

# **SCHOOLS/LOCAL GOVERNMENT ENERGY MANAGEMENT PROGRAM**

For

**McCAMEY  
INDEPENDENT SCHOOL DISTRICT  
McCamey, Texas**

*An Energy Efficient Partnership Service*  
of  
**COMPTROLLER of the STATE of TEXAS  
STATE ENERGY CONSERVATION OFFICE  
111 E. 17th Street  
Austin, Texas 78774**

**Professional Engineering Services By:**

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**May 6, 2009**

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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**.



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The service assists these public, non-profit institutions to take basic steps towards energy efficient facility operation. Active involvement in the partnership from the entire administration and staff within the agencies and institutions is critical in developing a customized blueprint for energy efficiency for their facilities.

In April 2009, **SECO** received a request for technical assistance from *Donny Wiley*, Superintendent for McCamey I.S.D. **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 heating and cooling 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 **McCamey ISD**, (hereafter known as MISD) 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 Appendix IV of this report.

Following the utility analysis and a preliminary consultation with Mr. Wiley, 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 6.0 of this report.

We estimate that as much as \$66,425 may be saved annually if all recommended projects are implemented. The estimated installed cost of these projects should total approximately **\$534,400**, yielding an average simple payback of **8** years.

**SUMMARY TABLE:**

<i><b>SUMMARY:</b></i>	<i><b>IMPLEMENTATION COST</b></i>	<i><b>ESTIMATED SAVINGS</b></i>	<i><b>SIMPLE PAYBACK</b></i>
<i>HVAC</i>	<i>\$128,700</i>	<i>\$ 10,725</i>	<i>12 Years</i>
<i>Lighting</i>	<i>\$ 119,300</i>	<i>\$ 19,900</i>	<i>6 Years</i>
<i>Controls</i>	<i>\$ 286,400</i>	<i>\$ 35,800</i>	<i>8 Years</i>
<i><b>TOTAL PROJECTS</b></i>	<i>\$ 534,400</i>	<i>\$ 66,425</i>	<i>8 Years</i>

(See Section 6.0 for a detailed description of each recommended project.)

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 should be even faster than noted within these calculations.

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 **MISD**. 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.

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**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 on-site visit was conducted by the professional engineering firm contracted by SECO to provide service within that area of the state. 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. ESA then toured the facilities to evaluate changes in maintenance, operations and/or equipment which would produce potential savings in energy consumption and cost.

SECO assisted McCamey ISD by providing Utility Bill Analysis in 1998 as part of an effort to create a statewide Utility Database for Texas Public Schools. At the time, McCamey's facilities were below regional averages for both energy consumption and energy cost per square foot.

### **3.0 CAMPUS DESCRIPTIONS:**

**McCamey ISD** has 10 buildings that make up one 190,942 square foot K-12 campus. McCamey is a small community located in Upton County 72 miles south of Odessa. The district serves approximately 500 students.

It should be noted that in May, 2009, voters in McCamey ISD passed a bond election to make improvements and additions to the Primary School cafeteria wing, Middle School Gym, Technology Lab, Band Hall and Sports facilities.

#### **General District Notes**

The buildings at McCamey ISD are dark red brick clad structures with flat roofs and as can be seen in the picture to the right, many have extended overhangs to protect windows from unwanted solar exposure. The High School and Junior High are two-story buildings; the remainder of the buildings are single-story.



The lighting system throughout the district is currently T12 linear fluorescent fixtures. Many of the classrooms were found to have 35 footcandles on the desktops where recommendations from the Illumination Engineering Society of North America (IESNA) are to have 50 footcandles. *We recommend that these fixtures be retrofit with T8 lamps and electronic ballasts.* These components will increase light output by approximately 18% while consuming about 20% less energy than the current components. This measure will also help MISD comply with the lighting renovation directives of House Bill HB3693 passed in June 2007.

Several of the exit fixtures were found to be incandescent lamp units. *We recommend the district retrofit these units with LED lamps to conserve energy and reduce maintenance expenses associated with lamp replacement or replace the units altogether with LED or LEC exit fixtures.*

It was noted during the survey that many of the district's computer monitors were running screen saver programs instead of being placed in "sleep" mode when the computer labs were not occupied. As demonstrated in Appendix VII, there is significant energy savings available by programming the monitors to move into a sleep mode during periods of inactivity.

Several exterior doors had weatherstripping that was in poor condition at the time of the survey. As can be seen in the picture to the right, the seals at the base of the door are missing which allows unwanted air and contaminant infiltration. *We recommend that the district inspect all exterior doors and repair any damaged or missing weatherstripping.*



The Elementary School and Band Hall were found to have vending machines with advertising lighting operating all of the time. There are new devices which utilize motion sensors to cycle off lighting and minimize compressor operation during unoccupied periods. *We recommend that the district consider installing these devices at vending machines around the campus.*

Some of the water heaters seen during the survey did not have insulation installed on all of the hot water piping (see picture to the right). The majority of the energy losses in hot water systems occurs in the piping of the system. We recommend that the district replace or install insulation on all exposed hot water piping. Additionally, some of the water heaters are electric and available to be controlled with a timer to eliminate operation during weekends, winter break and summer vacation.



There were several areas of the campus that light fixtures were discovered to be operating at unoccupied times. The situation was found in classrooms, the Auditorium, the Maintenance Shop, the Bus Barn and in corridor locations where skylights were providing sufficient ambient light so as to not require the operation of the artificial fixtures. We recommend the district implement a "turn off the lights" training program like the one described in Appendix VII and install separate corridor light switches for light fixtures adjacent to and incorporated in the skylight wells to limit their operation to necessary evening hours.

The HVAC System is generally controlled with conventional and programmable thermostats. As the campus is composed of multiple small buildings distributed over a large campus, verification that all of the units have been turned off at the end of the school day becomes difficult. *In order to maintain tighter control over non-occupied hour operation, we recommend the district consider installing a DDC energy management system or IP addressable programmable thermostats so the monitoring and programming of the HVAC System can be accomplished at one single location.*

The HVAC Systems consists of combinations of split systems (S/Ss) and heat pump rooftop units (RTUs). The district has gradually replaced the units and therefore the brands and ages of the existing systems vary greatly around the district.

Some of the High School Heat Pump RTUs were installed in 1994 and at 15 years old are approaching the end of their 15-20 year useful life expectancy. We recommend that district consider replacement of these units through planned obsolescence. In this process, the district replaces as many of the oldest and most maintenance prone units that the yearly budget can tolerate until all of the inefficient units have been renovated.

Much of the Junior High HVAC System was installed about 1992. These units (five each 5-ton, six each 4-ton and four each 3-1/2 ton) are in poor condition and should be considered for immediate replacement if not already included in the scope of work contained in the recently passed bond. At the time these units are replaced, the district should also consider replacing the associated condensate drain lines that are currently inadequately supported to maintain proper drainage.

