

SCHOOLS/LOCAL GOVERNMENT ENERGY MANAGEMENT PROGRAM

For

**SMYER
INDEPENDENT SCHOOL DISTRICT
Smyer, 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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June 24, 2009

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F-4882

Table of Contents

	<u>Page Number</u>
1.0 Executive Summary	1-2
2.0 Energy Assessment Procedure	3
3.0 Campus Description	3-5
4.0 Energy Performance Indicators	6-7
5.0 Utilities Rate Schedule Analysis	8
6.0 Recommendations	
A. Maintenance and Operations Projects	9
B. Capital Expense Projects	9-10
 APPENDICES:	
I. Summary of Funding and Procurement Options	11-19
II. Electric Utility Rate Schedule	20-21
III. Utilities Consumption History	22-23
IV. Energy Policy	24-25
V. Preliminary Energy Assessment Service Agreement	26-27
VI. Amortization Schedule	28-30
VII. SECO Program Contacts Watt Watchers of Texas	31-37
VIII. Texas Energy Managers Association (TEMA)	38-39
IX. Utility Charts on Diskette	40

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 *Dane A. Kerns*, Superintendent for Smyer 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 **Smyer ISD**, (hereafter known as **SISD**) 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 a Maintenance Employee for **SISD**, 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 \$9,658 may be saved annually if all recommended projects are implemented. The estimated installed cost of these projects should total approximately **\$91,050**, yielding an average simple payback of **9-1/2** years.

SUMMARY TABLE:

<i>SUMMARY:</i>	<i>IMPLEMENTATION COST</i>	<i>ESTIMATED SAVINGS</i>	<i>SIMPLE PAYBACK</i>
<i>Gymnasium Fixtures</i>	<i>\$16,000</i>	<i>\$ 2,000</i>	<i>8 Years</i>
<i>Replace Split Systems</i>	<i>\$34,200</i>	<i>\$ 3,420</i>	<i>10 Years</i>
<i>Replace Rooftop Units</i>	<i>\$ 38,850</i>	<i>\$ 3,238</i>	<i>12 Years</i>
<i>Recommission BEMS</i>	<i>\$ 2,000</i>	<i>\$ 1,000</i>	<i>2 Years</i>
<i>TOTAL PROJECTS</i>	<i>\$ 91,050</i>	<i>\$ 9,658</i>	<i>9-1/2 Years</i>

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 **SISD**. 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 Smyer ISD by providing an Energy Partnership Survey in 1999. At the time, Smyer's facilities were slightly below regional average for energy consumption and slightly above regional average for energy cost per square foot. Recommendations included:

1. Replace approximately 25 HVAC units.
2. Replace existing electric ovens with gas units.
3. Re-program the existing control system for demand control operation.

3.0 CAMPUS DESCRIPTIONS:

Smyer ISD consists of one 99,585 square foot K-12 campus. The buildings are brick clad, single story flat-roofed structures built in stages from 1951 through 1996. The building has insulation above the acoustical tile ceilings. A large portion of the original windows were enclosed to minimize thermal heat gain several years ago.

The district reports most of the HVAC Systems were replaced in 2005-2006. It was noted during the survey that the condensate drain lines were not installed correctly when the units were installed. First, the condensate drains were not installed to pipe to roof drains or gutters which would conceptually leave the condensate on the roof to evaporate and over time can cause damage to the roof through differential expansion and contraction. However, the p-trap exit is physically higher (see picture to the right) than the condensate-drain pan connection; therefore condensate will never drain from the unit and water will remain in the drain pan until it overflows down to surfaces below or evaporates. Both conditions lead to unacceptable indoor air quality conditions. *We recommend the p-trap be installed correctly on the condensate drain and the drain itself be extended to roof drain or gutter.*



Additionally, the refrigerant pipe insulation has already severely deteriorated and is completely absent in some locations (see picture to the right). This lack of insulation leads to the refrigerant



absorbing heat from the hot roof and not from the space the system is attempting to condition. *We recommend that the district replace and repair the insulation on these refrigerant lines.*

In addition to the work required at the new units, there are 12 additional systems that should be replaced. Seven (7) each 1996 3-ton Trane rooftop units are in poor condition. At 13 years old, they are nearing the end of their 15 year estimated life expectancy and should be budgeted for replacement in the near future.

Additionally, five split systems need to be replaced (18 tons of cooling capacity combined; installed between 1993 and 1998). The coil fins on these units are severely crushed due to the lack of adequate coil guards. Just 10% of fins being crushed can result in a loss of operating efficiency up to 30%. As can be seen in the picture to the right, at least one of these units has almost 100% of the fins crushed. The fins allow air to flow over the coil and draw heat from the refrigerant as it flows through the coil. If the heat is not dissipated from the system at the condensing unit, then it compromises the refrigerants ability to remove heat from the conditioned space which causes the unit to run more hours than should be required to cool the space and increases occupant discomfort. The gas furnaces that are matched with these units have standing pilots and also need to be replaced with new automatic ignition gas –fired units.



