Susan Combs
Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

Prepared by:

ESA ENERGY SYSTEMS ASSOCIATES, Inc

A TERRACON COMPANY

100 East Main Street

Round Rock, Texas 78664

(512) 258-0547

Highland Park Independent School District

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ESA
Energy Systems Associates, Inc.
A Terracon COMPANY

SECO
State Energy Conservation Office

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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**.

State Energy Conservation Office

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

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

In February 2010, **SECO** received a request for technical assistance from **Mike Brown, Superintendent for Highland Park 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 energy consuming systems around the facility. It is our opinion that significant decreases in annual energy costs, as well as major maintenance cost reductions, can be achieved through the efficiency recommendations provided herein.

This study has focused on energy efficiency and systems operations. To that end, an analysis of the utility usage and costs for **Highland Park ISD,** (hereafter known as HPISD) was completed by ESA **Energy Systems Associates, Inc**., (hereafter known as *Engineer*) to determine the annual energy cost index (ECI) and energy use index (EUI) for each campus or facility. A complete listing of the Base Year Utility Costs and Consumption is provided in Section 3.0 of this report.

Following the utility analysis and a preliminary consultation, a walk-through energy analysis was conducted throughout the campus. Specific findings of this survey and the resulting recommendations for both operation and maintenance procedures and cost-effective energy retrofit installations are identified in Section 7.0 of this report.

We estimate that as much as **$5,250** may be saved annually if all recommended projects are implemented. The estimated installed cost of these projects should total approximately **$37,125**, yielding an average simple payback of **7** years.

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

SUMMARY:	IMPLEMENTATION COST	ESTIMATED SAVINGS	SIMPLE PAYBACK
Retrofit Metal Halides to T5	$26,000	$3,500	7 ½ Yrs
Replace Incandescent Exit Fixtures With LED Fixtures	125	150	< 1 Year
Retrofit Cafeteria Compact Fluorescent Fixtures With T5	$11,000	$1600	7 Yrs
TOTAL PROJECTS	**$37,125**	**$5,250**	

Although additional savings from reduced maintenance expenses are anticipated, these savings projections are not included in the estimates provided above. As a result, the actual Internal Rate of Return (IRR), for this retrofit program has been calculated and shown in Section 8.0 of this report.

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

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

2.0 ENERGY ASSESSMENT PROCEDURE:

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

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

3.0 ENERGY PERFORMANCE INDICATORS:

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

1. Energy Utilization Index

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

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

ELECTRICITY Usage

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

NATURAL GAS Usage

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

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

by the building area.

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

2. Energy Cost Index

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

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

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

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

OWNER: **Highland Park ISD** **BUILDING:** **K-12 Campus**

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
MONTH	YEAR	CONSUMPTION KWH	METERED KW/KVA	CHARGED KW/KVA	COST OF DEMAND	TOTAL ALL ELECTRICAL COSTS $	CONSUMPTION MCF	COSTS $
JANUARY	2011	107,901	375	375	2,747	6,650	2,434	15,821
FEBRUARY	2011	120,164	377	377	2,684	6,975	1,067	7,456
MARCH	2010	100,093	390	390	2,777	6,403	2,807	22,367
APRIL	2010	109,548	413	413	2,941	7,051	510	3,182
MAY	2010	111,420	462	462	3,290	7,382	254	1,596
JUNE	2010	143,979	489	489	4,241	9,222	43	303
JULY	2010	126,694	471	471	4,470	8,823	17	152
AUGUST	2010	150,555	489	489	4,641	10,123	27	221
SEPTEMBER	2010	187,070	622	622	5,903	12,934	37	264
OCTOBER	2010	132,832	518	518	4,112	9,072	86	558
NOVEMBER	2010	108,918	392	392	2,791	6,815	826	4,919
DECEMBER	2010	107,831	345	345	2,456	6,420	1,601	10,628
TOTAL		**1,507,005**	**5,343**	**5,343**	**43,053**	**$97,870**	**9,709**	**$67,467**

Annual Total Energy Cost =	$165,337	Per Year	**Energy Use Index:** Total Site BTU's/yr / Total Area (sq.ft.)	104,439	BTU/s.f.yr
Total KWH x 0.003413 =	5,143.41	x 106			
Total MCF x 1.03 =	10,000.27	x 106	**Energy Cost Index:**		
Total Other x ____		x 106	Total Energy Cost/yr / Total Area (sq.ft.)	$1.14	$/s.f. yr
Total Site BTU's/yr	15,143.68	x 106			
Floor area:	145,000	s.f.			