## 4.0 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" (BTU's).

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

$$\text{ELECTRICITY Usage} \\ [\text{Total KWH /yr}] \times [3413 \text{ BTUs/KWH}] = \text{_____ BTUs / yr}$$

$$\text{NATURAL GAS Usage} \\ [\text{Total MCF/yr}] \times [1,030,000 \text{ BTUs/MCF}] = \text{_____ BTUs / yr}$$

After adding the BTU consumption of each fuel, the total BTU's are then divided by the building area.

$$\text{EUI} = [\text{Electricity BTU's} + \text{Gas BTU's}] \text{ divided by } [\text{Total square feet}]$$

### 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:

$$\text{ECI} = [\text{Electricity Cost} + \text{Gas Cost}] \text{ divided by } [\text{Total square feet}]$$

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 :**

**MCCAMEY ISD**

<b><u>CAMPUS</u></b>	<b>ENERGY UTILIZATION INDEX (EUI) (Btu/sf-year)</b>	<b>ENERGY COST INDEX (ECI) (\$/sf-year)</b>
<b>2008 McCamey K-12 Campus</b>	<b>53,267</b>	<b>\$1.08</b>
Region 18 2006 Average ES:	37,964	\$0.68
1998 McCamey K-12 Campus	48,077	\$0.62

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Comparison: McCamey ISD, 2008 to 1998: The district has increased its EUI 11% from 48,077 to 53,267 BTU/sf-year. ECIs are higher over the same time period, but this increase is exaggerated by the significant energy price increases experienced since 1998.

Comparison: McCamey ISD to Regional Averages: The EUIs for the McCamey facilities are above regional averages for EUI and ECI.

**5.0 RATE SCHEDULE ANALYSIS:****RETAIL ELECTRIC PROVIDER (REP):** West Texas Utilities [**\$0.0924 per kWh**]*Other Charges:*Service Charge (referred to as **ESI ID Charge**): = \$9.95 per month*Regulatory Charges*

Public Utility Assessment = 0.1667% of Monthly Subtotal

Texas Gross Receipts = .581% of REP + T&amp;D Charges

**TRANSMISSION AND DISTRIBUTION (T&D):** **AEP Texas North**

Electric Rate: Secondary Service &gt; 10 kW

**I. TRANSMISSION AND DISTRIBUTION CHARGES:**

Customer Charge	=	\$26.00 per IDR meter
Customer Charge	=	\$4.25 per Non-IDR meter
Metering Charge	=	\$35.00 per IDR meter
Metering Charge	=	\$18.68 per Non-IDR meter
Transmission System Charge (IDR Meter)	=	\$1.953 per 4CP kW
Transmission System Charge (Non-IDR Meter)	=	\$1.245 per NCP kW
Distribution System Charge	=	\$3.21 per NCP kW

**II. SYSTEM BENEFIT FUND** = \$0.000657 per kWh**III. TRANSITION CHARGES** = \$0.000277/kWh**IV. NUCLEAR DECOMMISSIONING CHARGE** = Not Applicable**V. TCRF (IDR Meter)** = \$0.358804/4CP kW

TCRF (Non-IDR Meter) = \$0.243181/ kW

**VI. EXCESS MITIGATION CREDIT** = not applicable**VII. STATE COLLEGE DISCOUNT** = not applicable**VIII. COMPETITIVE METERING CREDIT** = \$2.17 per month**IX. Rate Case Surcharge Rider** = \$0.000039 per kWhAverage Savings for consumption

$$= \$0.0924/\text{kWh} + \$0.000657/\text{kWh} + 0.000277/\text{kWh} + 0.000039/\text{kWh} = \underline{\underline{\$0.093096/\text{kWh}}}$$

$$\underline{\underline{\text{Average Savings for demand}}} = \$1.953 + \$3.21 + \$0.358804 = \underline{\underline{\$5.52/\text{kW}^{**}}}$$

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

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

**NATURAL GAS PROVIDER: Texas Gas Service**

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

Total Cost of Natural Gas purchased during Billing Period: \$33,279  
Total Quantity of Natural Gas purchased during Billing Period: 4,011 MCF

Cost / Quantity = Average Unit Cost  
\$ 33,279 / 4,011 mcf = **\$8.30 per mcf of natural gas**

## 6.0 RECOMMENDATIONS:

### A. MAINTENANCE AND OPERATIONS PROCEDURES

1. Weather-strip around movable portions of exterior door and operable window frames.  
*Stationary sections of window and door frames should be recaulked as needed.*
2. Install insulation on exposed hot water piping in hot water systems.  
*The majority of energy losses occur within the piping of hot water systems.*
3. Implement SECO’s Watt Watcher program to turn lights off in unoccupied areas.  
*The Watt Watcher program gets the students involved with helping to have lights turned off when not in use. Refer to Appendix VII for more information on the Watt Watcher Program.*
4. Retrofit existing incandescent exit fixtures with LED lamps .  
*Significantly reduce operating and maintenance expenses for constant operation devices.*
5. Install vending misers on vending machines around the campus.  
*It is not necessary to operate vending machine advertisement lighting or the compressor 100% of the time during unoccupied periods.*

### B. CAPITAL EXPENSE PROJECTS

#### I. HVAC

Replace 1992 and 1994 rooftop units at the Junior High and High School.

Estimated Installed Cost	=	\$128,700
Estimated Energy Cost Savings	=	\$ 10,725
Simple Payback Period	=	12 Years

#### II. Complete Retrofit from T12 to T8 Lighting System Components

Complete the T12 fluorescent lighting renovation to T8 lamps and electronic ballasts.

Estimated Installed Cost	=	\$119,330
Estimated Energy Cost Savings	=	\$ 19,900
Simple Payback Period	=	6 Years

#### III. Energy Management System

1. Install a DDC Energy Management System to eliminate operation of HVAC System after occupied hours:

Estimated Installed Cost	=	\$ 286,400
Estimated Energy Cost Savings	=	\$ 35,800
Simple Payback Period	=	8 Years

<b>SUMMARY:</b>	<b>IMPLEMENTATION COST</b>	<b>ESTIMATED SAVINGS</b>	<b>SIMPLE PAYBACK</b>
<i>HVAC</i>	\$128,700	\$ 10,725	12 Years
<i>Lighting</i>	\$ 119,300	\$ 19,900	6 Years
<i>Controls</i>	\$ 286,400	\$ 35,800	8 Years
<b>TOTAL PROJECTS</b>	<b>\$ 534,400</b>	<b>\$ 66,425</b>	<b>8 Years</b>

**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.

In-House Funding	=	\$ 534,400	
10 year commercial loan principal	=	\$ 534,400	
10 year commercial loan interest (5%) paid	=	\$ 145,777	
10 year commercial loan TOTAL	=	\$ 706,226	
Commercial Loan Annual Payment	=	\$ 5,668/month	= \$ 68,016/yr
Total Annual Payment Minus Annual Energy Cost Savings	=	\$68,016 – 66,425	= \$ 1,591
<b>Annual cOST to ISD (without considering Maintenance Cost Reduction)</b>	=	<b>\$ 1,591</b>	

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

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

## 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 Theresa Sifuentes of SECO (512-463-1896) for an up-to-date evaluation of prospects for obtaining a loan in the amounts desired.

**TASB (Texas Association Of School Boards) Capital Acquisition Program:**

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

**Loans On Commercial Market:**

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

**Leasing Corporations:**

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

**Bond Issue:**

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

**SUMMARY OF PROCUREMENT OPTIONS  
FOR CAPITAL EXPENDITURE PROJECTS**

**State Purchasing:**

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

**Design/Bid/Build (Competitive Bidding):**

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

**Design/Build:**

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

**Purchasing Standardization Method:**

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

**Performance Contracting:**

Through this arrangement, an energy service company (ESCO) using in-house or third party financing to implement comprehensive packages of energy saving retrofit projects. Usually a turnkey service, this method includes an initial assessment of energy savings potential, design of the identified projects, purchase and installation of the equipment, and overall project management. The ESCO guarantees that the cost savings generated will, at a minimum, cover the annual payment due over the term of the contract. The laws governing Performance Contracting for school districts are detailed in the Texas Education Code, Subchapter Z, Section 44.901. Senate Bill SB 3035, passed by the seventy-fifth Texas Legislature, amends some of these conditions. Performance Contracting is a highly competitive field, and interested districts may wish to contact Theresa Sifuentes of State Energy Conservation Office, (SECO), at 512-463-1896 for assistance in preparing requests for proposals or requests for qualifications.