Most of these older systems do not incorporate sufficient quantities of outside air to meet the dilution requirements of ASHRAE. At the time these units are replaced, consideration will have to be given to provide adequate volumes of outside air for dilution in the systems.

The district has a Honeywell Building Energy Management System (BEMS) but the staff reports it serves little purpose for the district. The description of issues that the staff has faced with the system would suggest that training on the system was not adequately provided when the system was installed and the staff quickly grew to distrust the system. All of the equipment required to have a properly operating system appears to be in place so the expense required to recommission and re-train staff on the system should be minimal. The benefit of tightly controlling the operational hours of the equipment to occupancy schedules would greatly outweigh these costs. *We recommend the district re-commission the existing BEMS and re-train the staff on its use.*

During the survey, it was noted that the computers in the computer classrooms were not programmed to have the monitors in “sleep” mode during periods of inactivity. At the time of the survey, late June with no summer school taking place, all of the computers should be off. It was also noted that lights were left operating in unoccupied spaces throughout the campus. *We recommend the district take advantage of the Wattwatcher programs (in particular, the “Sleep is*

Good” and “Turn Off the Lights Programs”) delineated in Appendix VII to save significant amounts of energy.

Both water heaters (one gas, one electric) observed during the survey did not have insulation installed on the hot water lines. The majority of energy losses in a hot water system occur in the piping. *We recommend the insulation at the units be installed to prevent energy losses in the system.*



The gymnasium has 28 each 250-watt metal halide and 12 each 2-lamp compact fluorescent fixtures that operate from the time school starts in the morning through after school activities. *We recommend the district replace these fixtures with new T5 high-bay linear fluorescent fixtures.* These new fixtures do not have the re-strike issue inherent to metal halides so the fixtures may be turned off during inactive periods of the day and no “warm-up” time is required to re-start the fixtures when gym activities resume.

There were three exterior lights still operating during the mid-morning hours. *We recommend these fixtures should be supplied with a timeclock or photocell controller to prevent them from operating during the daytime hours.*



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 :**SMYER ISD**

<u>CAMPUS</u>	ENERGY UTILIZATION INDEX (EUI) (Btu/sf-year)	ENERGY COST INDEX (ECI) (\$/sf-year)
2008 Smyer K-12	58,455	\$0.97
Region 17 2006 Average K-12:	56,293	\$0.77

Comparison: Smyer ISD to Regional Averages: The EUI for the Smyer facilities are slightly above the regional average (+4%). The ECI, however, is 26% higher than regional average.

There are several considerations to explain these numbers:

1. The regional averages used are from 2006 and therefore a portion of the energy price increases experienced from 2006 are not included in the averages, but are represented in the calculations made for the district's 2007-2008 utility billings.
2. The condition of the equipment (including the newer equipment) is such that units are running longer than should be necessary to condition the building. This condition results in higher than average energy indices.
3. Computer and lighting systems are operating well after occupancy hours are complete which also drives up consumption and cost.

5.0 RATE SCHEDULE ANALYSIS:

ELECTRICITY PROVIDER : South Plains Electric Cooperative

Customer Charge: \$50.00 per month

Demand Charge: \$1.00 per kW

Energy Charge:

First 200 kWh per kW \$0.093928

Next 200 kWh per kW \$0.081428

Over 400 kWh per kW \$0.062878

Average Savings for consumption = **\$0.081428/kWh**

Average Savings for demand = **\$1.00/kW**

NATURAL GAS PROVIDER: Atmos

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

Total Cost of Natural Gas purchased for Smyer ISD: \$28,599

Total Quantity of Natural Gas purchased for Smyer ISD: 3,537 MCF

Cost / Quantity = Average Unit Cost

\$ 28,599 / 3,537 mcf = **\$8.09 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 hot water piping in hot water systems.
The majority of energy losses in hot water systems occur in the hot water piping.
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. Implement SECO's "Sleep is Good" program to put monitors and computers in reduced power consumption mode during periods of inactivity.
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.
5. Install insulation on rooftop refrigerant lines.
Uninsulated refrigerant lines severely reduced the ability for the system to condition the assigned space.
6. Repair condensate lines on 2005-2006 rooftop unit installations.
Condensate drain pans will overflow into building or become contaminated and present indoor air quality in their current configuration.
7. Comb and repair coil fins on all salvageable HVAC equipment and install heavy-duty hail guards to prevent future damage.