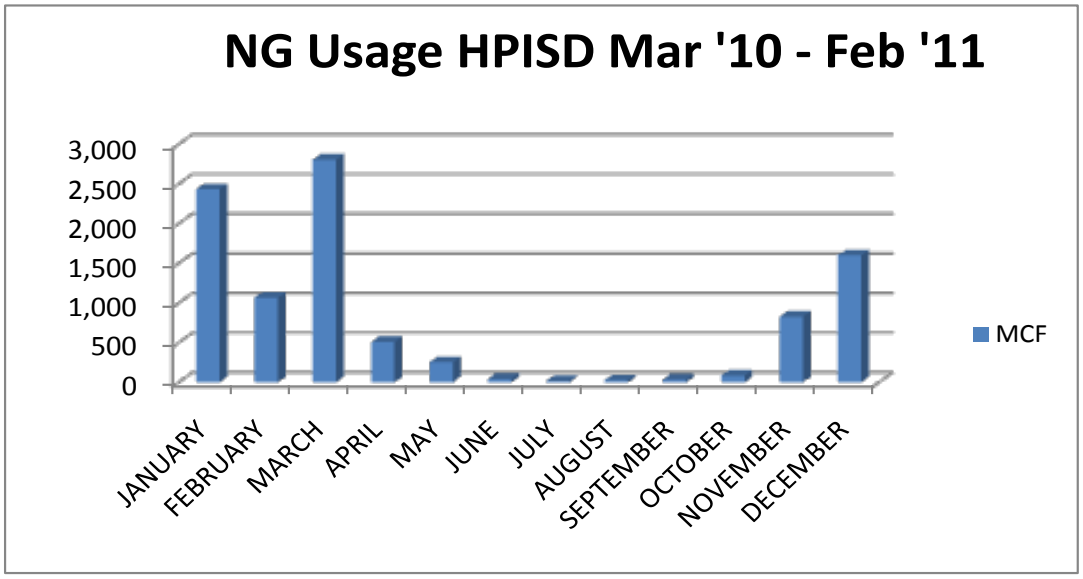
Electric Utility	Premise #	Meter#	Gas Utility	Meter #
Xcel Energy	300216310	5741, 7917, 6917, 2000	Atmos	9845047

Historical Energy Performance Indices for HPISD

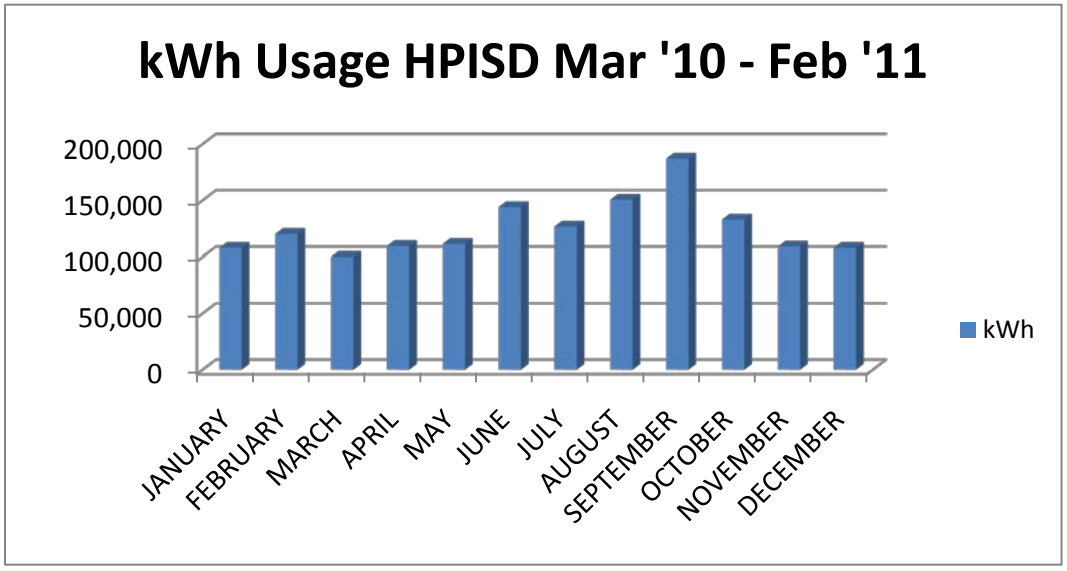
Note: Gross square footage has varied from analysis to analysis as a result of changes in area due to renovations and additions and the analysis of utility bills for individual buildings or the entire district.