## 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*

project, including the base date (the date to which all future costs are discounted), the service date (the date when the new system will be put into service), the study period (the life of the project or the number of years over which the investor has a financial interest in the project), and the discount rate. When two or more design alternatives are compared (or even when a single alternative is compared with an existing design), these variables must be the same for each to assure that the comparison is valid. It is meaningless to compare the LCC of two or more alternatives if they are computed using different study periods or different discount rates.

Decision makers in both the public and private sectors have long used LCC analysis to obtain an objective assessment of the total cost of owning, operating, and maintaining a building or building system improvement over its useful life. Nevertheless, an LCC analysis does require a good understanding of acceptable alternatives, useful life, equipment efficiencies, and discount rates.

### Selecting the "Best" Alternatives

Generally, all project alternatives should be screened using simple payback analyses. A more detailed and costly LCC analysis should be reserved for large projects or those improvements that entail a large investment, since a detailed cost analysis would then be a small part of the overall cost. Both simple payback and LCC analyses will allow you to set priorities based on measures that represent the greatest return on investment. In addition, these analyses can help you select appropriate financing options:

- Energy-efficiency measures with short payback periods, such as one to two years, are economically very attractive and should be implemented using operating reserves or other readily available internal funds, if possible.
- Energy-efficiency measures with payback periods from three to five years may be considered for funding from available internal capital investment monies, or may be attractive candidates for third-party financing through energy service companies or equipment leasing arrangements.
- Frequently, short payback measures can be combined with longer payback measures (10

years or more) in order to increase the number of measures that can be cost-effectively included in a project. Projects that combine short- and long-term paybacks are recommended to avoid "cream-skimming" (implementing only those measures that are highly cost effective and have quick paybacks) at the expense of other worthwhile measures. A selected set of measures with a combination of payback periods can be financed either from available internal funds or through third party alternatives.

If simple payback time is long, 10 or more years, economic factors can be very significant and LCC analysis is recommended. In contrast, if simple payback occurs within three to five years, more detailed LCC analysis may not be necessary, particularly if price and inflation changes are assumed to be moderate.

### Weighing Non-Cost Impacts

Some factors related to building heating, air conditioning, and lighting system design are not considered in either simple payback or LCC analyses. Examples include the thermal comfort of occupants in a building and the adequacy of task lighting, both of which affect productivity. A small loss in productivity due to reduced comfort or poor lighting can quickly offset any energy cost savings.

Conventional cost/benefit analyses also normally do not consider the ancillary societal benefits that can result from reduced energy use (e.g., reduced carbon emissions, improved indoor air quality). In some cases, these ancillary benefits can be assigned an agreed upon monetary value, but the values to be used are strongly dependent on local factors. In general, if societal benefits have been assigned appropriate monetary values by a local utility, they can be easily considered in your savings calculations. However, your team should discuss this issue with your local utility or with consultants working on such values in your area.

Finally, in any cost analysis, it can be very important to include avoided cost as part of the benefit of the retrofit. When upgrading or replacing building equipment, the avoided cost of maintaining existing equipment should be considered a cost savings provided by the improvement.

## 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*

infrastructure (such as lighting) to a complete package of measures for multiple buildings and facilities. Generally, the service provider will guarantee savings as a result of improvements in both energy and maintenance efficiencies. Flat-fee payments tend to be structured to maintain a positive cash flow to the customer with whom the agreement is made. With the increasing deregulation of conventional energy utilities, several larger utilities have formed unregulated subsidiaries that offer a full range of energy-efficiency services under performance agreements.

An energy performance contract must define the methodology for establishing the baseline costs and cost savings and for the distribution of those savings among the parties. The contract must also specify how those savings will be determined, and must address contingencies such as utility rate changes and variations in the use and occupancy of a building. While several excellent guidance documents exist for selecting and negotiating energy performance contracts, large or complicated contracts should be negotiated with the assistance of experienced legal counsel.

**Utility Incentives**

Some utilities still offer financial incentives for the installation of energy-efficient systems and equipment, although the number and extent of such programs appears to be decreasing as utility deregulation proceeds. These incentives are available for a variety of energy-efficient products including lighting, HVAC systems, energy management controls, and others. The most common incentives are equipment rebates, design assistance, and low-interest loans.

In general, the primary purpose of utility incentives is to lower peak demand; overall energy-efficiency is an important, but secondary consideration. Incentives are much more commonly offered by electric utilities than by natural gas utilities.

**Additional Financing Sources and Considerations**

**State and Federal Assistance.** Matching grants, loans, or other forms of financial assistance (in

addition to those listed above) may be available from the Federal government or state governments. If your community is considering energy-efficiency improvements for public or assisted multifamily housing, your program could be eligible to receive assistance through various programs of the U.S. Department of Housing and Urban Development. A variety of state-administered programs for building efficiency improvements may also be available, some of which are funded through Federal block grants and programs. Federal assistance available through states include Federal block grants and State Energy Conservation Program funds. An example of individual state programs is the Texas LoanSTAR program, which provides low-interest loans for state agencies and schools.

**Utility Assistance**

**Equipment Rebates.** Some utilities offer rebates on the initial purchase price of selected energy-efficient equipment. The amount of the rebate varies substantially depending on the type of equipment. For example, a rebate of \$.50 to \$1 may be offered for the replacement of an incandescent bulb with a more efficient fluorescent lamp, while the installation of an adjustable speed drive may qualify for a rebate of \$10,000 or more.

**Design Assistance.** A smaller number of utilities provide direct grants or financial assistance to architects and engineers for incorporating energy-efficiency improvements in their designs. This subsidy can be based on the square footage of a building, and/or the type of energy-efficiency measures being considered. Generally, a partial payment is made when the design process is begun, with the balance paid once the design has been completed and installation has commenced.

**Low-Interest Loans.** Loans with below-market rates are provided by other utilities for the purchase of energy-efficient equipment and systems. Typically, these low-interest loans will have an upper limit in the \$10,000 to \$20,000 range, with monthly payments scheduled over a two- to five-year period.

**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](http://www.rebuild.gov)*



APPENDIX II

ELECTRIC UTILITY RATE SCHEDULE

AEP TEXAS NORTH COMPANY  
 TARIFF FOR ELECTRIC DELIVERY SERVICE  
 Applicable: Entire System  
 Chapter: 6 Section: 6.1.1  
 Section Title: Delivery System Charges  
 Revision: Fourth Effective Date: March 31, 2008

**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	\$4.25	per Retail Customer per Month
	IDR Metered	\$26.00	per Retail Customer per Month
Metering Charge			
	Non-IDR Metered	\$18.68	per Retail Customer per Month
	IDR Metered	\$35.00	per Retail Customer per Month
Transmission System Charge			
	Non-IDR Metered	\$1.245	per NCP kW Billing Demand
	IDR Metered	\$1.953	per 4CP kW Billing Demand
Distribution System Charge		\$3.21	per NCP kW Billing Demand

**II. System Benefit Fund:** \$0.000657 per kWh See Charges for SBF

**III. Transition Charge:** See CTC

**IV. Nuclear Decommissioning Charge:** Not Applicable

PUBLIC UTILITY COMMISSION OF TEXAS  
 APPROVED

JAN - 2 '08 DOCKET 34561

AEP TEXAS NORTH COMPANY  
 TARIFF FOR ELECTRIC DELIVERY SERVICE

Applicable: Entire System  
 Chapter: 6 Section: 6.1.1  
 Section Title: Delivery System Charges  
 Revision: Fourth Effective Date: March 31, 2008