B. CAPITAL EXPENSE PROJECTS

I. Renovate Gymnasium fixtures from existing metal halide and compact fluorescent to T5 high-bay fluorescent fixtures.

Estimated Installed Cost	=	\$ 16,000
Estimated Energy Cost Savings	=	\$ 2,000
Simple Payback Period	=	8 Years

II. Replace 18 tons of cooling capacity split systems with new high-efficiency gas-fired heat, DX cool units.

Estimated Installed Cost	=	\$ 34,200
Estimated Energy Cost Savings	=	\$ 3,420
Simple Payback Period	=	10 Years

III. Replace seven 13- year old rooftop units with new high-efficiency gas-fired heat, DX cool units.

Estimated Installed Cost	=	\$ 38,850
Estimated Energy Cost Savings	=	\$ 3,238
Simple Payback Period	=	12 Years

IV. Recommission the existing energy management system to insure units do not operate outside the scheduled occupancy hours.

Estimated Installed Cost	=	\$ 2,000
Estimated Energy Cost Savings	=	\$ 1,000
Simple Payback Period	=	2 Years

SUMMARY:

Estimated Installed Cost	=	\$ 91,050
Estimated Energy Cost Savings	=	\$ 9,658
Simple Payback Period	=	9-1/2 Years

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	=	\$ 91,050
10 year commercial loan principal	=	\$ 91,050
10 year commercial loan interest (5%) paid	=	\$ 24,837
10 year commercial loan TOTAL	=	\$ 115,887
Commercial Loan Annual Payment	=	\$ 965/month = \$ 11,580/yr
Total Annual Payment Minus Annual Energy Cost Savings	=	\$11,580 – 9,658 = \$ 1,922
Annual Cost to ISD (without considering Maintenance Cost Reduction)	=	\$ 1,922

More information regarding financial programs available to SISD 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.

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*

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



APPENDIX II
ELECTRIC UTILITY RATE SCHEDULE

Sent By: SOUTH PLAINS ELECTRIC ADMIN; 806 775 7851; Jun-6-08 12:10; Page 6/6

South Plains Electric Cooperative Tariff for Electric Service	Section 20
Applicable to All Areas Effective: June 1, 2007	

RATE SCHEDULE	58	Public Schools - Demand Metered	SHEET 43
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Availability:

Available to public schools for lighting and power service. Rate is not available for service to any facility of any four year state university upper level institution, Texas state technical college, or college to which the Cooperative is required to discount the base rates as provided in PURA 95, Section 2.2141.

Type of Service:

Single phase and three phase at available primary and secondary voltages; motors having a rated capacity in excess of ten horsepower must be three phase. Frequency and voltage shall be subject to reasonable variation.

Rate:

Customer Charge: \$50.00 per month

Demand Charge: \$1.00 per kW
 applied to the maximum kilowatt demand for any period of fifteen minutes of maximum use during the billing period, but in no event is billing demand less than 75% of the highest adjusted kW demand established in the billing period or eleven (11) months preceding the billing period.

Energy Charge:
 First 200 kWh per kW - \$0.093928
 Next 200 kWh per kW - \$0.081428
 Over 400 kWh per kW - \$0.062878

Power Factor Adjustments:

The Customer agrees to maintain unity power factor as nearly as practicable. The kW demand will be adjusted for Customers to correct for average power factors lower than ninety-five percent (95%), if and when the Cooperative deems necessary. Such adjustments will be made by increasing the measured demand one percent (1%), for each one percent (1%) by which the average power factor is less than ninety-five percent (95%) lagging.

Billing Adjustments:

Reference Tariff Section 20.01.

Terms of Payment:

Each bill for utility service(s), regardless of the nature of the service(s), is due upon receipt and delinquent 16 days after issuance unless such day falls on a holiday or weekend, in which case payment is due on the next work day. If full payment is not received in the office of the Cooperative on or before the date such bill is due, the customer's account will be considered delinquent and subject to disconnection in accordance with the rules of the regulatory authority.

APPENDIX III

UTILITIES CONSUMPTION HISTORY

OWNER:		Smyer ISD			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	COSTS \$	MCF	COSTS
JANUARY	2009	52,758		186	4,636	6,009	885	\$7,310
FEBRUARY	2009	58,598		187	4,245	6,647	527	\$3,615
MARCH	2009	68,023		185	4,283	8,229	359	\$2,569
APRIL	2009	48,978		205	5,387	6,092	235	\$1,659
MAY	2008	73,006		262	6,894	8,699	43	\$391
JUNE	2008	55,594		177	4,769	4,610	31	\$531
JULY	2008	43,246		210	6,447	3,714	29	\$586
AUGUST	2008	42,786		210	5,674	4,014	31	\$475
SEPTEMBER	2008	47,226		193	5,127	4,357	40	\$554
OCTOBER	2008	51,668		185	4,321	4,870	138	\$1,063
NOVEMBER	2008	51,051		191	4,962	5,822	399	\$3,091
DECEMBER	2008	45,257		193	5,051	5,256	820	\$6,755
TOTAL		638,191	0	2,384	61,796	\$68,319	3,537	\$28,599
Annual Total Energy Cost =		\$96,918	Per Year	Energy Use Index:				
Total KWH x 0.003413 =		2,178.15	x 106	Total Site BTU's/yr		58,455 BTU/s.f.yr		
Total MCF x 1.03 =		3,643.11	x 106	Total Area (sq.ft.)				
Total Other x _____			x 106	Energy Cost Index:				
Total Site BTU's/yr		5,821.26	x 106	Total Energy Cost/yr		\$0.97 \$/s.f. yr		
Total Area (sq.ft.)				Total Area (sq.ft.)				
Floor area:		99,585	s.f.					
Electric Utility		Account #		Gas Account #				
South Plains Electric Co-op		Multiple		Multiple				

