Susan Combs
Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

Prepared by:

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Pampa Independent School District

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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**.

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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 August, 2011, **SECO** received a request for technical assistance from Mr. Barry Haenisch, Superintendent for **Pampa 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 **Pampa ISD,** (hereafter known as PISD) 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. Danny Seabourn, Chief Financial Officer for Pampa ISD, 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 **$7,375** may be saved annually if all recommended projects are implemented. The estimated installed cost of these projects should total approximately **$73,850** yielding an average simple payback of **10** years.

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

SUMMARY:	IMPLEMENTATION COST	ESTIMATED SAVINGS	SIMPLE PAYBACK
ENVELOPE ECRM #1	$2,750	$450	6 Years
HVAC ECRM #1 *	$7,000	$475	15 Years
HVAC ECRM #2,3	$51,000	$4,250	12 Years
LIGHTING ECRM #1	$7,500	$1,250	6 Years
LIGHTING ECRM #2,3	$5,600	$950	6 Years
TOTAL PROJECTS	**$73,850**	**$7,375**	**10 Years**

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

Our final "summary" comment is that **SECO** views the completion and presentation of this report as a beginning, rather than an end, of our relationship with PISD. 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

*** See explanation on page 12**

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 PISD, 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:

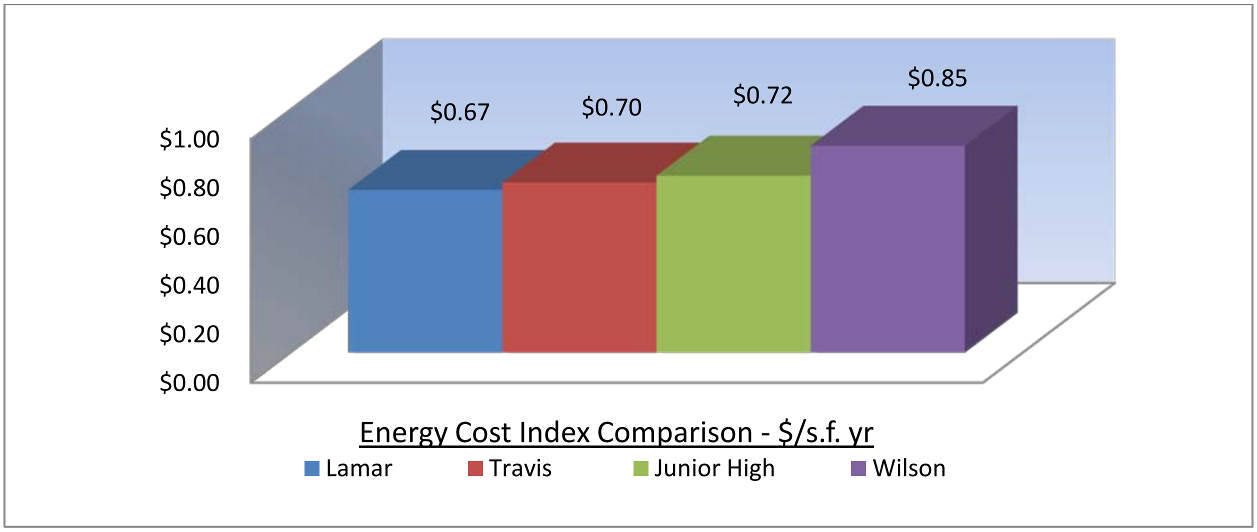
ECI = [Electricity Cost + Gas Cost] divided by [Total square feet]

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.

THE CURRENT PISD ENERGY PERFORMANCE INDICATORS:

PAMPA ISD

CAMPUS	ENERGY UTILIZATION INDEX (EUI) BTUs/sf-year	COMPARISON TO DISTRICT AVERAGE	ENERGY COST INDEX (ECI) $/sf-year	COMPARISON TO DISTRICT AVERAGE
Wilson	55,149	5%	$0.85	16%
Junior High	48,727	-7%	$0.72	-2%
Travis	54,773	4%	$0.70	-5%
Lamar	51,626	-2%	$0.67	-9%
Average Value:	52,569		$0.74	



The energy history spreadsheets are shown on the next few pages.

