEDULE GS (Cont.)

Sheet No.: 10
Effective Date: 5-2-11
Revision: 16
Supersedes: GS Effective 8-15-10
Schedule Consists of: Two Sheets

GENERAL SERVICE

(B) For new accounts with contracts for service for loads not existing prior to August 15, 2010 - the highest load established under V (A) above during the billing months of June - September during the 12 months ending with the current month.

(C) For either (A) or (B) above for the initial 12 months of Customer's service, the Contract Power shall be estimated in advance from best data available and subject to adjustment for difference in actual and estimated.

VII. **USE OF SERVICE**

Electric service furnished under this rate shall not be used by Customer as an auxiliary or supplementary service to engines or other prime movers, or to any other source of power except in conjunction with rider for Standby and Maintenance Service. Customer shall not sub-meter and resell any energy purchased under this rate, except as may be specifically authorized by the appropriate regulatory authority.

VIII. **AMOUNT DUE AND PAYMENT**

The past due amount for service furnished for which payment is not made within sixteen (16) days of the billing date shall be the monthly bill, including all adjustments under the rate schedule and applicable riders, plus 5%. The 5% penalty on delinquent bills shall not be applied to any balance to which the penalty has already been applied. If the amount due when rendered is paid prior to such date, the monthly bill, including all adjustments under the rate schedule and applicable riders, shall apply. If providing service to the State of Texas or to municipalities or other political subdivisions of this state, Company shall not assess a fee, penalty, interest or other charge to these entities for delinquent payment of a bill.

APPENDIX IV - PRELIMINARY ENERGY ASSESSMENT SERVICE AGREEMENT

SECO
State Energy Conservation Office

Local Governments and Municipalities

Preliminary Energy Assessment Service Agreement

Investing in our communities through improved energy efficiency in public buildings is a win-win opportunity for our communities and the state. Energy-efficient buildings reduce energy costs, increase available capital, spur economic growth, and improve working and living environments. The Preliminary Energy Assessment Service provides a viable strategy to achieve these goals.

Description of the Service

The State Energy Conservation Office (SECO) will analyze electric, gas and other utility data and work with TRINITY COUNTY, 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: Doug Page
Date: 03-25-11
Name (Mr./Ms./Dr.) DOUG PAGE
Title: TRINITY CO. JUDGE
Organization: TRINITY COUNTY
Phone: 936-642-1746
Street Address:
Fax:
Mailing Address: P.O. BOX 457
E-Mail: doug.page@co.trinity.tx.us
GROVETON, TX. 75845
County: TRINITY

Contact Information:

Name (Mr./Ms./Dr.): DOUG PAGE
Title: TRINITY CO. JUDGE
Phone: 936-642-1746
Fax:
E-Mail: doug.page@co.trinity.tx.us
County: TRINITY

Please sign and mail or fax to: Stephen Ross, **Local Governments and Municipalities** Program Administrator, State Energy Conservation Office, 111 E. 17th Street, Austin, Texas 78774. Phone: 512-463-1770. **Fax 512-475-2569.**

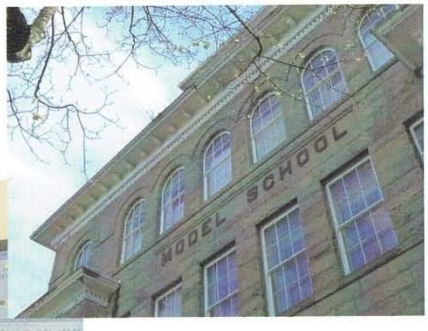
APPENDIX V - TEXAS ENERGY MANAGERS ASSOCIATION (TEMA)

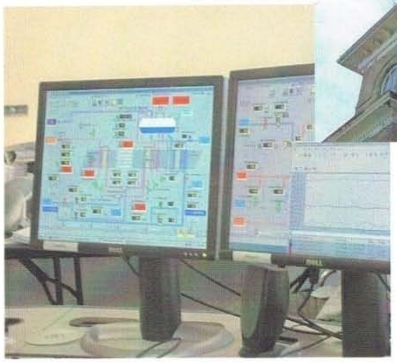
ANNOUNCING!

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

APPENDIX VI - UTILITY CHARTS ON CD