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 SMYER 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>Dane A. Kerns</u>	Date: <u>June 10, 2009</u>
Name (Mr./Ms./Dr.): <u>Dane A. Kerns</u>	Title: <u>Superintendent</u>
Organization: <u>Smyer ISD</u>	Phone: <u>806-234-2935</u>
Street Address: <u>4th and Lincoln</u>	Fax: <u>806-234-2411</u>
Mailing Address: <u>P.O. Box 206</u>	EMail: <u>dKerns@smyer-isd.org</u>
<u>Smyer, TX 79070</u>	County: <u>Hockley</u>

CONTACT INFORMATION:

Name (Mr./Ms./Dr.): <u>Dane Kerns</u>	Title: <u>Superintendent</u>
Phone: <u>806-234-2935</u>	Fax: <u>806-234-2411</u>
E-Mail: <u>dKerns@smyer-isd.org</u>	County: <u>Hockley</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. 17th 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	\$ 91,050.00
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	\$ 965.73
Scheduled number of payments	120
Actual number of payments	120
Total early payments	\$ -
Total interest	\$ 24,837.18

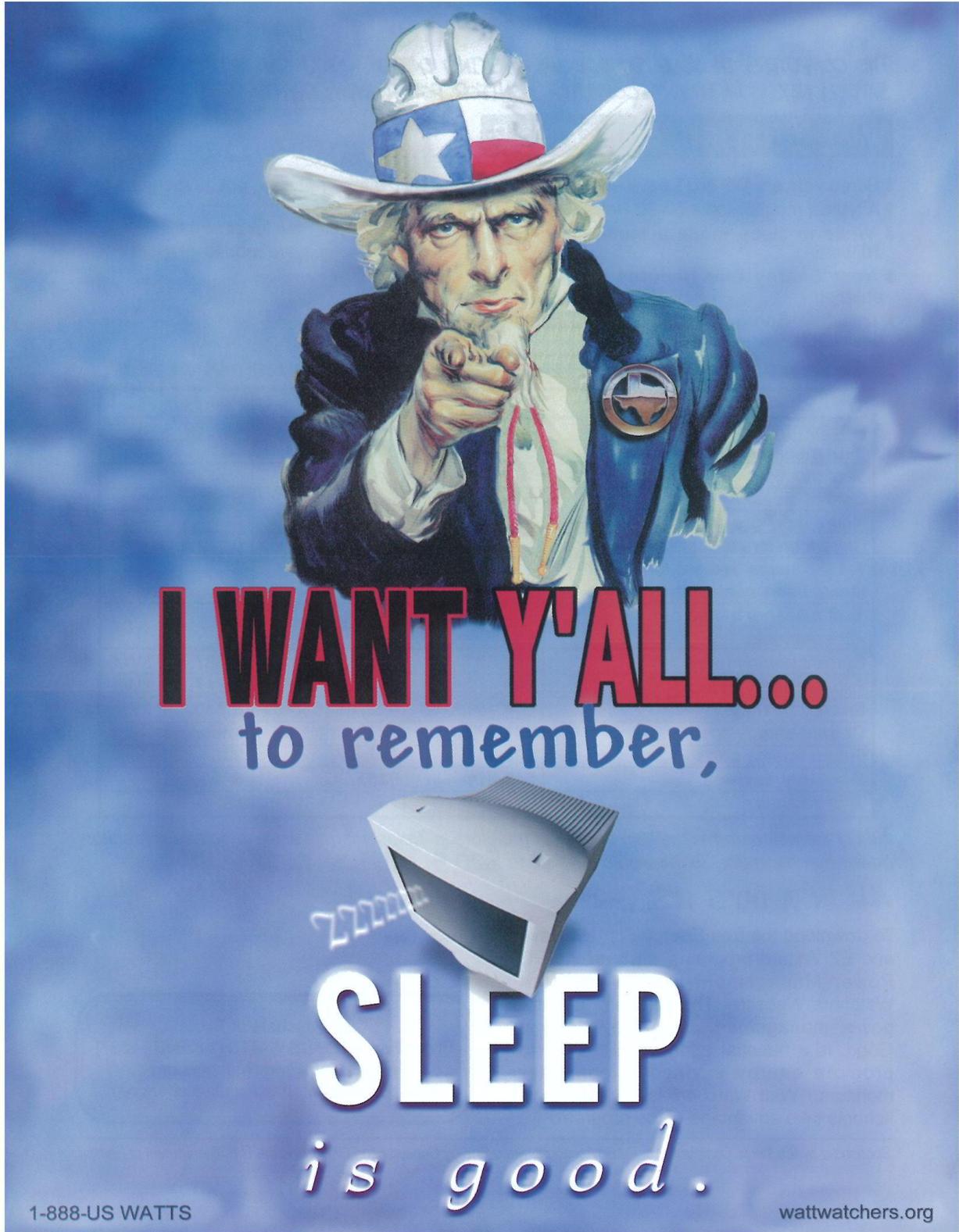
Lender name:

Pmt No.	Payment Date	Beginning Balance	Scheduled Payment	Extra Payment	Total Payment	Principal	Interest	Ending Balance	Cumulative Interest
1	8/1/2009	\$ 91,050.00	\$ 965.73	\$ -	\$ 965.73	\$ 586.35	\$ 379.38	\$ 90,463.65	\$ 379.38
2	9/1/2009	90,463.65	965.73	-	965.73	588.79	376.93	89,874.85	756.31
3	10/1/2009	89,874.85	965.73	-	965.73	591.25	374.48	89,283.61	1,130.79
4	11/1/2009	89,283.61	965.73	-	965.73	593.71	372.02	88,689.89	1,502.80
5	12/1/2009	88,689.89	965.73	-	965.73	596.19	369.54	88,093.71	1,872.34
6	1/1/2010	88,093.71	965.73	-	965.73	598.67	367.06	87,495.04	2,239.40
7	2/1/2010	87,495.04	965.73	-	965.73	601.16	364.56	86,893.88	2,603.96
8	3/1/2010	86,893.88	965.73	-	965.73	603.67	362.06	86,290.21	2,966.02
9	4/1/2010	86,290.21	965.73	-	965.73	606.18	359.54	85,684.02	3,325.56
10	5/1/2010	85,684.02	965.73	-	965.73	608.71	357.02	85,075.31	3,682.58
11	6/1/2010	85,075.31	965.73	-	965.73	611.25	354.48	84,464.07	4,037.06
12	7/1/2010	84,464.07	965.73	-	965.73	613.79	351.93	83,850.27	4,388.99
13	8/1/2010	83,850.27	965.73	-	965.73	616.35	349.38	83,233.92	4,738.37
14	9/1/2010	83,233.92	965.73	-	965.73	618.92	346.81	82,615.01	5,085.18
15	10/1/2010	82,615.01	965.73	-	965.73	621.50	344.23	81,993.51	5,429.41
16	11/1/2010	81,993.51	965.73	-	965.73	624.09	341.64	81,369.42	5,771.05
17	12/1/2010	81,369.42	965.73	-	965.73	626.69	339.04	80,742.73	6,110.08
18	1/1/2011	80,742.73	965.73	-	965.73	629.30	336.43	80,113.44	6,446.51
19	2/1/2011	80,113.44	965.73	-	965.73	631.92	333.81	79,481.52	6,780.32
20	3/1/2011	79,481.52	965.73	-	965.73	634.55	331.17	78,846.96	7,111.49
21	4/1/2011	78,846.96	965.73	-	965.73	637.20	328.53	78,209.76	7,440.02
22	5/1/2011	78,209.76	965.73	-	965.73	639.85	325.87	77,569.91	7,765.89
23	6/1/2011	77,569.91	965.73	-	965.73	642.52	323.21	76,927.39	8,089.10
24	7/1/2011	76,927.39	965.73	-	965.73	645.20	320.53	76,282.20	8,409.63
25	8/1/2011	76,282.20	965.73	-	965.73	647.88	317.84	75,634.31	8,727.48
26	9/1/2011	75,634.31	965.73	-	965.73	650.58	315.14	74,983.73	9,042.62
27	10/1/2011	74,983.73	965.73	-	965.73	653.29	312.43	74,330.44	9,355.05
28	11/1/2011	74,330.44	965.73	-	965.73	656.02	309.71	73,674.42	9,664.76
29	12/1/2011	73,674.42	965.73	-	965.73	658.77	306.98	73,015.67	9,971.74
30	1/1/2012	73,015.67	965.73	-	965.73	661.49	304.23	72,354.17	10,275.97
31	2/1/2012	72,354.17	965.73	-	965.73	664.25	301.48	71,689.92	10,577.45
32	3/1/2012	71,689.92	965.73	-	965.73	667.02	298.71	71,022.91	10,876.15