HPISD										
CAMPUS	ENERGY UTILIZATION INDEX (EUI) BTUs/sf-year					ENERGY COST INDEX (ECI) $/sf-year				
	1997	1999	2003	2008	2011	1997	1999	2003	2008	2011
Highland Park K-12	56,875	46,446	73,464	50,512	104,439	$ 0.58	$ 1.07	$ 0.69	$ 1.57	$ 1.14
# of students	227	n/a	860	867	850	227	n/a	860	867	850
Analyzed square footage	179,758	68,739	183,282	65,871	145,000	179,758	68,739	183,282	65,871	145,000

The following chart depicts the natural gas consumption for the district over a 12 month period. In the graph, a bell curve pattern of usage results, typical for consumption patterns for Texas schools. Usage is near zero during the summer months which indicates the district is doing a good job of turning gas consuming equipment off during those times.



The next chart depicts electricity consumption over the same 12 month period. This pattern is atypical for Texas schools as the characteristic drop in electricity use does not occur during the summer months when the buildings are unoccupied. June and July are typically the lowest consumption months in West Texas schools; this would suggest that HVAC equipment is running more hours than necessary in the unoccupied summer period.



4.0 RATE SCHEDULE ANALYSIS:

ELECTRICITY PROVIDER:

ELECTRIC PROVIDER: Xcel Energy Contract price (Municipal & School): $0.02458 per kWh
Contract price (Large School Service): $0.00384 per kWh

- **Municipal & School Electric Rate**:

Contract Price per kWh	=	$0.02458 per kWh
Pure Power Cost Recovery	=	$0.00061 per kWh
Transmission Cost Recovery	=	$0.00038 per kWh
Fuel Cost Recovery Factor	=	$0.02893 per kWh
Service Availability Charge	=	$10.45 per Meter
Franchise Fee	=	2.00%

Average Savings for consumption = $0.02458/kWh + $0.00061/kWh + $0.00038/kWh + $0.02893/kWh = $0.0545/kWh

- **Large School Service Electric Rate**:

Contract Price per kWh	=	$0.00384 per kWh
Demand (Winter Rate)	=	$7.12 per kW
Demand (Summer Rate)	=	$9.49 per kW
Pure Power Cost Recovery	=	$0.26825 per kW
Transmission Cost Recovery	=	$0.07565 per kW
Fuel Cost Recovery Factor	=	$.02893 per kWh
Service Availability Charge	=	$24.70 per Meter
Franchise Fee	=	2.00%

Average Savings for consumption = $0.00384/kWh + $0.02893/kWh = $0.03277/kWh
Average Savings for demand (Winter) = $7.12 + $0.26825 + $0.07565 = $ 7.4639/kW
Average Savings for demand (Summer) = $9.49 + $0.26825 + $0.07565 = $ 9.8339/kW

NATURAL GAS PROVIDER:

Total cost for natural gas at the facilities in the analyzed billing cycle: $67,467

Total quantity purchased during the analyzed billing cycle: 9,709 MCF

Average cost per MCF = Cost of natural gas / quantity purchased = $67,467 / 9,709 MCF

Average cost per MCF = $6.95

5.0 CAMPUS DESCRIPTIONS:

Highland Park ISD consists of a single campus with an Elementary, Middle and High School building. The district is located just east of Amarillo, Texas, in Potter County and is home to approximately 850 students. The first building used at the district was constructed in 1937. Other buildings were added in 1982 and 1997.

Photo courtesy of HPISD webpage

Highland Park has participated in the SECO Energy Partnership Program in the past. ESA performed a Preliminary Energy Assessment report (PEA) in 1997, 1999, 2003, 2008 and 2011. The following table summarizes the results of those studies.

