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Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

Prepared by:

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Iola Independent School District

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ESA-Energy Systems Associates, Inc.
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SECO
State Energy Conservation Office

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1.0 EXECUTIVE SUMMARY:

This **Energy Efficient Partnership Service** is provided to public school districts and hospitals as a portion of the state's ***Schools/ Local Government Energy Management Program***; a program sponsored by the **State Energy Conservation Office (SECO)**, a division of the **State of Texas Comptroller of Public Accounts**.

SECO
State Energy Conservation Office

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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 February 2010, **SECO** received a request for technical assistance from *Douglas Devine*, Superintendent for Iola 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 **Iola ISD,** (hereafter known as IISD) was completed by **ESA Energy Systems Associates, Inc**., (hereafter known as *Engineer*) to determine the annual energy cost index (ECI) and energy use index (EUI) for each campus or facility. A complete listing of the Base Year Utility Costs and Consumption is provided in Section 3.0 of this report.

Following the utility analysis and a preliminary consultation with *Mr. Devine*, 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 **$15,206** may be saved annually if all recommended projects are implemented. The estimated installed cost of these projects should total approximately **$136,900**, yielding an average simple payback of **9** years.

SUMMARY:	IMPLEMENTATION COST	ESTIMATED SAVINGS	SIMPLE PAYBACK
HVAC ECRM #1	$86,100	$9,566	9 Years
Lighting ECRM #1	$ 4,000	$ 800	5 Years
Controls ECRM #1	$ 11,200	$ 1,890	6 Years
Envelope ECRM #1	$ 35,600	$ 2,950	12 Years
TOTAL PROJECTS (Lighting and HVAC 2)	$ 136,900	$ 15,206	9 Years

The total utility cost for IISD in 2009 was $77,964. The projected savings of $15,206 would represent a decrease in utility expenditures for the district of 19.5%. 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 7.0 of this report.

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

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

2.0 ENERGY ASSESSMENT PROCEDURE:

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

1. Analyze systems for code and standard compliance in areas such as cooling system refrigerants used, outside air quantity, and lighting illumination levels.
2. 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.
3. Develop a prioritized schedule for replacement projects.
4. Developing and drafting an overall Energy Management Policy.
5. Assist in the development of guidelines for efficiency levels of future equipment purchases.

3.0 ENERGY PERFORMANCE INDICATORS:

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

1. Energy Utilization Index

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

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

ELECTRICITY Usage

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

NATURAL GAS Usage

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

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

by the building area.

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

2. Energy Cost Index

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

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

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

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

THE CURRENT ENERGY PERFORMANCE INDICATORS FOR :

IOLA ISD

CAMPUS	ENERGY UTILIZATION INDEX (EUI) (Btu/sf-year)	ENERGY COST INDEX (ECI) ($/sf-year)
2009 Iola K-12	**31,269**	**$0.80**

OWNER: **Iola ISD** **BUILDING:** **K-12**

MONTH / YEAR		ELECTRIC					PROPANE	
			DEMAND					
MONTH	YEAR	CONSUMPTION KWH	METERED KW/KVA	CHARGED KW/KVA	COST OF DEMAND	TOTAL ALL ELECTRICAL COSTS $	CONSUMPTION Gallons	COSTS $
JANUARY	2010	74,180	515	515		8,007	803	$1,578
FEBRUARY	2010	104,845	605	605		7,709	779	$1,480
MARCH	2009	65,825	526	526		8,899	245	$478
APRIL	2009	59,206	455	455		6,345		
MAY	2009	48,901	281	281		4,871		
JUNE	2009	72,817	379	379		6,971		
JULY	2009	56,127	348	348		5,593		
AUGUST	2009	61,758	241	241		4,584		
SEPTEMBER	2009	52,765	236	236		3,274	298	$414
OCTOBER	2009	85,401	378	378		5,342		
NOVEMBER	2009	72,547	375	375		5,603	166	$249
DECEMBER	2009	59,805	334	334		5,981	391	$587
TOTAL		**814,177**	**4,673**	**4,673**		**$73,179**	**2,682**	**$4,785**

Annual Total Energy Cost =	$77,964	Per Year	
Total KWH x 0.003413 =	2,778.79	x 106	
Total Gallons x 0.095476 =	256.07	x 106	
Total Other x ____		x 106	
Total Site BTU's/yr	3,034.85	x 106	
Floor area:	97,057	s.f.	