33	4/1/2012	71,022.91	965.73	-	965.73	669.80	295.93	70,353.11	11,172.08
34	5/1/2012	70,353.11	965.73	-	965.73	672.59	293.14	69,680.52	11,465.22
35	6/1/2012	69,680.52	965.73	-	965.73	675.39	290.34	69,005.13	11,755.56
36	7/1/2012	69,005.13	965.73	-	965.73	678.21	287.52	68,326.92	12,043.08
37	8/1/2012	68,326.92	965.73	-	965.73	681.03	284.70	67,645.89	12,327.77
38	9/1/2012	67,645.89	965.73	-	965.73	683.87	281.86	66,962.02	12,609.63
39	10/1/2012	66,962.02	965.73	-	965.73	686.72	279.01	66,275.31	12,888.64
40	11/1/2012	66,275.31	965.73	-	965.73	689.58	276.15	65,585.73	13,164.79
41	12/1/2012	65,585.73	965.73	-	965.73	692.45	273.27	64,893.27	13,438.06
42	1/1/2013	64,893.27	965.73	-	965.73	695.34	270.39	64,197.94	13,708.45
43	2/1/2013	64,197.94	965.73	-	965.73	698.24	267.49	63,499.70	13,975.94
44	3/1/2013	63,499.70	965.73	-	965.73	701.14	264.58	62,798.56	14,240.52
45	4/1/2013	62,798.56	965.73	-	965.73	704.07	261.66	62,094.49	14,502.18
46	5/1/2013	62,094.49	965.73	-	965.73	707.00	258.73	61,387.49	14,760.91
47	6/1/2013	61,387.49	965.73	-	965.73	709.95	255.78	60,677.55	15,016.69
48	7/1/2013	60,677.55	965.73	-	965.73	712.90	252.82	59,964.64	15,269.51
49	8/1/2013	59,964.64	965.73	-	965.73	715.87	249.85	59,248.77	15,519.37
50	9/1/2013	59,248.77	965.73	-	965.73	718.86	246.87	58,529.91	15,766.24
51	10/1/2013	58,529.91	965.73	-	965.73	721.85	243.87	57,808.06	16,010.11
52	11/1/2013	57,808.06	965.73	-	965.73	724.86	240.87	57,083.20	16,250.98
53	12/1/2013	57,083.20	965.73	-	965.73	727.88	237.85	56,355.32	16,488.83
54	1/1/2014	56,355.32	965.73	-	965.73	730.91	234.81	55,624.41	16,723.64
55	2/1/2014	55,624.41	965.73	-	965.73	733.96	231.77	54,890.45	16,955.41
56	3/1/2014	54,890.45	965.73	-	965.73	737.02	228.71	54,153.43	17,184.12
57	4/1/2014	54,153.43	965.73	-	965.73	740.09	225.64	53,413.35	17,409.76
58	5/1/2014	53,413.35	965.73	-	965.73	743.17	222.56	52,670.17	17,632.31
59	6/1/2014	52,670.17	965.73	-	965.73	746.27	219.46	51,923.91	17,851.77
60	7/1/2014	51,923.91	965.73	-	965.73	749.38	216.35	51,174.53	18,068.12
61	8/1/2014	51,174.53	965.73	-	965.73	752.50	213.23	50,422.03	18,281.35
62	9/1/2014	50,422.03	965.73	-	965.73	755.63	210.09	49,666.40	18,491.44
63	10/1/2014	49,666.40	965.73	-	965.73	758.78	206.94	48,907.61	18,698.38
64	11/1/2014	48,907.61	965.73	-	965.73	761.94	203.78	48,145.67	18,902.17
65	12/1/2014	48,145.67	965.73	-	965.73	765.12	200.61	47,380.55	19,102.77