SECO PEA Summary 1997-2008

Year	Recommendation	Estimated Cost	Estimated Savings	Simple Payback
1997	T12 Lighting Retrofit to T8	$ 75,000	$ 9,000	8-1/3
	Revise HVAC controls for 1 hour override	$ 15,000	$ 5,000	3
	REPORT SUMMARY	*$ 90,000*	*$ 14,000*	*6*
1999	Complete Current T12 Lighting Renovation to T8	$ 38,000	$ 5,200	7-1/4
	REPORT SUMMARY	*$ 38,000*	*$ 5,200*	*7-1/4*
2003	Replace 74 rooftop units / New DDC	$ 775,000	$ 24,000	32
	Complete Current T12 Lighting Renovation to T8	$ 90,000	$ 15,000	6
	REPORT SUMMARY	*$ 865,000*	*$ 39,000*	*22-1/4*
2008	Complete Current Lighting Renovation	$ 28,125	$ 4,700	6
	Wind Powered Turbine Generator	$ 500,000	$ 30,000	16-2/3
	REPORT SUMMARY	*$ 528,125*	*$ 34,700*	*15-1/4*

The district has incrementally implemented most of the measures delineated in the PEA reports as their budget has allowed between other new additions and renovation projects. The wind powered turbine project was not implemented.

6.0 ENERGY RECOMMENDATIONS:

Lighting ECRM 1: RETROFIT METAL HALIDE FIXTURES TO T5

In the Elementary School Gym, there are twenty each 250-watt metal halide fixtures, twenty-four each 400-watt metal halide fixtures in the Junior Varsity Gym, and thirty each 400-watt fixtures in the Varsity Gym. One characteristic of metal halide fixtures is their inherently long re-strike. This means that if the fixtures are ever turned off, it can take up to 15 minutes for them to come back on. This long re-strike encourages staff to leave the lights on throughout the day, even if the space is not occupied. *We recommend replacing all 250-watt metal halides with 4-lamp T5 high bay fluorescent fixtures and all 400-watt metal halides with 6-lamp T5 high bay fluorescent fixtures.*

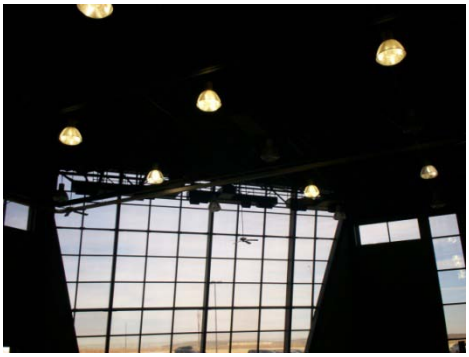
Estimated Cost: $26,000 Estimated Savings: $3,500 Estimated Payback: 7 ½ Years

Lighting ECRM 2: REPLACE INCANDESCENT EXIT FIXTURES WITH LED FIXTURES

While surveying the campus, maintenance personnel stated that they have begun the process of replacing the old incandescent exit fixtures with new LED fixtures. Most incandescent exit fixtures have two each 15-watt lamps and consume 30 watts per fixture, 8,760 hours per year. Therefore, each fixture consumes 263 kWh per year. LED exit fixtures consume less than 5 watts per fixture and reduce electrical consumption to 44 kWh per year. *We recommend the district replace all incandescent exit fixtures with LED exit fixtures.*

Estimated Cost: $125 per fixture Est. Savings: $150 per fixture Est. Payback: <1 Year

Lighting ECRM 3: RETROFIT CAFETERIA COMPACT FLUORESCENT FIXTURES WITH T5



In the cafeteria, there are 31 light fixtures that contain eight 23-watt compact fluorescent lamps in each fixture. It was expressed to us that because there are so many lamps in each fixture, group re-lamping the fixtures as they go out is a considerable burden for district maintenance. *We recommend the district replace the existing lighting fixtures with 4-lamp T5 high bay fluorescent fixtures.* On average, 4-pin CFL lamps have a life expectancy of 10,000 hours and cost approximately $5 each. T5 fluorescent lamps have an average life expectancy of 20,000 hours and cost approximately $7 each. Maintenance personnel explained that they are getting around 3,000 to 5,000 hours of life out of each CFL lamp instead of the 10,000 than are to be expected under normal circumstances. The cost estimate below is based upon the district getting 10,000 hours of usefulness from each CFL. If the district is indeed getting less than that, this payback will improve as a result of increased maintenance labor and cost savings.