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 31,269 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $0.80 $/s.f. yr

Iola ISD is supplied electricity by Entergy. The rate schedule analysis for the district is shown below. A copy of the rate schedule is included in Appendix II.

4.0 RATE SCHEDULE ANALYSIS:

ELECTRICITY PROVIDER:

RETAIL ELECTRIC SUPPLIER: Entergy

Electric Rate: General Service

I.	Customer Charge	=	$37.1500 per meter
II.	Demand Charge	=	$4.31000 per Billing kW
III.	Energy Charge	=	$0.0234 per kWh

TTC RIDER		=	$0.0011000 per kWh
FUEL ADJUSTMENT	[Varies per month]	=	$0.0547115 per kWh
	[Average for 12 months of analyzed billing cycle.]		

Average Savings for consumption (from billings) = $0.0234 + $0.001100 + $0.0547115 = $0.0792115 / kWh

Average Savings for demand = $4.31 = $4.31 / kW**

** This number is a generalization of average cost per kW because the rate schedule from ENTERGY utilizes two (2) different types of demand for the calculation of the utility bill:

1. Highest Contract Power: the greater of (i) the highest Billing Load established during the billing months of June through September or (ii) the contracted kW specified in the currently effective contract.
2. Contract Power: the greater of (i) 60% of the Highest Contract Power, or (ii) the customer's maximum measured 30-minute demand during any 30-minute interval during the billing months of June – September during the 12 months ending with the current month.

5.0 CAMPUS DESCRIPTIONS:

Iola ISD consists of multiple educational buildings which are located on one K-12 campus at 7282 Fort Worth Street, Iola, Texas. The buildings are single story, brick-clad wall construction with combination of flat built-up and low-sloping metal roofs. The original building construction was the practice gymnasium built in 1937; other buildings were added in 1959 (Upper Elementary School), 1983 (High School), 1992 (Administration), 1995 (Vocational) and 1998 (Junior High Main and Band Hall). There is a new competition gymnasium currently under construction; anticipated occupancy will be in late 2010 or early 2011.

The facility ceilings are largely acoustical tile with insulation covering the tiles below the attic plenum. Window construction varies with the age of the building; the older units are non-tinted, single pane, awning type, while newer units have some degree of tint and are generally in better overall condition. The staff reports that many of the oldest and least efficient windows are scheduled to be replaced through a bond funded project next year. During the project, only two of the existing windows will be replaced with new windows; the remaining 4 windows in each classroom will be enclosed with insulated panels.

HVAC System Description:

The majority of the campus is conditioned with split or packaged heat pumps. The units range in age from 1984 to 2009. Many of the condenser coils on the units have suffered mild to moderate coil fin damage, which reduces the capacity of the units to dissipate heat to the atmosphere, therefore reducing operating efficiency. *We recommend the district comb these fins straight and install heavy-duty coil guards to prevent similar damage in the future.* Additionally, it was note during the survey that many of the units have damaged or missing insulation on the refrigerant lines. *We recommend the insulation be inspected and replaced as needed to reduce the amount of heat the line absorbs from the outdoor air*. The current HVAC inventory for IISD is as follows:

1	Heritage	6C0048A300A3		1995	230/3/14.4	Refrigerant Line Insulation Cracking
2	Heritage	6C0030A300A1	K363WATCF	1995	230/3/8.2	
3	Heritage	6C0030A300A1		1995	230/3/8.2	
4	Heritage	6C0030A300A1		1995	230/3/8.2	
5	Heritage	6C0030A300A1		1995	230/3/8.2	
6	Rheem	RAMB-036-CBZ	6317F2703	2003	230/3/10.3	
7	Trane	TWA048A300A1	E04233205	1990	230/3/14.5	REPLACE
8	Rheem	RPNE 036 CAZ		2007	230/3/11.8	
9	Trane	BWA048A300A0	Y06206556	1985		REPLACE
10	Rheem	3-ton (x2)		2009	230/3/14.2	
11	Trane	BWA060A300	X38281981	1984	230/3/19.2	REPLACE
12	Rheem	5-ton		2002		refrigerant insulation damaged or missing
13	Rheem	4-ton (x2)		04, '07		
14	Rheem	3-ton		2007		
15	York	HIDA060	EFCM310748	1994	230/3/20.7	
16	Carrier	38YCB048	2397E04004		230/3/14.1	
17	Rheem	3-ton		2008	230/3/13.2	
18	Trane	BWA048		1985	230/3/16.8	REPLACE
19	Trane	BWA048		1985	230/3/16.8	REPLACE
20	Lennox	HP 411 1P	5189A18188	1994	230/1/18	
21	Rheem	2-1/2 ton		2003		
22	Carrier	38YCA030	1294E24069	1994	230/1/18	
23	Rheem					06 3-ton; '09 2-1/2 ton; '07 3-ton'03 5-ton
24	Lennox	HP19-653-2Y	5191F16503	1991	230/3/17.7	REPLACE
25	RTU	20-ton	Gymnasium unit - REPLACE			

* Units have numbered by surveyor and do not reflect area assignment by district

**Electrical characteristics are for compressor only - volts / phase / running load amps

Control System Description:

The district utilizes a combination of programmable and conventional thermostats to control the district's HVAC equipment at the Administration, Elementary School and Junior High, while there is a computer-based Energy Management System (EMS) at the High School. The new construction facilities will be covered by an extension of the EMS for its units. Where conventional and programmable thermostats are utilized, the maintenance and custodial staffs use a night setback policy during unoccupied hours instead of turning the units completely off. This procedure can be used effectively, but in this case, the district is executing a setback of only 80°F during the cooling season at 1530 hours. The staff states the normal occupied cooling setpoint temperature is 76°F. *We recommend the district raise the overnight setback temperature to a minimum of 85°F or modify the setback procedure to completely turn off the units for all but the most extreme conditions (freeze protection during the heating season)*. Since the most efficient operating condition for any piece of equipment is off, the district can save significant amounts of energy by eliminating after-hour operation of the systems without sacrificing occupant comfort the next morning.

During the survey, it was noted that the programming at several of the programmable thermostats was overridden and the cooling setpoint temperature was "HOLDING" at a lower than assigned temperature for the district standard. For example, the Band Hall was found to be unoccupied but the thermostat was on "HOLD" at 69°F. Similarly, the Ag Building classroom thermostat, also unoccupied at the time of the survey, was on "HOLD" at 70°F. If occupants are continuously overriding the district's recommended setpoints, especially during unoccupied hours, *we recommend the district review its recommended setpoints with the staff and make any adjustments necessary to balance occupant comfort and energy use, then remove the override functionality from the programmable thermostat in each space. Additionally, the district could opt to replace the existing programmable thermostats with new IP addressable programmable thermostats. These units allow the energy manager to monitor and program the system via the existing school intranet and eliminate the need to travel to each space to review or make programming changes.*

Lighting System Description:

The district is currently illuminated with mostly T8 linear fluorescent fixtures. While a new competition gymnasium is under construction, the practice gymnasium currently utilizes 10 each 400-watt metal halide fixtures. *We recommend these fixtures be replaced with new 4-lamp T8 high-bay fixtures to significantly improve the quality of light in the space and generate energy savings.* The new fixtures will eliminate the lamp flickering and ballast hum that is currently extremely prevalent in the gym.