- V. **Transmission Cost Recovery Factor:** See Rider TCRF
- VI. **Excess Mitigation Credit:** Not Applicable
- VII. **State Colleges and Universities Discount:** See Rider SCUD
- VIII. **Competitive Metering Credit** See Rider CMC
- IX. **Other Charges or Credits**
  - A. **Rate Case Surcharge Rider** See Rider RCS

**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.

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## APPENDIX III

### UTILITIES CONSUMPTION HISTORY

**OWNER:** McCamey

**BUILDING:** K-12

MONTH / YEAR		ELECTRIC				NAT'L GAS / FUEL		
		DEMAND						
		CONSUMPTION	METERED	CHARGED	COST OF	TOTAL ALL	CONSUMPTION	\$
MONTH	YEAR	KWH	KW/KVA	KW/KVA	DEMAND	ELECTRICAL	MCF	COSTS
						COSTS \$		
JANUARY	2009	128,418	550	550	0	12,255	1,002	\$7,215
FEBRUARY	2008	157,856	770	770	0	15,685	587	\$3,683
MARCH	2008	112,027	708	708	0	11,711	390	\$1,983
APRIL	2008	171,847	906	906	0	16,530	149	\$1,617
MAY	2008	182,825	945	945	0	17,386	44	\$602
JUNE	2008	133,253	545	545	0	13,301	71	\$1,266
JULY	2008	126,716	738	738	0	12,827	59	\$1,271
AUGUST	2008	177,624	776	776	0	16,457	101	\$1,464
SEPTEMBER	2008	225,101	1,126	1,126	0	20,866	161	\$1,555
OCTOBER	2008	155,417	837	837	0	14,981	281	\$1,190
NOVEMBER	2008	106,886	441	441	0	10,257	920	\$5,288
DECEMBER	2008	145,462	592	592	0	13,963	246	\$6,145
<b>TOTAL</b>		<b>1,823,432</b>	<b>8,934</b>	<b>8,934</b>	<b>0</b>	<b>\$176,219</b>	<b>4,011</b>	<b>\$33,279</b>

Annual Total Energy Cost = \$209,498 Per Year

Total KWH x 0.003413 = 6,223.37 x 106

Total MCF x 1.03 = 4,131.33 x 106

Total Other x \_\_\_\_\_ x 106

Total Site BTU's/yr 10,354.70 x 106

Floor area: 194,392 s.f.

**Electric Utility** Constellation      **Account #** Multiple      **Meter#**

**Gas Utility** Natgas Inc.      **Account #** 0

**Energy Use Index:**  
Total Site BTU's/yr 53,267 BTU/s.f.yr  
 Total Area (sq.ft.)

**Energy Cost Index:**  
Total Energy Cost/yr \$1.08 \$/s.f. yr  
 Total Area (sq.ft.)

APPENDIX IV

ENERGY POLICY

## ENERGY POLICY

[Name of Institution]

Recognizing our responsibility as Trustees of \_\_\_\_\_, we believe that every effort should be made to conserve energy and natural resources. As a result, we are establishing this Energy Management Policy which shall be implemented within each of our facilities. We believe that this policy will be beneficial for taxpayers and community residents in the prudent management of our financial and energy resources.

The fulfillment of this policy shall be the joint responsibility of the trustees, administrators, staff and support personnel. The success of the policy is dependent upon total cooperation from all levels within the system.

The board will designate an Energy Manager to coordinate and implement the overall Energy Policy. The Energy Manager will also maintain accurate records of energy consumption and cost on a monthly and annual basis. Energy audits will be conducted annually at each facility and recommendations will be made for updating and improving the energy program. Energy efficiency guidelines and procedures will be reviewed and accepted or rejected by the board. In addition, the procedures required for implementation of the program, and the results achieved from its administration, will be published for administrative and staff information.

Adopted this \_\_\_\_\_ day of \_\_\_\_\_, 200 .

\_\_\_\_\_  
 President, Board of Trustees

Attest: \_\_\_\_\_  
 Secretary, Board of Trustees

APPENDIX V

Preliminary Energy Assessment Service Agreement



## 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 McCAMEY ISD, 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 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 and recommendations to key decision makers.

### Acceptance of Agreement

This agreement should be signed by your organization's chief executive officer or other upper management staff.

Signature: <u>Donny Wiley</u>	Date: <u>4/27/09</u>
Name (Mr./Ms./Dr.): <u>Donny Wiley</u>	Title: <u>Superintendent</u>
Organization: <u>McCamey ISD</u>	Phone: <u>432-652-3666 x 302</u>
Street Address: <u>111 East 11th</u>	Fax: <u>432-652-4219</u>
Mailing Address: <u>PO Box 1069</u>	E-Mail: <u>dwiley@esc18.net</u>
<u>McCamey, TX 78752</u>	County: <u>Upton</u>

**CONTACT INFORMATION:**

Name (Mr./Ms./Dr.): <u>Donny Wiley</u>	Title: <u>Superintendent</u>
Phone: <u>432-652-3666 x 302</u>	Fax: <u>432-652-4219</u>
E-Mail: <u>dwiley@esc18.net</u>	County: <u>Upton</u>

Please sign & FAX or mail to Glenda Baldwin at State Energy Conservation Office. FAX: 512-475-2569  
 Address: LBJ State Office Building, 111 E. 17<sup>th</sup> Street, Austin, Texas 78774. Phone: 512-463-1731  
**AND also, please fax a copy to your SECO Contractor: ESA Energy Systems Associates, Inc.; Attn: Yvonne Huneycutt. FAX: 512-388-3312. Phone: 512-258-0547 x124**

APPENDIX VI

AMORTIZATION SCHEDULE

### Loan Amortization Schedule

Enter values	
Loan amount	\$ 534,400.00
Annual interest rate	5.00 %
Loan period in years	10
Number of payments per year	12
Start date of loan	7/1/2009
Optional extra payments	\$ -

Loan summary	
Scheduled payment	\$ 5,668.14
Scheduled number of payments	120
Actual number of payments	120
Total early payments	\$ -
Total interest	\$ 145,776.94