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

A copy of the rate schedule is included in Appendix II

OWNER: **Pampa ISD** **BUILDING:** **Wilson**

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
		CONSUMPTION	METERED	CHARGED	COST OF	TOTAL ALL ELECTRICAL	CONSUMPTION	COSTS
MONTH	YEAR	KWH	KW/KVA	KW/KVA	DEMAND	COSTS $	MCF	$
JANUARY	2011	30,800		132	940	2,020	303	3,142
FEBRUARY	2011	43,400		192	1,149	2,649	364	2,800
MARCH	2011	31,800		134	1,096	2,210	113	2,281
APRIL	2011	38,000		152	1,243	2,570	44	756
MAY	2011	39,400		198	1,635	3,016	22	106
JUNE	2010	40,700		164	1,434	2,812	14	79
JULY	2010	42,000		130	1,234	2,607	7	40
AUGUST	2010	52,600		250	2,373	4,298	6	36
SEPTEMBER	2010	60,600		242	2,297	4,503	13	62
OCTOBER	2010	40,200		242	1,743	3,206	30	317
NOVEMBER	2010	39,400		148	1,054	2,457	135	970
DECEMBER	2010	36,000		144	1,025	2,310	295	2,021
TOTAL		494,900	0	2,128	17,223	$34,658	1,346	$12,610

Annual Total Energy Cost =	$47,268	Per Year	**Energy Use Index:** Total Site BTU's/yr / Total Area (sq.ft.)	55,149 BTU/s.f.yr
Total KWH x 0.003413 =	1,689.09	x 106		
Total MCF x 1.03 =	1,386.38	x 106	**Energy Cost Index:** Total Energy Cost/yr / Total Area (sq.ft.)	$0.85 $/s.f. yr
Total Other x ____		x 106		
Total Site BTU's/yr	3,075.47	x 106		
Floor area:	55,767	s.f.		

OWNER: **Pampa ISD** **BUILDING:** **Junior High**

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
		CONSUMPTION	METERED	CHARGED	COST OF	TOTAL ALL ELECTRICAL	CONSUMPTION	COSTS
MONTH	YEAR	KWH	KW/KVA	KW/KVA	DEMAND	COSTS $	MCF	$
JANUARY	2011	76,800	285	285	2,571	5,320	657	6,680
FEBRUARY	2011	91,800	279	279	2,579	5,812	794	3,392
MARCH	2011	66,300	282	282	2,865	5,151	245	2,401
APRIL	2011	77,400	288	288	2,336	5,027	162	1,334
MAY	2011	79,800	633	633	2,945	5,709	60	289
JUNE	2010	90,600	461	461	3,202	6,236	32	175
JULY	2010	101,400	288	288	3,459	6,763	4	24
AUGUST	2010	111,300	306	306	3,675	7,548	31	177
SEPTEMBER	2010	107,700	414	414	4,972	8,924	23	115
OCTOBER	2010	89,400	405	405	4,085	7,348	45	387
NOVEMBER	2010	91,500	306	306	2,760	6,011	206	1,337
DECEMBER	2010	85,200	270	270	2,435	5,455	323	2,166
TOTAL		1,069,200	4,217	4,217	37,884	$75,304	2,582	$18,477

Annual Total Energy Cost =	$93,781	Per Year	**Energy Use Index:** Total Site BTU's/yr / Total Area (sq.ft.)	48,727 BTU/s.f.yr
Total KWH x 0.003413 =	3,649.18	x 106		
Total MCF x 1.03 =	2,659.46	x 106	**Energy Cost Index:** Total Energy Cost/yr / Total Area (sq.ft.)	$0.72 $/s.f. yr
Total Other x ____		x 106		
Total Site BTU's/yr	6,308.64	x 106		
Floor area:	129,468	s.f.		

OWNER: **Pampa ISD** **BUILDING:** **Travis**

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
		CONSUMPTION	METERED	CHARGED	COST OF	TOTAL ALL ELECTRICAL	CONSUMPTION	COSTS
MONTH	YEAR	KWH	KW/KVA	KW/KVA	DEMAND	COSTS $	MCF	$
JANUARY	2011	25,920		113	805	1,717	475	2,548
FEBRUARY	2011	41,640		120	932	2,379	512	1,889
MARCH	2011	28,680		115	941	1,949	164	1,989
APRIL	2011	32,160		128	1,047	2,175	78	807
MAY	2011	35,400		178	1,480	2,722	33	157
JUNE	2010	27,660		121	1,049	2,005	19	104
JULY	2010	19,920		65	617	1,289	5	32
AUGUST	2010	38,400		209	1,983	3,410	7	41
SEPTEMBER	2010	46,680		215	2,023	3,737	17	85
OCTOBER	2010	36,240		170	1,210	2,514	27	302
NOVEMBER	2010	32,280		127	904	2,060	182	1,211
DECEMBER	2010	29,400		116	826	1,877	287	1,980
TOTAL		**394,380**	**0**	**1,677**	**13,817**	**$27,834**	**1,806**	**$11,145**