6.0 RECOMMENDATIONS

A. MAINTENANCE AND OPERATIONS PROCEDURES

HVAC

- Comb fins on damaged condensing units
- Install hail guards to protect fins in future
- Replace refrigerant line insualtion where required
- Check for "HOLD" overrides at spaces over summer

Building Envelope

- Check weatherstrip at all exterior doors, replace as needed

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

HVAC M&O #1:
At IISD, the HVAC M&O opportunities revolve around combing the condenser fins [combs available for less than $10]. The installation of coil guards and concrete maintenance pads prevents future fin combing, which is ultimately a combination of deferred labor savings for eliminating the need for maintenance personnel to perform the task and energy savings resulting from the units maintaining optimum operating efficiency.

HVAC M&O #2:
It was noted during the survey that many of the condensing units had damaged or missing refrigerant line insulation. This condition allows the refrigerant to absorb heat from the ambient air and minimizes its ability to absorb heat from the interior space as desired.

Envelope M&O
As discussed previously, calculating paybacks for missing or damaged weatherstripping is tedious and serves little purpose. It was noted there were several exterior doors around the district that suffered from missing or absent weatherstripping and we recommend that these situations be addressed as the opportunity arises.

B. CAPITAL EXPENSE PROJECTS

HVAC	• Replace 20 year old or older S/Ss and RTUs.
Lighting	• Renovate Gym 400-watt Metal Halide fixtures with high-bayT8 fixtures
Controls	• Install IP Addressable Programmable thermostats at all HVAC units
Building Envelope	• Replace approximately 84 windows at Upper/Lower Elementary Schools with new windows or window enclosures

HVAC ECRM

ECRM #1: There is one 20 year old 20-ton package unit at the gymnasium and five (5) each split systems (22 tons of additional cooling capacity) that are 20 years and older still in use at the district. Planned replacement of the equipment is less expensive than emergency equipment replacement. These units have all surpassed their normal life expectancy of 20 years.

Estimated Installed Cost	=	$86,100
Estimated Energy Cost Savings	=	$ 9,566
Simple Payback Period	=	9 years

LIGHTING ECRM

ECRM #1: Replace existing metal halide gymnasium fixtures with new high-bay T8 fluorescent fixtures

Existing lighting at the gymnasium is 10 each 400-watt metal halide fixtures. Metal halides have long re-strike issue which promotes districts to allow the lights to be left operating in unoccupied gyms. The new high-bay fixtures do not have the inherent re-strike issue and may be easily turned on and off when the activity in the space changes.

Estimated Installed Cost	=	$ 4,000
Estimated Energy Cost Savings	=	$ 800
Simple Payback Period	=	5 years

<u>CONTROLS ECRM</u>

ECRM #1: Replace existing programmable thermostats with new IP addressable programmable thermostats.

It was observed during the survey that many of the thermostats have been overridden to temperature setpoints that do not coincide with the district's recommended setpoint of 76°F. IP addressable thermostats allow the energy manager to monitor and control the operation of the HVAC units without the need to extend the computer based EMS from its current service area. It is estimated that this condition applies to approximately 28 units.

Estimated Installed Cost	=	$ 11,200
Estimated Energy Cost Savings	=	$ 1,890
Simple Payback Period	=	6 years

<u>ENVELOPE ECRM</u>

ECRM #1: Replace existing single pane windows at Upper and Lower Elementaries with new windows or window enclosures. Note: The implementation of this project has already begun at the school district through a bond funded project.

The district has already entertained replacing 2 of the 6 windows in each classroom with new double pane energy efficient windows and the remaining four with window enclosures.