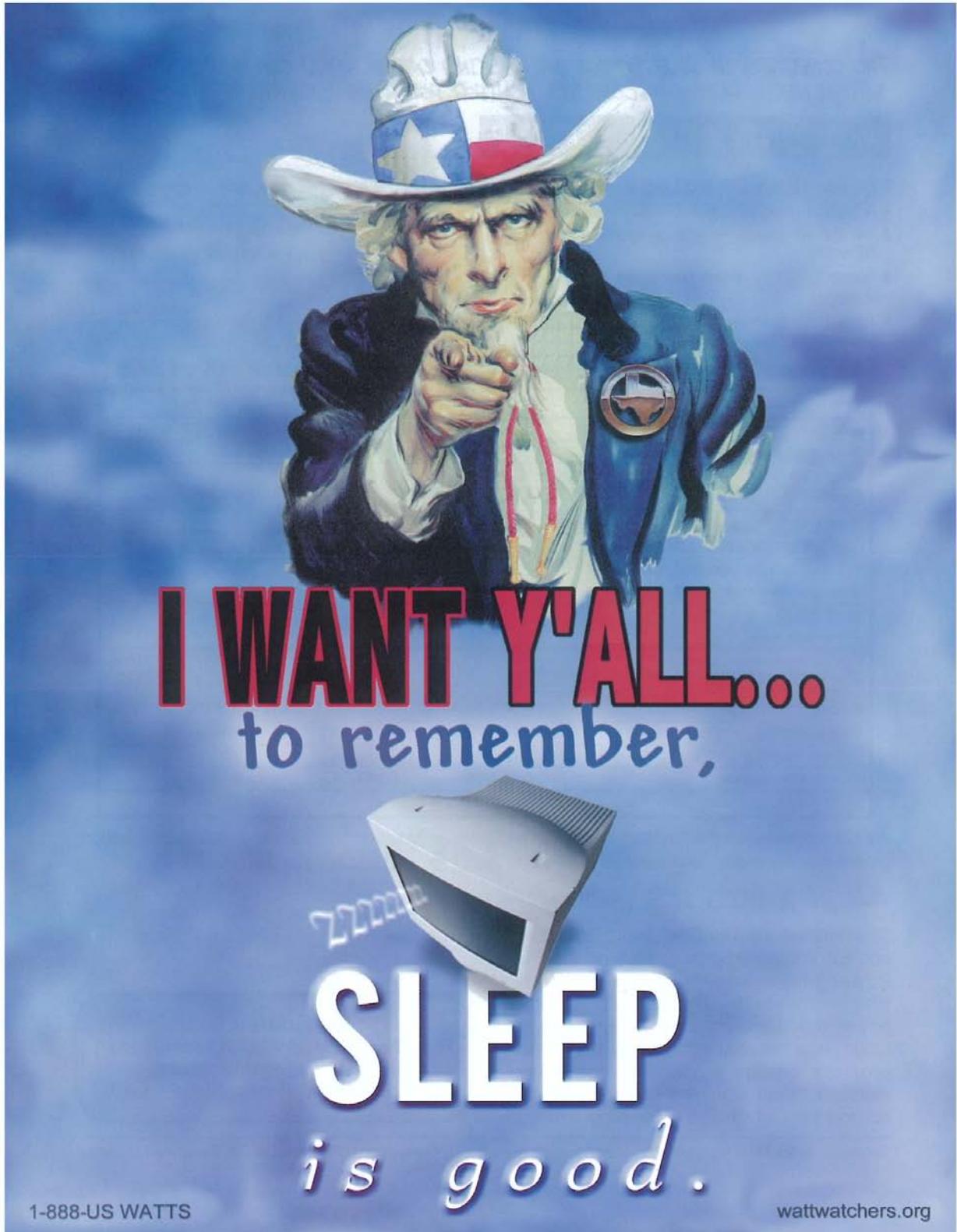
Lender name:

Pmt No.	Payment Date	Beginning Balance	Scheduled Payment	Extra Payment	Total Payment	Principal	Interest	Ending Balance	Cumulative Interest
1	8/1/2009	\$ 534,400.00	\$ 5,668.14	\$ -	\$ 5,668.14	\$ 3,441.47	\$ 2,226.67	\$ 530,958.53	\$ 2,226.67
2	9/1/2009	530,958.53	5,668.14	-	5,668.14	3,455.81	2,212.33	527,502.71	4,438.99
3	10/1/2009	527,502.71	5,668.14	-	5,668.14	3,470.21	2,197.93	524,032.50	6,636.92
4	11/1/2009	524,032.50	5,668.14	-	5,668.14	3,484.67	2,183.47	520,547.83	8,820.39
5	12/1/2009	520,547.83	5,668.14	-	5,668.14	3,499.19	2,168.95	517,048.63	10,989.34
6	1/1/2010	517,048.63	5,668.14	-	5,668.14	3,513.77	2,154.37	513,534.86	13,143.71
7	2/1/2010	513,534.86	5,668.14	-	5,668.14	3,528.41	2,139.73	510,006.45	15,283.44
8	3/1/2010	510,006.45	5,668.14	-	5,668.14	3,543.11	2,125.03	506,463.34	17,408.46
9	4/1/2010	506,463.34	5,668.14	-	5,668.14	3,557.88	2,110.26	502,905.46	19,518.73
10	5/1/2010	502,905.46	5,668.14	-	5,668.14	3,572.70	2,095.44	499,332.76	21,614.17
11	6/1/2010	499,332.76	5,668.14	-	5,668.14	3,587.59	2,080.55	495,745.17	23,694.72
12	7/1/2010	495,745.17	5,668.14	-	5,668.14	3,602.54	2,065.60	492,142.63	25,760.33
13	8/1/2010	492,142.63	5,668.14	-	5,668.14	3,617.55	2,050.59	488,525.09	27,810.92
14	9/1/2010	488,525.09	5,668.14	-	5,668.14	3,632.62	2,035.52	484,892.47	29,846.44
15	10/1/2010	484,892.47	5,668.14	-	5,668.14	3,647.76	2,020.39	481,244.71	31,866.83
16	11/1/2010	481,244.71	5,668.14	-	5,668.14	3,662.95	2,005.19	477,581.75	33,872.01
17	12/1/2010	477,581.75	5,668.14	-	5,668.14	3,678.22	1,989.92	473,903.54	35,861.94
18	1/1/2011	473,903.54	5,668.14	-	5,668.14	3,693.54	1,974.60	470,209.99	37,836.54
19	2/1/2011	470,209.99	5,668.14	-	5,668.14	3,708.93	1,959.21	466,501.06	39,795.74
20	3/1/2011	466,501.06	5,668.14	-	5,668.14	3,724.39	1,943.75	462,776.68	41,739.50
21	4/1/2011	462,776.68	5,668.14	-	5,668.14	3,739.90	1,928.24	459,036.77	43,667.73
22	5/1/2011	459,036.77	5,668.14	-	5,668.14	3,755.49	1,912.65	455,281.28	45,580.39
23	6/1/2011	455,281.28	5,668.14	-	5,668.14	3,771.14	1,897.01	451,510.15	47,477.39
24	7/1/2011	451,510.15	5,668.14	-	5,668.14	3,786.85	1,881.29	447,723.30	49,358.68
25	8/1/2011	447,723.30	5,668.14	-	5,668.14	3,802.63	1,865.51	443,920.67	51,224.20
26	9/1/2011	443,920.67	5,668.14	-	5,668.14	3,818.47	1,849.67	440,102.20	53,073.87
27	10/1/2011	440,102.20	5,668.14	-	5,668.14	3,834.38	1,833.76	436,267.82	54,907.63
28	11/1/2011	436,267.82	5,668.14	-	5,668.14	3,850.36	1,817.78	432,417.46	56,725.41
29	12/1/2011	432,417.46	5,668.14	-	5,668.14	3,866.40	1,801.74	428,551.06	58,527.15
30	1/1/2012	428,551.06	5,668.14	-	5,668.14	3,882.51	1,785.63	424,668.54	60,312.78
31	2/1/2012	424,668.54	5,668.14	-	5,668.14	3,898.69	1,769.45	420,769.86	62,082.23
32	3/1/2012	420,769.86	5,668.14	-	5,668.14	3,914.93	1,753.21	416,854.92	63,835.44
33	4/1/2012	416,854.92	5,668.14	-	5,668.14	3,931.25	1,736.90	412,923.68	65,572.33
34	5/1/2012	412,923.68	5,668.14	-	5,668.14	3,947.63	1,720.52	408,976.05	67,292.85
35	6/1/2012	408,976.05	5,668.14	-	5,668.14	3,964.07	1,704.07	405,011.98	68,996.92
36	7/1/2012	405,011.98	5,668.14	-	5,668.14	3,980.59	1,687.55	401,031.39	70,684.47
37	8/1/2012	401,031.39	5,668.14	-	5,668.14	3,997.18	1,670.96	397,034.21	72,355.43
38	9/1/2012	397,034.21	5,668.14	-	5,668.14	4,013.83	1,654.31	393,020.38	74,009.74
39	10/1/2012	393,020.38	5,668.14	-	5,668.14	4,030.56	1,637.58	388,989.82	75,647.32
40	11/1/2012	388,989.82	5,668.14	-	5,668.14	4,047.35	1,620.79	384,942.47	77,268.12
41	12/1/2012	384,942.47	5,668.14	-	5,668.14	4,064.21	1,603.93	380,878.26	78,872.04
42	1/1/2013	380,878.26	5,668.14	-	5,668.14	4,081.15	1,586.99	376,797.11	80,459.03
43	2/1/2013	376,797.11	5,668.14	-	5,668.14	4,098.15	1,569.99	372,698.95	82,029.02
44	3/1/2013	372,698.95	5,668.14	-	5,668.14	4,115.23	1,552.91	368,583.73	83,581.94
45	4/1/2013	368,583.73	5,668.14	-	5,668.14	4,132.38	1,535.77	364,451.35	85,117.70
46	5/1/2013	364,451.35	5,668.14	-	5,668.14	4,149.59	1,518.55	360,301.76	86,636.25
47	6/1/2013	360,301.76	5,668.14	-	5,668.14	4,166.88	1,501.26	356,134.87	88,137.51
48	7/1/2013	356,134.87	5,668.14	-	5,668.14	4,184.25	1,483.90	351,950.63	89,621.40
49	8/1/2013	351,950.63	5,668.14	-	5,668.14	4,201.68	1,466.46	347,748.95	91,087.86
50	9/1/2013	347,748.95	5,668.14	-	5,668.14	4,219.19	1,448.95	343,529.76	92,536.82
51	10/1/2013	343,529.76	5,668.14	-	5,668.14	4,236.77	1,431.37	339,292.99	93,968.19
52	11/1/2013	339,292.99	5,668.14	-	5,668.14	4,254.42	1,413.72	335,038.57	95,381.91
53	12/1/2013	335,038.57	5,668.14	-	5,668.14	4,272.15	1,395.99	330,766.42	96,777.90
54	1/1/2014	330,766.42	5,668.14	-	5,668.14	4,289.95	1,378.19	326,476.48	98,156.10
55	2/1/2014	326,476.48	5,668.14	-	5,668.14	4,307.82	1,360.32	322,168.65	99,516.42
56	3/1/2014	322,168.65	5,668.14	-	5,668.14	4,325.77	1,342.37	317,842.88	100,858.79
57	4/1/2014	317,842.88	5,668.14	-	5,668.14	4,343.80	1,324.35	313,499.09	102,183.13
58	5/1/2014	313,499.09	5,668.14	-	5,668.14	4,361.99	1,306.25	309,137.10	103,489.38
59	6/1/2014	309,137.10	5,668.14	-	5,668.14	4,380.07	1,288.07	304,757.03	104,777.45
60	7/1/2014	304,757.03	5,668.14	-	5,668.14	4,398.32	1,269.82	300,358.71	106,047.27
61	8/1/2014	300,358.71	5,668.14	-	5,668.14	4,416.65	1,251.50	295,942.06	107,298.77
62	9/1/2014	295,942.06	5,668.14	-	5,668.14	4,435.05	1,233.09	291,501.01	108,531.86
63	10/1/2014	291,501.01	5,668.14	-	5,668.14	4,453.53	1,214.61	287,053.48	109,746.47
64	11/1/2014	287,053.48	5,668.14	-	5,668.14	4,472.08	1,196.06	282,581.40	110,942.53
65	12/1/2014	282,581.40	5,668.14	-	5,668.14	4,490.72	1,177.42	278,090.68	112,119.95