Estimated Cost: $11,000 Estimated Savings: $1600 Estimated Payback: 7 Years

7.0 MAINTENANCE AND OPERATION RECOMMENDATIONS

Building Envelope

- Replace damaged or missing weatherstripping

Lighting

- De-lamp remaining 4-lamp corridor lighting fixtures

Controls

- Ensure temperature setback times are correct

Maintenance and Operation procedures are strategies that can offer significant energy savings potential, yet require little or no capital investment by the district to implement. Exact paybacks are at times difficult to calculate, but are typically always less than one year. The difficulties with payback calculation are often related to the fact that the investigation required to make the payback calculation, for example measuring the air gap between exterior doors and missing or damaged weatherstripping so that exact air losses may be determined, is time and cost prohibitive when the benefits of renovating door and weather weatherstripping are well documented and universally accepted.

Building Envelope M&O

It was noted during the survey that some exterior doors had missing or damaged weatherstripping. This condition allows conditioned air to escape and unconditioned air to enter the building. Schools should be maintained at a slight positive pressure to minimize the infiltration of contaminants; failed weatherstripping makes maintaining a slight positive pressure difficult. *We recommend the district inspect and replace all damaged weatherstripping at exterior doors.*

Lighting M&O

Some of the campus still utilizes 4-lamp lighting fixtures in the building corridors. It was noted that many of the corridors had already been de-lamped from 4-lamps per fixture to 2-lamps per fixture. Maintenance personnel stated the building occupants have been satisfied with the light levels from using the de-lamped fixtures and expressed their intent to de-lamp the remaining 4-lamp fixtures throughout all district corridors. Due to the immediate energy savings it will provide, *we recommend the district complete the de-lamping of all corridor fixtures from 4-lamps to 2-lamps.*

Controls M&O

During our survey we were told that the building's HVAC equipment currently has operation setback times that fluctuate within the different areas of the building. We strongly recommend the district adopt a strict energy management policy in regards to when the HVAC units will come on and shut off each day. We recognize that the district is the only one who knows its exact requirements for scheduled HVAC use, so we encourage the HPISD to determine the best policy that saves energy while keeping all building occupants comfortable throughout the day.

8.0 FINANCIAL EVALUATION

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

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

Proposal:	Perform recommended ECRMs			
Assumptions:				
1. Equipment will last at least 15 years prior to next renovation				
2. No maintenance expenses for first five years (warranty period)				
3. $500 maintenance expense next 5 years				
4. $1000 maintenance expense next 5 years				
5. Savings decreases 5% per year after year 5				
Cash Flow	**Project Cost**	**Project Savings**	**Maintenance Expense**	**Net Cash Flow**
Time 0	($37,125)		0	($37,125)
Year 1		$ 5,250.00	0	$5,250
Year 2		$ 5,250.00	0	$5,250
Year 3		$ 5,250.00	0	$5,250
Year 4		$ 5,250.00	0	$5,250
Year 5		$ 5,250.00	0	$5,250
Year 6		$ 4,987.50	($500)	$4,488
Year 7		$ 4,725.00	($500)	$4,225
Year 8		$ 4,462.50	($500)	$3,963
Year 9		$ 4,200.00	($500)	$3,700
Year 10		$ 3,937.50	($500)	$3,438
Year 11		$ 3,675.00	($1,000)	$2,675
Year 12		$ 3,412.50	($1,000)	$2,413
Year 13		$ 3,150.00	($1,000)	$2,150
Year 14		$ 2,887.50	($1,000)	$1,888
Year 15		$ 2,625.00	($1,000)	$1,625
			Internal Rate of Return	**7.33%**

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

APPENDIX I: SUMMARY OF FUNDING AND PROCUREMENT OPTIONS

9.0 GENERAL COMMENTS

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

APPENDICES

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

SUMMARY OF FUNDING OPTIONS FOR CAPITAL EXPENDITURE PROJECTS

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

LoanSTAR Program:

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

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

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

Loans on Commercial Market:

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

Leasing Corporations:

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

Bond Issue:

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

SUMMARY OF PROCUREMENT OPTIONS FOR CAPITAL EXPENDITURE PROJECTS

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

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

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

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

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

Solution Center

How to Finance Your Energy Program

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

Selecting a Cost/Benefit Analysis Method

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

Simple Payback Analysis

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

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

Simple Payback

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

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

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

Life-Cycle Cost Analysis

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

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

continued

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

policy, accounting standards, and/or Federal or state legislation.