Estimated Installed Cost	=	$ 35,600
Estimated Energy Cost Savings	=	$ 2,950
Simple Payback Period	=	12 years

SUMMARY TABLE:

If all of the recommended projects were completed at one time, the overall project finances would be as follows (excluding HVAC ECRM #1):

Estimated Installed Cost	=	$ 136,900
Estimated Energy Cost Savings	=	$ 15,206
Simple Payback Period	=	9 years

Should the district desire to implement these projects in stages and not all at once, we recommend the following implementation schedule:

1. Lighting ECRM #1 — Less expensive than the HVAC recommendation and demonstrating a faster payback, this project will yield faster results.
2. HVAC ECRM #1 — Replacing the units in a planned and budgeted manner will prevent the requirement for emergency replacement costs if the units are allowed to fail on their own.
3. Controls ECRM #1 — The importance of this project depends largely on the success of the behavioral adjustment recommended in the report. If the occupants will cooperate with district recommendations for energy policies, then a capital investment project will not be necessary.
4. Envelope ECRM #1 — Window replacement has a longer payback than most energy efficiency projects, typically relegating them to a later implementation date.

7.0 FINANCIAL EVALUATION

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

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

Proposal:	Perform recommended ECRMs			
Assumptions:				
1. Equipment will last at least 15 years prior to next renovation				
2. No maintenance expenses for first five years (warranty period)				
3. $500 maintenance expense next 10 years				
4. Savings decreases 2% per year after year 5				
Cash Flow	**Project Cost**	**Project Savings**	**Maintenance Expense**	**Net Cash Flow**
Time 0	($136,900.00)		0	($136,900)
Year 1		$ 15,206.00	0	$15,206
Year 2		$ 15,206.00	0	$15,206
Year 3		$ 15,206.00	0	$15,206
Year 4		$ 15,206.00	0	$15,206
Year 5		$ 15,206.00	0	$15,206
Year 6		$ 14,901.88	($500)	$14,402
Year 7		$ 14,597.76	($500)	$14,098
Year 8		$ 14,293.64	($500)	$13,794
Year 9		$ 13,989.52	($500)	$13,490
Year 10		$ 13,685.40	($500)	$13,185
Year 11		$ 13,381.28	($500)	$12,881
Year 12		$ 13,077.16	($500)	$12,577
Year 13		$ 12,773.04	($500)	$12,273
Year 14		$ 12,468.92	($500)	$11,969
Year 15		$ 12,164.80	($500)	$11,665
			Internal Rate of Return	**5.96%**

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

APPENDIX I: SUMMARY OF FUNDING AND PROCUREMENT OPTIONS

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 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*

Financing Mechanisms

Capital for energy-efficiency improvements is available from a variety of public and private sources, and can be accessed through a wide and flexible range of financing instruments. While variations may occur, there are five general financing mechanisms available today for investing in energy-efficiency:

- **Internal Funds.** Energy-efficiency improvements are financed by direct allocations from an organization's own internal capital or operating budget.
- **Debt Financing.** Energy-efficiency improvements are financed with capital borrowed directly by an organization from private lenders.
- **Lease or Lease-Purchase Agreements.** Energy-efficient equipment is acquired through an operating or financing lease with no up-front costs, and payments are made over five to ten years.
- **Energy Performance Contracts.** Energy-efficiency measures are financed, installed, and maintained by a third party, which guarantees savings and payments based on those savings.
- **Utility Incentives.** Rebates, grants, or other financial assistance are offered by an energy utility for the design and purchase of certain energy-efficient systems and equipment.

These financing mechanisms are not mutually exclusive (i.e., an organization may use several of them in various combinations). The most appropriate set of options will depend on the size and complexity of a project, internal capital constraints, in-house expertise, and other factors. Each of these mechanisms is discussed briefly below, followed by some additional funding sources and considerations.

Internal Funds

The most direct way for the owner of a building or facility to pay for energy-efficiency improvements is to allocate funds from the internal capital or operating budget. Financing internally has two clear advantages over the other options discussed below – it retains internally all savings from increased energy-efficiency, and it is usually the simplest option administratively. The resulting savings may be used to decrease overall operating expenses in future years or retained within a revolving fund used to support additional efficiency investments. Many public and private organizations regularly finance some or all of their energy-efficiency improvements from internal funds.