Annual Total Energy Cost =	$38,979	Per Year	
Total KWH x 0.003413 =	1,346.02	x 106	
Total MCF x 1.03 =	1,860.18	x 106	
Total Other x ____		x 106	
Total Site BTU's/yr	3,206.20	x 106	
Floor area:	58,536	s.f.	

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 54,773 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $0.67 $/s.f. yr

OWNER: **Pampa ISD** **BUILDING:** **Lamar**

MONTH / YEAR		ELECTRIC					NAT'L GAS / FUEL	
			DEMAND					
		CONSUMPTION	METERED	CHARGED	COST OF	TOTAL ALL ELECTRICAL	CONSUMPTION	COSTS
MONTH	YEAR	KWH	KW/KVA	KW/KVA	DEMAND	COSTS $	MCF	$
JANUARY	2011	36,200	136	136	968	2,247	386	2,094
FEBRUARY	2011	39,600	150	150	1,068	2,446	457	1,597
MARCH	2011	35,400	258	258	1,098	2,353	136	1,847
APRIL	2011	32,000	132	132	1,079	2,196	78	923
MAY	2011	35,200	168	168	1,374	4,632	32	154
JUNE	2010	26,800	104	104	896	2,830	19	103
JULY	2010	18,400	44	44	418	1,028	5	33
AUGUST	2010	23,400	124	124	1,177	2,005	7	41
SEPTEMBER	2010	46,400	212	212	2,012	3,716	16	77
OCTOBER	2010	41,000	196	196	1,667	3,164	20	272
NOVEMBER	2010	33,600	132	132	940	2,142	118	880
DECEMBER	2010	37,200	130	130	926	2,248	364	2,380
TOTAL		**405,200**	**1,786**	**1,786**	**13,623**	**$31,007**	**1,638**	**$10,402**

Annual Total Energy Cost =	$41,409	Per Year	
Total KWH x 0.003413 =	1,382.95	x 106	
Total MCF x 1.03 =	1,687.14	x 106	
Total Other x ____		x 106	
Total Site BTU's/yr	3,070.09	x 106	
Floor area:	59,468	s.f.	

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 51,626 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $0.70 $/s.f. yr

4.0 RATE SCHEDULE ANALYSIS:

ELECTRICITY PROVIDER:

ENERGY PROVIDER: Xcel Energy Contract price: $0.004305 per kWh

Electric Rate: Secondary Service > 10 kVA

I.	SERVICE AVAILABILITY CHARGE:	=	$21.60 per Month
II.	DEMAND CHARGE		
	Summer Demand Charge	=	$12.53 per kW
	Winter Demand Charge	=	$10.16 per kW
III.	SECONDARY DISTRIBUTION FUEL COST RECOVERY FACTOR		
	Summer Factor	=	$0.030785 per kWh
	Winter Factor	=	$0.029849 per kWh
IV.	SUB-TRANSMISSION FUEL COST RECOVERY FACTOR		
	Summer Factor	=	$0.028481 per kWh
	Winter Factor	=	$0.027616 per kWh
V.	BACKBONE-TRANSMISSION FUEL COST RECOVERY FACTOR		
	Summer Factor	=	$0.028278 per kWh
	Winter Factor	=	$0.027418 per kWh
VI.	PURCHASED POWER COST RECOVERY FACTOR	=	$0.052557 per kW
VII.	FRANCHISE FEE	=	2% of Bill Subtotal
VIII.	TAXES		
	General Local Taxes		

Summer Average Savings for consumption = $0.030785/kWh + $0.028481/kWh + $0.028278/kWh = $0.087544/kWh
Summer Average Savings for demand = $12.53/kW + $0.052557 = $ 12.582557/kW**

Winter Average Savings for consumption = $0.029849/kWh + $0.027616/kWh + $0.027418 = $0.08488/kWh
Winter Average Savings for demand = $10.16/kW + $0.052557 = $ 10.212557/kW**

ATMOS NATURAL GAS PROVIDER:

The rate schedule for natural gas is unavailable, but we have calculated the average cost per MCF of purchased natural gas in the district by analyzing the utility histories for the schools surveyed in this report.