Pmt No.	Payment Date	Beginning Balance	Scheduled Payment	Extra Payment	Total Payment	Principal	Interest	Ending Balance	Cumulative Interest
66	1/1/2015	47,380.55	965.73	-	965.73	768.31	197.42	46,612.24	19,300.19
67	2/1/2015	46,612.24	965.73	-	965.73	771.51	194.22	45,840.73	19,494.41
68	3/1/2015	45,840.73	965.73	-	965.73	774.72	191.00	45,066.01	19,685.41
69	4/1/2015	45,066.01	965.73	-	965.73	777.95	187.78	44,288.06	19,873.19
70	5/1/2015	44,288.06	965.73	-	965.73	781.19	184.53	43,506.86	20,057.72
71	6/1/2015	43,506.86	965.73	-	965.73	784.45	181.28	42,722.42	20,239.00
72	7/1/2015	42,722.42	965.73	-	965.73	787.72	178.01	41,934.70	20,417.01
73	8/1/2015	41,934.70	965.73	-	965.73	791.00	174.73	41,143.70	20,591.74
74	9/1/2015	41,143.70	965.73	-	965.73	794.29	171.43	40,349.41	20,763.17
75	10/1/2015	40,349.41	965.73	-	965.73	797.60	168.12	39,551.80	20,931.29
76	11/1/2015	39,551.80	965.73	-	965.73	800.93	164.80	38,750.88	21,096.09
77	12/1/2015	38,750.88	965.73	-	965.73	804.26	161.46	37,946.61	21,257.55
78	1/1/2016	37,946.61	965.73	-	965.73	807.62	158.11	37,139.00	21,415.66
79	2/1/2016	37,139.00	965.73	-	965.73	810.98	154.75	36,328.01	21,570.41
80	3/1/2016	36,328.01	965.73	-	965.73	814.36	151.37	35,513.65	21,721.78
81	4/1/2016	35,513.65	965.73	-	965.73	817.75	147.97	34,695.90	21,869.75
82	5/1/2016	34,695.90	965.73	-	965.73	821.16	144.57	33,874.74	22,014.32
83	6/1/2016	33,874.74	965.73	-	965.73	824.58	141.14	33,050.16	22,155.46
84	7/1/2016	33,050.16	965.73	-	965.73	828.02	137.71	32,222.14	22,293.17
85	8/1/2016	32,222.14	965.73	-	965.73	831.47	134.26	31,390.67	22,427.43
86	9/1/2016	31,390.67	965.73	-	965.73	834.93	130.79	30,555.74	22,558.22
87	10/1/2016	30,555.74	965.73	-	965.73	838.41	127.32	29,717.33	22,685.54
88	11/1/2016	29,717.33	965.73	-	965.73	841.90	123.82	28,875.43	22,809.36
89	12/1/2016	28,875.43	965.73	-	965.73	845.41	120.31	28,030.02	22,929.68
90	1/1/2017	28,030.02	965.73	-	965.73	848.93	116.79	27,181.08	23,046.47
91	2/1/2017	27,181.08	965.73	-	965.73	852.47	113.25	26,328.61	23,159.72
92	3/1/2017	26,328.61	965.73	-	965.73	856.02	109.70	25,472.58	23,269.42
93	4/1/2017	25,472.58	965.73	-	965.73	859.59	106.14	24,612.99	23,375.56
94	5/1/2017	24,612.99	965.73	-	965.73	863.17	102.55	23,749.82	23,478.11
95	6/1/2017	23,749.82	965.73	-	965.73	866.77	98.96	22,883.05	23,577.07
96	7/1/2017	22,883.05	965.73	-	965.73	870.38	95.35	22,012.67	23,672.42
97	8/1/2017	22,012.67	965.73	-	965.73	874.01	91.72	21,138.67	23,764.14
98	9/1/2017	21,138.67	965.73	-	965.73	877.65	88.08	20,261.02	23,852.21
99	10/1/2017	20,261.02	965.73	-	965.73	881.31	84.42	19,379.71	23,936.64
100	11/1/2017	19,379.71	965.73	-	965.73	884.98	80.75	18,494.73	24,017.38
101	12/1/2017	18,494.73	965.73	-	965.73	888.67	77.06	17,606.07	24,094.45
102	1/1/2018	17,606.07	965.73	-	965.73	892.37	73.36	16,713.70	24,167.80
103	2/1/2018	16,713.70	965.73	-	965.73	896.09	69.64	15,817.61	24,237.45
104	3/1/2018	15,817.61	965.73	-	965.73	899.82	65.91	14,917.79	24,303.35
105	4/1/2018	14,917.79	965.73	-	965.73	903.57	62.16	14,014.22	24,365.51
106	5/1/2018	14,014.22	965.73	-	965.73	907.33	58.39	13,106.89	24,423.90
107	6/1/2018	13,106.89	965.73	-	965.73	911.11	54.61	12,195.78	24,478.51
108	7/1/2018	12,195.78	965.73	-	965.73	914.91	50.82	11,280.87	24,529.33
109	8/1/2018	11,280.87	965.73	-	965.73	918.72	47.00	10,362.14	24,576.33
110	9/1/2018	10,362.14	965.73	-	965.73	922.55	43.18	9,439.59	24,619.51
111	10/1/2018	9,439.59	965.73	-	965.73	926.39	39.33	8,513.20	24,658.84
112	11/1/2018	8,513.20	965.73	-	965.73	930.25	35.47	7,582.94	24,694.31
113	12/1/2018	7,582.94	965.73	-	965.73	934.13	31.60	6,648.81	24,725.91
114	1/1/2019	6,648.81	965.73	-	965.73	938.02	27.70	5,710.79	24,753.61
115	2/1/2019	5,710.79	965.73	-	965.73	941.93	23.79	4,768.86	24,777.41
116	3/1/2019	4,768.86	965.73	-	965.73	945.86	19.87	3,823.00	24,797.28
117	4/1/2019	3,823.00	965.73	-	965.73	949.80	15.93	2,873.20	24,813.21
118	5/1/2019	2,873.20	965.73	-	965.73	953.75	11.97	1,919.45	24,825.18
119	6/1/2019	1,919.45	965.73	-	965.73	957.73	8.00	961.72	24,833.17
120	7/1/2019	961.72	965.73	-	961.72	957.71	4.01	0.00	24,837.18