Pmt No.	Payment Date	Beginning Balance	Scheduled Payment	Extra Payment	Total Payment	Principal	Interest	Ending Balance	Cumulative Interest
66	1/1/2015	278,090.78	5,668.14	-	5,668.14	4,509.43	1,158.71	273,581.35	113,278.66
67	2/1/2015	273,581.35	5,668.14	-	5,668.14	4,528.22	1,139.92	269,053.13	114,418.58
68	3/1/2015	269,053.13	5,668.14	-	5,668.14	4,547.09	1,121.05	264,506.04	115,539.64
69	4/1/2015	264,506.04	5,668.14	-	5,668.14	4,566.03	1,102.11	259,940.01	116,641.75
70	5/1/2015	259,940.01	5,668.14	-	5,668.14	4,585.06	1,083.08	255,354.95	117,724.83
71	6/1/2015	255,354.95	5,668.14	-	5,668.14	4,604.16	1,063.98	250,750.79	118,788.81
72	7/1/2015	250,750.79	5,668.14	-	5,668.14	4,623.35	1,044.79	246,127.44	119,833.60
73	8/1/2015	246,127.44	5,668.14	-	5,668.14	4,642.61	1,025.53	241,484.83	120,859.14
74	9/1/2015	241,484.83	5,668.14	-	5,668.14	4,661.95	1,006.19	236,822.88	121,865.32
75	10/1/2015	236,822.88	5,668.14	-	5,668.14	4,681.38	986.76	232,141.50	122,852.08
76	11/1/2015	232,141.50	5,668.14	-	5,668.14	4,700.88	967.26	227,440.61	123,819.34
77	12/1/2015	227,440.61	5,668.14	-	5,668.14	4,720.47	947.67	222,720.14	124,767.01
78	1/1/2016	222,720.14	5,668.14	-	5,668.14	4,740.14	928.00	217,980.00	125,695.01
79	2/1/2016	217,980.00	5,668.14	-	5,668.14	4,759.89	908.25	213,220.11	126,603.26
80	3/1/2016	213,220.11	5,668.14	-	5,668.14	4,779.72	888.42	208,440.39	127,491.68
81	4/1/2016	208,440.39	5,668.14	-	5,668.14	4,799.64	868.50	203,640.75	128,360.18
82	5/1/2016	203,640.75	5,668.14	-	5,668.14	4,819.64	848.50	198,821.11	129,208.68
83	6/1/2016	198,821.11	5,668.14	-	5,668.14	4,839.72	828.42	193,981.39	130,037.10
84	7/1/2016	193,981.39	5,668.14	-	5,668.14	4,859.89	808.26	189,121.50	130,845.36
85	8/1/2016	189,121.50	5,668.14	-	5,668.14	4,880.13	788.01	184,241.37	131,633.37
86	9/1/2016	184,241.37	5,668.14	-	5,668.14	4,900.47	767.67	179,340.90	132,401.04
87	10/1/2016	179,340.90	5,668.14	-	5,668.14	4,920.89	747.25	174,420.01	133,148.29
88	11/1/2016	174,420.01	5,668.14	-	5,668.14	4,941.39	726.75	169,478.62	133,875.04
89	12/1/2016	169,478.62	5,668.14	-	5,668.14	4,961.98	706.16	164,516.64	134,581.20
90	1/1/2017	164,516.64	5,668.14	-	5,668.14	4,982.66	685.49	159,533.99	135,266.69
91	2/1/2017	159,533.99	5,668.14	-	5,668.14	5,003.42	664.72	154,530.57	135,931.41
92	3/1/2017	154,530.57	5,668.14	-	5,668.14	5,024.26	643.88	149,506.31	136,575.29
93	4/1/2017	149,506.31	5,668.14	-	5,668.14	5,045.20	622.94	144,461.11	137,198.23
94	5/1/2017	144,461.11	5,668.14	-	5,668.14	5,066.22	601.92	139,394.89	137,800.16
95	6/1/2017	139,394.89	5,668.14	-	5,668.14	5,087.33	580.81	134,307.56	138,380.97
96	7/1/2017	134,307.56	5,668.14	-	5,668.14	5,108.53	559.61	129,199.03	138,940.58
97	8/1/2017	129,199.03	5,668.14	-	5,668.14	5,129.81	538.33	124,069.22	139,478.91
98	9/1/2017	124,069.22	5,668.14	-	5,668.14	5,151.19	516.96	118,918.04	139,995.87
99	10/1/2017	118,918.04	5,668.14	-	5,668.14	5,172.65	495.49	113,745.39	140,491.36
100	11/1/2017	113,745.39	5,668.14	-	5,668.14	5,194.20	473.94	108,551.18	140,965.30
101	12/1/2017	108,551.18	5,668.14	-	5,668.14	5,215.84	452.30	103,335.34	141,417.59
102	1/1/2018	103,335.34	5,668.14	-	5,668.14	5,237.58	430.56	98,097.76	141,848.16
103	2/1/2018	98,097.76	5,668.14	-	5,668.14	5,259.40	408.74	92,838.36	142,256.90
104	3/1/2018	92,838.36	5,668.14	-	5,668.14	5,281.31	386.83	87,557.05	142,643.73
105	4/1/2018	87,557.05	5,668.14	-	5,668.14	5,303.32	364.82	82,253.73	143,008.55
106	5/1/2018	82,253.73	5,668.14	-	5,668.14	5,325.42	342.72	76,928.31	143,351.27
107	6/1/2018	76,928.31	5,668.14	-	5,668.14	5,347.61	320.53	71,580.70	143,671.80
108	7/1/2018	71,580.70	5,668.14	-	5,668.14	5,369.89	298.25	66,210.81	143,970.06
109	8/1/2018	66,210.81	5,668.14	-	5,668.14	5,392.26	275.88	60,818.55	144,245.94
110	9/1/2018	60,818.55	5,668.14	-	5,668.14	5,414.73	253.41	55,403.82	144,499.35
111	10/1/2018	55,403.82	5,668.14	-	5,668.14	5,437.29	230.85	49,966.53	144,730.20
112	11/1/2018	49,966.53	5,668.14	-	5,668.14	5,459.95	208.19	44,506.58	144,938.39
113	12/1/2018	44,506.58	5,668.14	-	5,668.14	5,482.70	185.44	39,023.89	145,123.83
114	1/1/2019	39,023.89	5,668.14	-	5,668.14	5,505.54	162.60	33,518.34	145,286.43
115	2/1/2019	33,518.34	5,668.14	-	5,668.14	5,528.48	139.66	27,989.86	145,426.09
116	3/1/2019	27,989.86	5,668.14	-	5,668.14	5,551.52	116.62	22,438.35	145,542.72
117	4/1/2019	22,438.35	5,668.14	-	5,668.14	5,574.65	93.49	16,863.70	145,636.21
118	5/1/2019	16,863.70	5,668.14	-	5,668.14	5,597.88	70.27	11,265.82	145,706.48
119	6/1/2019	11,265.82	5,668.14	-	5,668.14	5,621.20	46.94	5,644.62	145,753.42
120	7/1/2019	5,644.62	5,668.14	-	5,644.62	5,621.10	23.52	0.00	145,776.94