Total cost for natural gas at the eight facilities in the analyzed billing cycle: $52,634

Total quantity purchased during the analyzed billing cycle: 7,372 MCF

Average cost per MCF = Cost of natural gas / quantity purchased = $52,634 / 7,372 MCF

Average cost per MCF = $7.14

5.0 CAMPUS DESCRIPTIONS:

Pampa ISD consists of 9 educational campuses [1 High School, 1 Middle Schools, 6 Elementary Schools and the Pampa Learning Center (PLC)]. The energy survey focused on 3 of the educational campuses:

Table 2: School Facilities Analyzed For This Report

Facility	Year originally Constructed	Approximate Square Footage	Basic HVAC Cool/Heat	Basic HVAC Air Distribution	Basic Lighting System Description	Basic Control System Description
Austin	1956 1997 Addition 1989 Addition	56,000	RTUs	RTUs	T8 in CRs and Metal Halide at Gym	Conventional Thermostat
Junior High	2010	129,500	RTUs	RTUs	T8 and T5	TAC DDC
Carver Admin	1951	12,000	RTUs/Unit Heaters	RTUs/Unit Heaters	T12	Conventional Thermostats

Note: RTUs = Rooftop Units

The selection of campuses represented a mix of older and newer campuses which allows for comparison of energy strategies between older and newer designs as well as the ability to extrapolate recommendations for these facilities to other facilities in the district.

6.0 ENERGY RECOMMENDATIONS:

ENVELOPE ECRM #1: REPLACE AGED WINDOWS AT CARVER ADMINISTRATION BUILDING WITH WINDOW ENCLOSURES AND NEW WINDOWS

The windows at the Carver Administration complex are original to the 1951 construction. They are single pane awning windows with seals that are in very poor condition. The blinds in some spaces sway in the breeze as they cover a locked and closed window. The Board Room, as an example, has seven 30" x 84" (approximate) windows in the room. We recommend the district replace every other window with an insulated window enclosure and the remaining four windows with new double-pane units to allow natural light into the space. The scope of work defined by the price below is indicative of the Board Room only; the project should be expanded to replace other windows at Carver in similar condition.

Estimated Cost: $2,750 Estimated Annual Savings: $450 Estimated Payback: 6 Years

HVAC ECRM #1: REPLACE AGED HVAC EQUIPMENT AT CARVER ADMINISTRATION BUILDING

The HVAC system at Carver consists of two separate systems: cooling only rooftop units and wall mounted standing pilot natural gas unit heaters in the rooms. Each system has its own separate manual thermostats; this condition is prone to simultaneous heating and cooling processes, especially during cool morning and warm afternoon seasons like the spring and fall, as each system's thermostat responds to the cooling or heating processes controlled by the other thermostat. We recommend the district replace the existing cooling only RTUs with natural gas heat RTUs. The project will require the installation of new gas piping on the roof, which makes the payback for this project slightly longer than a traditional RTU renovation project. Pricing shown is a typical installed cost for one 3-ton RTU. Our recommendation is that all existing cooling only RTU's and natural gas unit heaters be replaced with combination heat/cool RTUs.

Estimated Cost: $7,000 /3 ton RTU Est. Annual Savings: $475 Est. Payback: 15 Years

HVAC ECRM #2, 3: REPLACE AGED HVAC EQUIPMENT AT AUSTIN ELEMENTARY, INCLUDE IP ADDRESSABLE THERMOSTATS WITH NEW EQUIPMENT INSTALLATION

It was noted during the survey that the RTUs at Austin ES have reached or surpassed their anticipated useful life expectancy of 15-20 years. One unit has been replaced in 2009; unit failures will begin to increase as the existing units continue to age which can lead to expensive emergency replacement costs. There are approximately 142 nominal tons of units that are 1997 or older; 24 tons of these units are 1989 era RTUs that we recommend be replaced as soon as possible. The 1997 units may be replaced through a process of planned obsolescence, a process by which the Board chooses to replace a certain number of the oldest or most maintenance intensive units each year until all of the 15 year old or older units have been replaced. The price below is indicative of a project replacing just the six 4-ton 1989 units. As the units are replaced, we recommend the district incorporate IP Addressable thermostats that will allow the district to remotely monitor and program the units from the district computer network.