In some instances, competition from alternative capital investment projects and the requirement for relatively high rates of return may limit the use of internal funds for major, standalone investments in energy-efficiency. In most organizations, for example, the highest priorities for internal funds are business or service expansion, critical health and safety needs, or productivity enhancements. In both the public and private sectors, capital that remains available after these priorities have been met will usually be invested in those areas that offer the highest rates of return. The criteria for such investments commonly include an annual return of 20 percent to 30 percent or a simple payback of three years or less.

Since comprehensive energy-efficiency improvements commonly have simple paybacks of five to six years, or about a 12 percent annual rate of return, internal funds often cannot serve as the sole source of financing for such improvements. Alternatively, however, internal funding can be used well and profitably to achieve more competitive rates of return when combined with one or more of the other options discussed below.

Debt Financing

Direct borrowing of capital from private lenders can be an attractive alternative to using internal funds for energy-efficiency investments. Financing costs can be repaid by the savings that accrue from increased energy-efficiency. Additionally, municipal governments can often issue bonds or other long-term debt instruments at substantially lower interest rates than can private corporate entities. As in the case of internal funding, all savings from efficiency improvements (less only the cost of financing) are retained internally.

Debt financing is administratively more complex than internal funding, and financing costs will vary according to the credit rating of the borrower. This approach may also be restricted by formal debt ceilings imposed by municipal

How to Finance Your Energy Program *continued*

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

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

Lease and Lease-Purchase Agreements

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

Energy Performance Contracts

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

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

Types of Leasing Agreements

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

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

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

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

How to Finance Your Energy Program *continued*

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

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

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

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

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

Rebuild America
U.S. Dept. of Energy

APPENDIX II - ELECTRIC UTILITY RATE SCHEDULE

ENTERGY TEXAS, INC. Electric Service SCHEDULE GS	Sheet No.: 9 Effective Date: 1-28-09 Revision: 14 Supersedes: GS Effective 3-1-99 Schedule Consists of: Two Sheets

GENERAL SERVICE

I. APPLICABILITY

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

II. NET MONTHLY BILL

A. Customer Charge $37.15 per month

B. Billing Load Charge
All kW per month $ 4.31 per kW

C. Energy Charge

All kWh used $ 0.02003 per kWh*

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

D. Delivery Voltage Adjustment

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

Delivery Voltage	Adjustment
Secondary	No adjustment
Primary (2.4KV-34.5KV)	($0.53) per kW of Billing Load
69KV/138KV	($1.05) per kW of Billing Load

E. Minimum Charge

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

(Continued on reverse side)

III. METERING, PHASE AND VOLTAGE OF SERVICE

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

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

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

IV. POWER FACTOR ADJUSTMENT

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

V. DETERMINATION OF BILLING LOAD

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

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

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

(C) 5 kW.

VI. DETERMINATION OF CONTRACT POWER

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

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

Contract Power - the greater of (i) 60% of the Highest Contract Power, or (ii) the highest load established under V (A) above during the billing months of June - September during the 12 months ending with the current month. For the initial 12 months of Customer's service, the Contract Power shall be estimated in advance from best data available and subject to adjustment for difference in actual and estimated.

 (Continued on next page)

ENTERGY TEXAS, INC. Electric Service SCHEDULE GS (Cont.)	Sheet No.: 10 Effective Date: 1-28-09 Revision: 14 Supersedes: GS Effective 3-1-99 Schedule Consists of: Two Sheets

GENERAL SERVICE

VII. **USE OF SERVICE**

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

VIII. **AMOUNT DUE AND PAYMENT**

The past due amount for service furnished for which payment is not made within sixteen (16) days of the billing date shall be the monthly bill, including all adjustments under the rate schedule and applicable riders, plus 5% of the first $50.00 and 2% of any additional amount of such net monthly bill above $50.00. If the amount due when rendered is paid prior to such date, the monthly bill, including all adjustments under the rate schedule and applicable riders, shall apply. If providing service to the state of Texas, Company shall not assess a fee, penalty, interest or other charge to the state for delinquent payment of a bill.