In general, debt financing should be considered for larger retrofit projects that involve multiple buildings or facilities. When considering debt financing, organizations should weigh the cost and complexity of this type of financing against the size and risk of the proposed projects.

Lease and Lease-Purchase Agreements

Leasing and lease-purchase agreements provide a means to reduce or avoid the high, up-front capital costs of new, energy-efficient equipment. These agreements may be offered by commercial leasing corporations, management and financing companies, banks, investment brokers, or equipment manufacturers. As with direct borrowing, the lease should be designed so that the energy savings are sufficient to pay for the financing charges. While the time period of a lease can vary significantly, leases in which the lessee assumes ownership of the equipment generally range from five to ten years. There are several different types of leasing agreements, as shown in the sidebar. Specific lease agreements will vary according to lessor policies, the complexity of the project, whether or not engineering and design services are included, and other factors.

Energy Performance Contracts

Energy performance contracts are generally financing or operating leases provided by an Energy Service Company (ESCo) or equipment manufacturer. The distinguishing features of these contracts are that they provide a guarantee on energy savings from the installed retrofit measures, and they provide payments to the ESCo from the savings, freeing the customer from any need of up-front payments to the ESCo. The contract period can range from five to 15 years, and the customer is required to have a certain minimum level of capital investment (generally $200,000 or more) before a contract will be considered.

Under an energy performance contract, the ESCo provides a service package that typically includes the design and engineering, financing, installation, and maintenance of retrofit measures to improve energy-efficiency. The scope of these improvements can range from measures that affect a single part of a building's energy-using

Types of Leasing Agreements

Operating Leases are usually for a short term, occasionally for periods of less than one year. At the end of the lease period, the lessee may either renegotiate the lease, buy the equipment for its fair market value, or acquire other equipment. The lessor is considered the owner of the leased equipment and can claim tax benefits for its depreciation.

Financing Leases are agreements in which the lessee essentially pays for the equipment in monthly installments. Although payments are generally higher than for an operating lease, the lessee may purchase the equipment at the end of the lease for a nominal amount (commonly $1). The lessee is considered the owner of the equipment and may claim certain tax benefits for its depreciation.

Municipal Leases are available only to tax-exempt entities such as school districts or municipalities. Under this type of lease, the lessor does not have to pay taxes on the interest portion of the lessee's payments, and can therefore offer an interest rate that is lower than the rate for usual financing leases. Because of restrictions against multi-year liabilities, the municipality specifies in the contract that the lease will be renewed year by year. This places a higher risk on the lessor, who must be prepared for the possibility that funding for the lease may not be appropriated. The lessor may therefore charge an interest rate that is as much as 2 percent above the tax-exempt bond rate, but still lower than rates for regular financing leases. Municipal leases nonetheless are generally faster and more flexible financing tools than tax-exempt bonds.

Guaranteed Savings Leases are the same as financing or operating leases but with the addition of a guaranteed savings clause. Under this type of lease, the lessee is guaranteed that the annual payments for leasing the energy-efficiency improvements will not exceed the energy savings generated by them. The owner pays the contractor a fixed payment per month. If actual energy savings are less than the fixed payment, however, the owner pays only the small amount saved and receives a credit for the difference.

How to Finance Your Energy Program *continued*

Bulk Purchasing. Large organizations generally have purchasing or materials procurement departments that often buy standard materials in bulk or receive purchasing discounts because of the volume of their purchases. Such organizations can help reduce the costs of energy-efficiency renovations if their bulk purchasing capabilities can be used to obtain discounts on the price of materials (e.g., lamps and ballasts). While some locales may have restrictions that limit the use of this option, some type of bulk purchasing can usually be negotiated to satisfy all parties involved.

Project Transaction Costs. Certain fixed costs are associated with analyzing and installing energy measures in each building included in a retrofit program. Each additional building, for example, could represent additional negotiations and transactions with building owners, building analysts, energy auditors, equipment installers, commissioning agents, and other contractors. Similarly, each additional building will add to the effort involved in initial data analysis as well as in tracking energy performance after the retrofit. For these reasons, it is often possible to achieve target energy savings at lower cost by focusing only on those buildings that are the largest energy users. One disadvantage with larger buildings is that the energy systems in the building can be more difficult to understand, but overall, focusing on the largest energy users is often the most efficient use of your financial resources.