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
Energy savings	604,141 kWh	4,357,860 kWh	3,340,350 kWh
Current energy costs	\$71,522	\$320,322	\$305,265
Future energy costs	\$26,211	\$67,566	\$104,844
Monetary savings	\$45,311	\$252,756	\$200,421
% 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
 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.



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

Watt 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
- * 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

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:

Watt Watchers of Texas
Phone/Fax 1-888-US WATTS (1-888-879-2887)
e-mail 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**

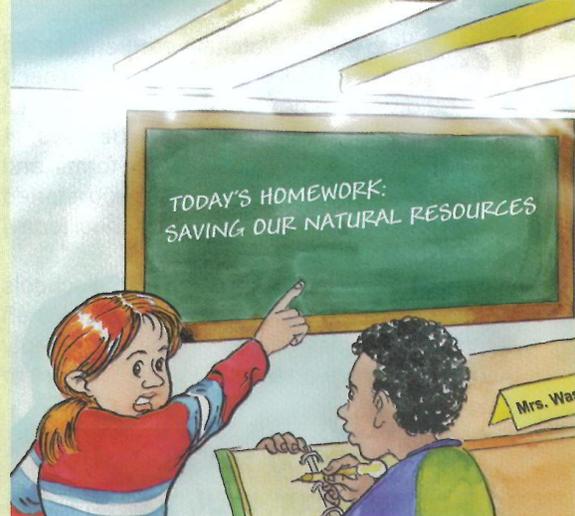
- 4-NAME BADGES
- 4-NOTEBOOKS
- 4-LANYARDS
- 4-PENCILS

**FORMS &
MANUAL**

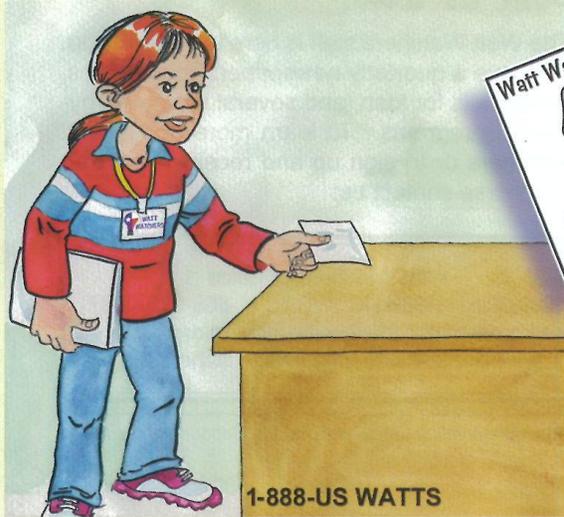
**1 YOUR STUDENTS
PATROL THE SCHOOL**



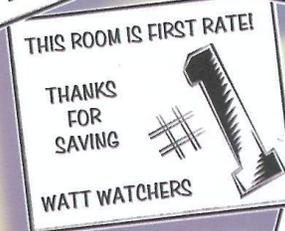
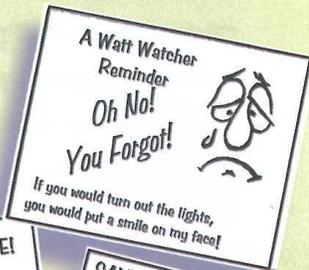
**2 FIND EMPTY CLASSROOMS
WITH THE LIGHTS ON**



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



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



wattwatchers.org

ENROLL IN WATT WATCHERS OF TEXAS



Getting 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
 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

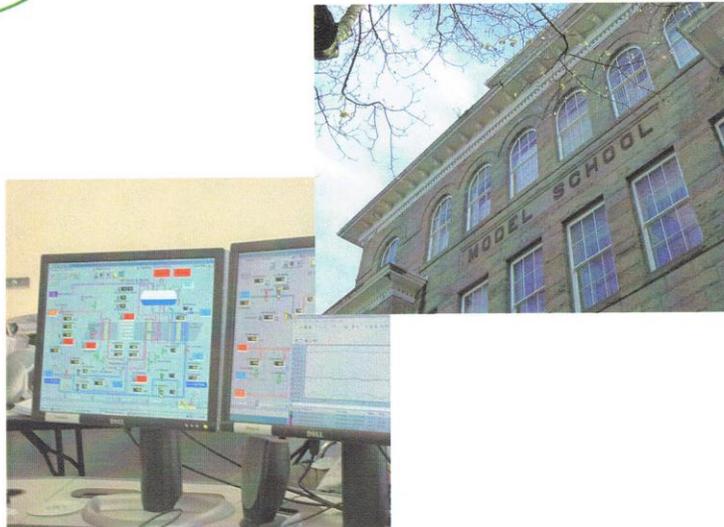
**TEXAS ENERGY MANAGERS ASSOCIATION
(TEMA)**

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