ENTERGY TEXAS, INC. Electric Service SCHEDULE SMC	Sheet No.: 13 Effective Date: 1-28-09 Revision: 9 Supersedes: SMC Effective 12-18-98 Schedule Consists of: One Sheet

SPECIAL MINIMUM CHARGE RIDER TO SCHEDULES SGS, GS AND LGS

I. APPLICABILITY

This rider is applicable under the regular terms and conditions of the Company to Customers served under Schedule SGS, GS or LGS for service to seasonal operations recurring annually such as the following:

- seasonally operated municipal facilities including sewage treatment plants, municipally-owned seasonal athletic fields;
- Municipal Utility Districts serving an incorporated city;
- churches; and,
- elementary and secondary schools (public and parochial) and state colleges and universities including the athletic fields of such educational institutions.

For purposes of this rider, seasonal operations are those operations associated with agricultural products (rice, soybeans, cotton, etc.), ball parks operated by non-profit organizations, and public playgrounds.

II. MODIFICATION TO REGULAR RATE SCHEDULE

Section V, Determination of Billing Load, under Schedules GS and LGS is modified to the extent that Billing Load will be the actual maximum kW load of the current month but not less than 5 kW under Schedule GS and 300 kW under Schedule LGS.

III. SEASONALLY OPERATED FACILITY RECONNECTIONS

Seasonally operated facilities such as those described above may, upon request, reconnect after the facility's regular seasonal operations have been completed. Such reconnections will be allowed in accordance with § A and B below. Where a portion of the service, such as lighting is on a year-round basis and not seasonally disconnected, Customer will arrange wiring so that such portion can be separately served, metered, and billed under the applicable rate schedule.

A. Following a seasonal disconnect, the first reconnection of service requested in the same calendar year that the seasonal disconnect was requested will be free of charge;

B. For each additional reconnection of service requested thereafter, in the same calendar year, the customer will be charged a Connection Charge in accordance with § II.B of Rate Schedule MES.

SECTION III RATE SCHEDULES Page 28.1

ENTERGY TEXAS, INC. Electric Service SCHEDULE FF	Sheet No.: 51 Effective Date: 3-2-10 Revision: 29 Supersedes: FF Effective 8-28-09 Schedule Consists of: One Sheet

FIXED FUEL FACTOR AND LOSS MULTIPLIERS

The Texas retail fixed fuel factor is $0.0528816 per kWh.

The loss multipliers by voltage level are:

Delivery Voltage	Loss Multiplier
Secondary	1.034603
Primary	1.004911
69KV/138KV	0.962921
230KV	0.945741

The corresponding fixed fuel factors by voltage level are:

Delivery Voltage	Fixed Fuel Factor
Secondary	$0.0547115 per kWh
Primary	$0.0531413 per kWh
69KV/138KV	$0.0509208 per kWh
230KV	$0.0500123 per kWh

APPENDIX IV - PRELIMINARY ENERGY ASSESSMENT SERVICE AGREEMENT

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 Iola 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: 4-22-10

Name (Mr./Ms./Dr.) Douglas Devine Title: Superintendent

Organization: Iola ISD Phone: 936-394-2361

Street Address: 7282 Fort Worth Street Fax: 936-394-2132

Mailing Address: P.O. Box 159 E-Mail: ddevine@iolaisd.net

Iola, Texas 77861 County: Grimes

Contact Information:

Name (Mr./Ms./Dr.): Same as Above Title:

Phone: Fax:

E-Mail: County:

Please sign and mail or fax to: Juline Ferris, Schools and Education Program Administrator, State Energy Conservation Office, 111 E. 17th Street, Austin, Texas 78774. Phone: 512-936-9283. Fax 512-475-2569.

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

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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.

Texas Energy Managers Association

SECO
State Energy Conservation Office

APPENDIX VI - UTILITY CHARTS ON CD