Estimated Cost: $51,000 Estimated Savings: $4,250 Estimated Payback: 12 Years

Lighting ECRM #1: RETROFIT T12 FIXTURES WITH T8 LAMPS AND ELECTRONIC BALLASTS

It was noted at Carver, that the light fixtures still utilize T12 lighting components. We recommend the district replace these lamps and ballasts with new T8 lamps and electronic ballasts. These components produce approximately 20% more light from the same fixture and consume about 18% less energy to do the work.

Tax records indicate that Carver is approximately 12,000 square feet of space.

Estimated Cost: $7,500   Estimated Savings: $1,250   Estimated Payback: 6 Years

Lighting ECRM #2: REPLACE EXISTING METAL HALIDE GYMNASIUM FIXTURES WITH T5 FLUORESCENT AT AUSTIN ELEMENTARY

The gymnasium at Austin ES utilizes 16-400 watt metal halide fixtures that *we recommend are replaced with 6-lamp T5 high bay linear fluorescent fixtures similar to the ones installed at the new Junior High School.* Metal halides have an inherently long re-strike time that promotes staff to leave them operating throughout the day instead of turning them off during unoccupied periods. T5 fixtures do not have this inherent long re-strike so in addition to their increased energy efficiency, they may be operated for fewer hours each day.

Estimated Cost: $5,600   Estimated Savings: $950   Estimated Payback: 6 Years

7.0 MAINTENANCE AND OPERATION RECOMMENDATIONS

HVAC

- Include coil guards in purchasing/design specifications for future purchases.
- Comb damaged coil fins and install coil guards on existing units.

Lighting

- De-lamp existing corridor fixtures from 3 to 2 lamps
- Turn off lights in unoccupied spaces
- Turn off lights at vestibules during daytime hours

Building Envelope

- Replace damaged or missing weatherstripping
- Discourage air conditioning of vestibules in future designs

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, 2

It was noted during the survey that many of the existing rooftop units (RTUs) did not have coil guards installed and some of these units have sustained damage to the coil fins (see picture to the right). Damage to just 10% of the coil fins can lead to a loss of operating efficiency of up to 30%. *We recommend the district comb the coil fins on existing units (combs available for less than $10) and install coil guards on the existing units to prevent future damage. We also recommend that coil guards be incorporated as a requirement in the purchasing/design specifications for all future DX HVAC equipment purchased by the district.*

Lighting M&O #1

The corridor light fixtures at Austin Elementary are 3-lamp T8 fixtures. The light levels recorded in the hallways were between 54 and 78 footcandles. The Illumination Engineering Society of North America (IESNA) recommends that school corridors have 10-15 footcandles. We recommend the district de-lamp each corridor fixture by removing the center lamp and just operating the outboard 2 lamps in the fixtures. The resultant light levels should be between 36 and 52 footcandles after the renovation, which still exceeds the lighting recommendations set forth by IESNA.

Lighting M&O #2

It was noted during the survey that the light fixtures in the vestibules were operating during the daytime. The light levels in these spaces exceeded 120 footcandles, with little to no contribution resulting from the light fixtures themselves. *We recommend the district turn off these light fixtures during the day, and allow the natural daylight to illuminate the space.* Photocells could be incorporated in to the existing lighting circuit to allow the lights to turn on automatically as needed for cloudy days or at dusk.

Lighting M&O #3

It was noted that some lights at Austin ES were left on in unoccupied spaces, particularly after the students left for the day, and some fixtures that were not necessary to operate during the daytime hours. Studies have indicated that turning off unnecessary fixtures or light fixtures in unoccupied spaces results in energy savings after 23 seconds for the linear fluorescent fixtures found in most Texas classrooms. There are three primary strategies for gaining compliance for occupants to turn off their lights as they leave a space:

- Inform and remind staff of the energy saving opportunities available to the district at the staff in-service sessions already planned for the school year.

- Implement a "red-dot" program at the campus. This program identifies light switches that do not need to be turned on during the day and places a small red adhesive dot over the switch to remind staff to not automatically turn on these switches during the day.
- While representing a small to moderate capital investment, installing occupancy sensors and photocell controls into the existing lighting circuits provides automated control of fixtures left on in unoccupied spaces or turned on unnecessarily in daylit areas.