APPENDIX VII

SECO PROGRAM CONTACTS  
WATT WATCHERS OF TEXAS



*THE COMPUTERS IN YOUR SCHOOL ARE WASTING ENERGY. YOU CAN HELP YOUR SCHOOL SAVE MONEY. IMPLEMENT COMPUTER MONITOR POWER MANAGEMENT.*

**WHAT Y'ALL NEED TO REMEMBER:**

- Screen savers **DO NOT** save energy!
- A typical monitor uses 60-90 watts
- While in sleep mode a monitor uses 2-10 watts
- Your Energy Star features may not be enabled
- Use free Energy Star software to capture savings
- Utilize your network, put all monitors to sleep at once
- Turn off your monitor at night
- Save energy, save money, prevent pollution

*SOME ACTUAL EXAMPLES FROM DISTRICTS THAT ALREADY SET THEIR MONITORS TO SLEEP:*

	District A	District B	District C
# of computers	3,000	10,000	15,000
% of monitors enabled	55	0	50
% of monitors enabled after mandate	100	100	100
Cost of electricity	7.5¢	5.8¢	6.0¢
Hours monitors are used per week	9	9	9
Days monitors are used per week	5	5	5
% of monitors that are turned off at night and weekends	35	35	35
% of monitors turned off after mandate	65	65	65
Current energy use	953,620 kWh	5,522,790 kWh	5,087,745 kWh
Future energy use	349,479 kWh	1,164,930 kWh	1,747,395 kWh
<b>Energy savings</b>	<b>604,141 kWh</b>	<b>4,357,860 kWh</b>	<b>3,340,350 kWh</b>
Current energy costs	\$71,522	\$320,322	\$305,265
Future energy costs	\$26,211	\$67,566	\$104,844
<b>Monetary savings</b>	<b>\$45,311</b>	<b>\$252,756</b>	<b>\$200,421</b>
% of savings	63	79	65

*If all of the estimated 1.2 million computer monitors in Texas schools were enabled for monitor power management, Texas would save up to **\$20.5 MILLION EACH YEAR!***

**ALL IN A DAY'S REST...**

To download the free Energy Star EZ Save and EZ Wizard programs, click on the PC Power Management link on the Watt Watchers Website. The computer monitor power management campaign, Sleep is Good, is a national effort by EPA/DOE to promote energy savings in computer monitors. Watt Watchers is helping Texas schools take advantage of the program.

Watt Watchers of Texas  
 Phone/Fax 1-888-US WATTS (1-888-879-2887)  
 e-mail [info@wattwatchers.org](mailto:info@wattwatchers.org)  
 Visit our website <http://wattwatchers.org>

*Sponsored by the Texas Comptroller of Public Accounts, State Energy Conservation Office, and the U.S. Department of Energy.*



**I WANT Y'ALL  
FOR WATT WATCHERS**

**1-888 US WATTS**  
**wattwatchers.org**

**SPONSORED BY THE TEXAS STATE ENERGY CONSERVATION OFFICE**

## -IT'S FREE!-IT'S SIMPLE!-IT WORKS!- START YOUR PROGRAM TODAY!

**W**att Watchers of Texas is a FREE energy efficiency program for Texas schools sponsored by the Texas Comptroller of Public Accounts, State Energy Conservation Office, and the U.S. Department of Energy. The program is designed to help school districts save energy and money by getting students involved. It is simple and effective! Students patrol the halls of the schools reducing energy waste by turning off lights and leaving "tickets" for empty classrooms with the lights on. Turning out the lights in a classroom during two unoccupied hours per day (lunch & after school) can save \$50 over a school year.