Direct Value-Added Benefits. The primary value of retrofits to buildings and facilities lies in the reduction of operating costs through improved energy-efficiency and maintenance savings. Nevertheless, the retrofit may also directly help address a variety of related concerns, and these benefits (and avoided costs) should be considered in assessing the true value of an investment. A few examples of these benefits include the improvement of indoor air quality in office buildings and schools; easier disposal of toxic or hazardous materials found in energy-using equipment; and assistance in meeting increasingly stringent state or Federal mandates for water conservation. Effective energy management controls for buildings can also provide a strong electronic infrastructure for improving security systems and telecommunications.

Economic Development Benefits. In addition to direct savings on operating costs and the added-value benefits mentioned above, investments in energy-efficiency can also support a community's economic development and employment opportunities. Labor will typically constitute about 60 percent of a total energy investment, and about 50 percent of equipment can be expected to be purchased from local equipment suppliers; as a result, about 85 percent of the investment is retained within the local economy. Additionally, funds retained in urban areas will generally be re-spent in the local economy. The Department of Commerce estimates that each dollar retained in an urban area will be re-spent three times. This multiplier effect results in a three-fold increase in the economic benefits of funds invested in energy-efficiency, without even considering the savings from lower overall fuel costs.

For more information contact the Rebuild America Clearinghouse at 252-459-4664 or visit www.rebuild.gov

Rebuild America
U.S. Dept. of Energy

APPENDIX II - ELECTRIC UTILITY RATE SCHEDULE

Xcel Energy
SOUTHWESTERN PUBLIC SERVICE

Section No. IV
Sheet No. IV-182
Revision No. 2

Page 1 of 2

ELECTRIC TARIFF

LARGE SCHOOL SERVICE

APPLICABLE: To all public and private schools supplied electric service at secondary voltage and at one point of delivery, and measured through one meter, where facilities of adequate capacity and suitable voltage are adjacent to the premises to be served, in excess of 10kW of demand in any month.

Not applicable to temporary, breakdown, standby, supplementary, resale or shared service, or to service for which a specific rate schedule is provided.

TERRITORY: Texas service territory.

RATE: Service Availability Charge Per Meter Per Month: $24.70 per month

Energy Charge: $0.00384 per kWh for all kWh used during the month

Demand Charge:
$9.49 per kW of demand used per month during each summer month
$7.12 per kW of demand used per month during each winter month

SUMMER MONTHS: The billing months of June through September.

WINTER MONTHS: The billing months of October through May.

DEMAND: The Company will furnish at its expense the necessary metering equipment to measure the customer's kW demand for the 30-minute period of greatest use during the month. In no month, shall the billing demand be greater than the value in kW determined by dividing the kWh sales for the billing period by 80 hours.

POWER FACTOR ADJUSTMENT: Company may install power factor metering for customers with demand in excess of 200 kW. Bills computed under the above rate will be increased $0.50 for each kvar by which the reactive demand exceeds, numerically, 0.53 times the measured kW demand, and will be reduced $0.50 for each kvar by which the reactive demand is less than, numerically, 0.40 times the measured kW demand.

FUEL COST RECOVERY AND ADJUSTMENTS: The charge per kilowatt hour of the above rate shall be increased by the applicable fuel cost recovery factor per kilowatt hour as provided in PUCT Sheet IV-69. This rate schedule is subject to other applicable rate adjustments as in effect from time to time in this tariff.

PUBLIC UTILITY COMMISSION OF TEXAS
APPROVED
MAY 29 '09 DOCKET 35763
CONTROL #

PRESIDENT & CEO,
SOUTHWESTERN PUBLIC SERVICE COMPANY

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Xcel Energy
SOUTHWESTERN PUBLIC SERVICE

Section No. IV
Sheet No. IV-182
Revision No. 2

ELECTRIC TARIFF

LARGE SCHOOL SERVICE

CHARACTER OF SERVICE: A-C; 60 hertz; single or three phase, at one available standard voltage.

LINE EXTENSIONS: The Company will make line extensions in accordance with its standard line extension policy.