Building Envelope M&O #1

It was noted that that the weatherstripping at some of the exterior doors at Austin is damaged or missing (see picture to the right). This allows the conditioned air to escape the building and contaminants to enter. *We recommend the district replace the damaged or missing weatherstripping.*

Building Envelope M&O #2

It was noted that the vestibules at the new Junior High School were conditioned as if they were separate occupied spaces. The purpose of the vestibule is to serve as an air break between conditioned spaces of the building and the exterior atmosphere; conditioning these spaces results in extra and unnecessary energy consumption. We recommend the district incorporate design directives into their basis of design that prohibits conditioning the vestibules constructed in future buildings.

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. $1,000 maintenance expense next 5 years				
5. Savings decreases 5% per year after year 5				
Cash Flow	**Project Cost**	**Project Savings**	**Maintenance Expense**	**Net Cash Flow**
Time 0	($73,850)		0	($73,850)
Year 1		$ 7,375.00	0	$7,375
Year 2		$ 7,375.00	0	$7,375
Year 3		$ 7,375.00	0	$7,375
Year 4		$ 7,375.00	0	$7,375
Year 5		$ 7,375.00	0	$7,375
Year 6		$ 7,006.25	($500)	$6,506
Year 7		$ 6,637.50	($500)	$6,138
Year 8		$ 6,268.75	($500)	$5,769
Year 9		$ 5,900.00	($500)	$5,400
Year 10		$ 5,531.25	($500)	$5,031
Year 11		$ 5,162.50	($1,000)	$4,163
Year 12		$ 4,793.75	($1,000)	$3,794
Year 13		$ 4,425.00	($1,000)	$3,425
Year 14		$ 4,056.25	($1,000)	$3,056
Year 15		$ 3,687.50	($1,000)	$2,688
			Internal Rate of Return	**1.76%**

More information regarding financial programs available to PISD 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

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

Xcel Energy
SOUTHWESTERN PUBLIC SERVICE

ELECTRIC TARIFF INTERIM

SECONDARY GENERAL SERVICE

APPLICABLE: To all commercial and industrial electric service supplied at secondary voltage level 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 10 kW of demand in any month.

Not applicable to temporary, breakdown, standby, supplementary, resale or shared service, or service to oil and natural gas production customers.

TERRITORY: Texas service territory.

RATE: Service Availability Charge: $21.60 per month I
Energy Charge: $0.004305 per kWh for all kWh used during the month I

Demand Charge:
$12.53 per kW of demand used per month during each summer month I
$10.16 per kW of demand used per month during each winter month I

SUMMER MONTHS: The billing months of June through September.

WINTER MONTHS: The billing months of October through May.

OPTIONAL SERVICE: Customers receiving service under this rate may elect to receive interruptible service under the Interruptible Credit Option.

DEMAND: The Company will furnish, at Company's 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 kW value 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 exceeding 200 kW. Bills will be increased $0.50 for each kvar by which the reactive demand exceeds 0.33 times the measured kW demand, and will be reduced $0.50 for each kvar T
by which the reactive demand is less than 0.33 times the measured kW demand. T

FUEL COST RECOVERY AND ADJUSTMENTS: The charge per kilowatt-hour 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.

DIRECTOR, REGULATORY ADMINISTRATION

Xcel Energy
SOUTHWESTERN PUBLIC SERVICE

ELECTRIC TARIFF INTERIM

SECONDARY GENERAL 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.

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.

Effective 2/16/2011

DIRECTOR, REGULATORY ADMINISTRATION

APPENDIX IV - PRELIMINARY ENERGY ASSESSMENT SERVICE AGREEMENT

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 Pampa 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: Barry Haenisch
Date: 8/11/11
Name (Mr./Ms./Dr.) Mr. Barry Haenisch
Title: Superintendent
Organization: Pampa ISD
Phone: 806/669-4700
Street Address: 321 W. Albert
Fax: 806/665-0506
Mailing Address: Pampa, TX 79065
E-Mail: barry.haenisch@pampaisd.net
County: Gray

Contact Information:

Name (Mr./Ms./Dr.): Mr. Danny Seabourn
Title: CFO
Phone: 806/669-4700
Fax: 806/665-0506
E-Mail: danny.seabourn@pampaisd.net
County: Gray

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.**

8/17/11 - ESACM1007

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