### GET STARTED

Call 1-888-USWATTS or

Sign up for a free kit. go on-line at <http://wattwatchers.org> to enroll. You will receive a free kit which includes a set of 4 Watt Watchers binders, 4 name badges and 4 name tags with 4 lanyards, 4 pencils, a complete instruction manual on CD-ROM, plus a supply of forms, sample tickets and thank you notes. Everything you need — open your kit and get started today! Not only will your school be provided with all of the materials listed above (approximately a \$25 value), Watt Watchers will provide free support for the program, including:

- \* WATTS NEWS — Quarterly 20 page Newspaper
- \* Toll Free Phone & Toll Free Fax support line
- \* Website and e-mail support
- \* E-Mail Update — Monthly news for Watt Watchers
- \* Workshops — Watt Watchers sponsors regional workshops

- \* Conferences — Watt Watchers attends educational conferences — see you there.
- \* CD-ROM with all the materials — Over 450MB!
- \* Five Year Lapel Pins for dedicated Watt Watchers sponsors
- \* Watt Watchers Certificates for participation and Zero Hero Awards

### BUT THAT'S NOT ALL, Y'ALL!

In addition to student energy patrols that find waste and raise awareness, Watt Watchers also has additional programs for your school:

- \* Traveling Energy Exploration Stations — free loans of hands-on kits for classes
- \* Knowledge is Power — an energy efficiency curriculum supplement
- \* Sleep Is Good — a computer monitor power management program
- \* Junior Solar Sprint — a model solar race car project
- \* Energy Encounter — a one day workshop for high school students
- \* District Energy Council — students assisting energy managers
- \* The Weatherization Project — a residential community energy project
- \* Benchmarking — compare your school district energy use nationally

Watt Watchers of Texas  
Phone/Fax 1-888-US WATTS (1-888-879-2887)  
e-mail [info@wattwatchers.org](mailto:info@wattwatchers.org)  
Visit our website <http://wattwatchers.org>

*Sponsored by the Texas Comptroller of Public Accounts, State Energy Conservation Office, and the U.S. Department of Energy.*

**ENROLL IN  
WATT WATCHERS  
NOW  
IT'S EASY!**

**SIGN-UP  
FOR YOUR**

**FREE  
KIT**

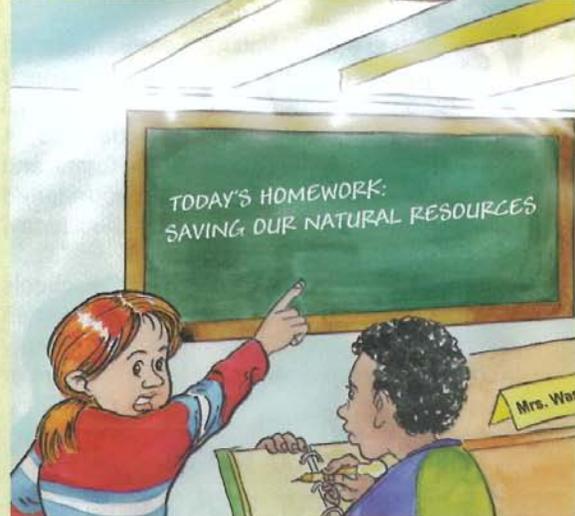
**4-NAME BADGES  
4-NOTEBOOKS  
4-LANYARDS  
4-PENCILS**

**FORMS &  
MANUAL**

**1 YOUR STUDENTS  
PATROL THE SCHOOL**

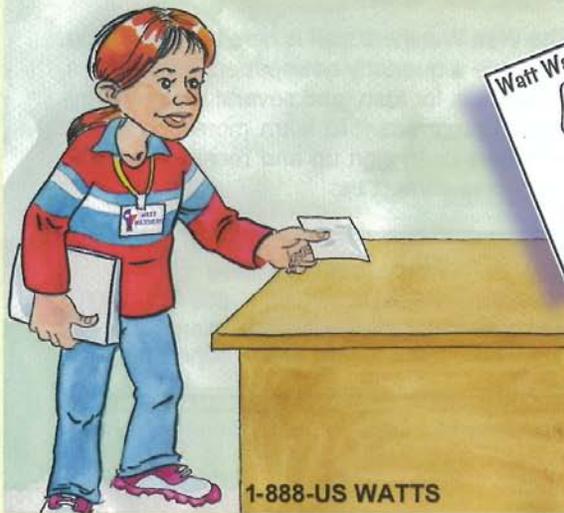


**2 FIND EMPTY CLASSROOMS  
WITH THE LIGHTS ON**



**3 LEAVE TICKETS, SOMETIMES  
THANK YOU NOTES...**

**...REMINDING EVERYONE  
TO SAVE ENERGY AND MONEY**



[wattwatchers.org](http://wattwatchers.org)

# ENROLL IN WATT WATCHERS OF TEXAS



**G**etting a Watt Watchers program started in your school is so simple. All you need to do is order the FREE kit! Your kit comes complete with 4 name badges, 4 lanyards, 4 notebooks, 4 pencils, the forms, and a CD-ROM with a manual to get you started saving energy and money for your school today!

Your students will patrol the halls of the schools to see where energy is being wasted. When they locate a classroom or office that is empty and the lights are on they will leave a reminder ticket ...

**"OH, NO -YOU FORGOT TO TURN YOUR LIGHTS OUT WHEN YOU LEFT THE ROOM!"**

If they notice classrooms that consistently turn the lights out they leave them a thank-you note...

**"THIS ROOM IS FIRST RATE -THANKS FOR SAVING ENERGY FOR OUR SCHOOL!"**

## IT IS THAT SIMPLE.

Your students and your entire school will learn a valuable lesson about energy efficiency and its benefits that will last a lifetime. Your students will change habits and attitudes about our environment while saving money and preventing pollution. You will change the world for the better.

Teachers, just place the Watt Watchers materials in a bin at your front door and assign your students a time to go on patrols throughout the day and the work is done. The program can be adapted to fit your teaching needs and demands. The Watt Watchers program is designed not to interrupt daily school activities. Thousands of programs across Texas are now patrolling quickly and quietly.

## JOIN US TODAY!

The Watt Watchers staff is here to support you. We have a quarterly newspaper, lesson plans, energy kits for loan, and several more energy-related programs. To learn more about Watt Watchers or to sign up and receive your free kit, please contact us:

Watt Watchers of Texas  
 Phone/Fax 1-888-US WATTS (1-888-879-2887)  
 e-mail [info@wattwatchers.org](mailto:info@wattwatchers.org)  
 Visit our website <http://wattwatchers.org>

*Sponsored by the Texas Comptroller of Public Accounts, State Energy Conservation Office, and the U.S. Department of Energy*

APPENDIX VIII

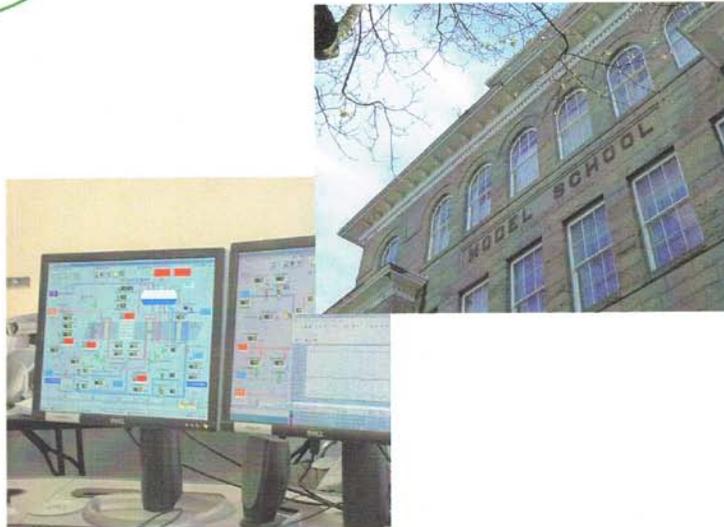
TEXAS ENERGY MANAGERS ASSOCIATION  
(TEMA)

**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.



APPENDIX IX

UTILITY CHARTS ON DISKETTE