TERMS OF PAYMENT: Net in 16 days after mailing date; 5 percent added to bill after 16 days. If the sixteenth day falls on a holiday or weekend, the due date will be the next work day.

FRANCHISE FEE: All current and future franchise fees not included in base rates shall be separately assessed in the municipality where the excess franchise fee is authorized. Bills computed under the above rate will be increased by the additional franchise fees imposed by the appropriate municipality or taxing authority in which jurisdiction the customer's consuming facility resides, when applicable. The franchise fee will appear on the bill as a separate item.

RULES, REGULATIONS AND CONDITIONS OF SERVICE: Service supplied under this schedule is subject to the terms and conditions set forth in the Company's Rules, Regulations and Conditions of Service on file with The Public Utility Commission of Texas.

PUBLIC UTILITY COMMISSION OF TEXAS
APPROVED

MAY 29 '09 DOCKET 35763

CONTROL # _____

PRESIDENT & CEO,
SOUTHWESTERN PUBLIC SERVICE COMPANY

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APPENDIX IV - PRELIMINARY ENERGY ASSESSMENT SERVICE AGREEMENT

OFFICE OF THE COMPTROLLER TEXAS

SECO
State Energy Conservation Office

Public Schools, Colleges and Non-Profit Hospitals

Preliminary Energy Assessment Service Agreement

Investing in our public schools, colleges and non-profit hospitals 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 Highland Park 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 designated contractor to establish an Energy Policy and set realistic energy efficiency goals.
- ✓ SECO's contractor will go on site to provide walk through assessments of selected facilities. SECO will provide a report which identifies no cost/low cost recommendations, Capital Retrofit Projects, and potential sources of funding. Portions of this report may be posted on the SECO website.
- ✓ Partner will schedule a time for SECO's contractor to make a presentation of the assessment findings key decision makers.

Acceptance of Agreement

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

Signature: [signature] Date: 3/1/2011

Name (Mr./Ms./Dr.) Mike Brown Title: Superintendent

Organization: Highland Park ISD Phone: 806-335-2823

Street Address: 15300 Amarillo Blvd East Fax: 806-335-3547

Mailing Address: Box 30430 E-Mail: mike.brown@hpisd.net

Amarillo, TX 79120 County: Potter

Contact Information:

Name (Mr./Ms./Dr.): Mike Brown Title: Superintendent

Phone: 806-335-2823 Fax: 806-335-3547

E-Mail: mike.brown@hpisd.net County: Potter

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

AND fax to the SECO Contractor for this service, **Colby May**, ESA Energy Systems Associates, Inc. Phone: 512-258-0547, x124. **Fax: 512-388-3312.**

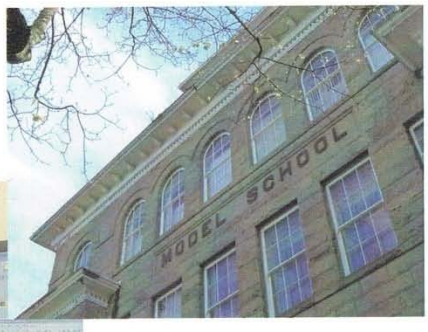
APPENDIX V - TEXAS ENERGY MANAGERS ASSOCIATION (TEMA)

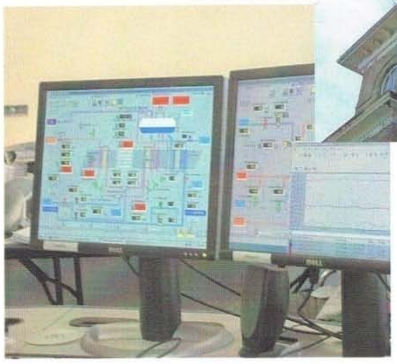
ANNOUNCING!

TEMA

TEXAS ENERGY MANAGERS ASSOCIATION

A PROFESSIONAL ASSOCIATION FOR THOSE RESPONSIBLE FOR ENERGY MANAGEMENT IN TEXAS PUBLIC FACILITIES





- Networking
- Sharing Knowledge and Resources
- Training Workshops
- Regional Meetings
- Annual Conference
- Certification
- Legislative Updates
- Money-Saving Opportunities

WWW.TEXASEMA.ORG

Check the website for Membership and Association information.

SECO
State Energy Conservation Office

APPENDIX VI - UTILITY CHARTS ON CD