Susan Combs
Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

Prepared by:

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Lubbock Independent School District

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ESA Energy Systems Associates, Inc. A Terracon COMPANY

SECO State Energy Conservation Office

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1.0 EXECUTIVE SUMMARY:

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

SECO State Energy Conservation Office	Program Administrator:	Stephen Ross
	Phone:	512-463-1770
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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 September 2011, **SECO** received a request for technical assistance from Bill Craft, Executive Director of Facilities for **Lubbock 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 **Lubbock ISD,** (hereafter known as LISD) 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. Craft*, 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.

<u>We estimate that as much as **$87,870** may be saved annually if all recommended projects are implemented</u>. The estimated installed cost of these projects should total approximately **$828,780**, yielding an average simple payback of **9-1/2** years.

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

SUMMARY:	ECRM DESCRIPTION	IMPLEMENTATION COST	ESTIMATED SAVINGS	SIMPLE PAYBACK
HVAC ECRM #1	Replace central system components at LHS	$511,000	$45,000	11-1/2 Years
HVAC ECRM #2	Replace AHUs at LHS	$44,000	$4,400	10 Years
HVAC ECRM #3	Install S/S for admin areas at LHS	-	-	-
HVAC ECRM #4	Dry bulb economizers at LHS	$1,000	$250	4 Years
HVAC ECRM #5	Replace hot water heaters with on-demand water heaters at LHS	$4,000	$650	6 Years
Lighting ECRM #1	Metal Halides to T5	$34,650	$5,775	6 Years
Lighting ECRM #2	Remaining T12 to T8	$94,650	$15,775	6 Years
Building Envelope ECRM #1	Replace single pane windows	$49,000	$4,100	12
Controls ECRM #1	Replace pneumatic controls	$87,600	$10,000	9 Years
Controls ECRM #2	Install vending machine controls	$2,880	$1,920	1-1/2 Years
TOTAL PROJECTS		**$ 828,780**	**$ 87,870**	**9-1/2 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 LISD. We hope to be ongoing partners in assisting you to implement the recommendations listed in this report. Please call us if you have further questions or comments regarding your Energy Management Issues.

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

2.0 ENERGY ASSESSMENT PROCEDURE:

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

CAMPUS	ENERGY UTILIZATION INDEX (EUI) BTUs/sf-year	COMPARISON TO DISTRICT AVERAGE	ENERGY COST INDEX (ECI) $/sf-year	COMPARISON TO DISTRICT AVERAGE
Lubbock High School	68,675	37%	$0.92	24%
Roscoe Wilson Elementary	65,958	31%	$0.92	24%
Hutchinson Middle School	65,477	30%	$0.84	13%
O. L. Slaton Middle School	57,016	13%	$0.77	4%
Mackenzie Middle School	47,989	-4%	$0.76	2%
Irons Middle School	47,330	-6%	$0.73	-2%
Cavazos Middle School	40,790	-19%	$0.69	-7%
Williams Elementary	39,782	-21%	$0.69	-7%
Stewart Elementary	40,461	-19%	$0.66	-11%
Bayless Elementary	43,446	-14%	$0.65	-12%
Atkins Middle School	44,670	-11%	$0.64	-14%
Smylie Wilson Middle School	41,295	-18%	$0.64	-14%
Average Value:	50,241		$0.74	

Lubbock ISD purchases electricity from Lubbock Power and Light. There is not a separate Transmission and distribution company. 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 new interim rate schedule is included in Appendix I

OWNER: **Lubbock ISD** **BUILDING:** **Lubbock HS**

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	178,740		562	4,002	11,336	1,640	13,503
FEBRUARY	2011	196,810		473	3,368	11,380	1,912	14,430
MARCH	2011	205,664		528	3,756	11,977	1,534	13,329
APRIL	2011	244,839		525	3,735	14,208	122	952
MAY	2011	223,809		557	3,965	13,299	33	328
JUNE	2011	268,391		590	5,597	19,277	4	70
JULY	2011	244,915		382	3,621	15,918	2	54
AUGUST	2011	294,411		682	6,469	22,485	5	88
SEPTEMBER	2010	308,154		680	6,453	18,585	26	216
OCTOBER	2010	241,898		605	4,309	14,641	75	455
NOVEMBER	2010	186,474		819	5,832	14,097	683	4,707
DECEMBER	2010	232,495		530	3,775	12,975	2,035	13,416
TOTAL		**2,826,600**		**6,933**	**54,882**	**$180,178**	**8,071**	**$61,548**

Annual Total Energy Cost = $241,726 Per Year

Total KWH x 0.003413 = 9,647.19 x 106
Total MCF x 1.03 = 8,313.13 x 106
Total Other x ____ x 106
Total Site BTU's/yr 17,960.32 x 106

Floor area: 261,528 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) 68,675 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) $0.92 $/s.f. yr

Electric Utility Lubbock Power and Light
Meter# 1365, 1793, 7193, 7230, 3042, 6812

Gas Utility Atmos
Meter # 3025

OWNER: **Lubbock ISD** **BUILDING:** **Roscoe Wilson ES**

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	40,820		151	1,070	2,653	417	3,437
FEBRUARY	2011	41,380		146	1,038	2,638	416	3,139
MARCH	2011	43,860		169	1,209	2,910	261	2,264
APRIL	2011	48,760		175	1,243	3,215	91	713
MAY	2011	44,880		213	1,519	3,233	52	508
JUNE	2011	38,860		187	1,772	3,580	4	70
JULY	2010	29,340		111	1,054	2,413	3	75
AUGUST	2010	51,400		257	2,445	5,012	5	86
SEPTEMBER	2010	55,240		235	2,232	4,165	10	68
OCTOBER	2010	49,720		205	1,460	3,385	89	546
NOVEMBER	2010	42,040		161	1,149	2,781	181	1,250
DECEMBER	2010	50,160		155	1,104	3,010	433	2,852
TOTAL		**536,460**		**2,165**	**17,295**	**$38,995**	**1,962**	**$15,008**

Annual Total Energy Cost = $54,003 Per Year

Total KWH x 0.003413 = 1,830.94 x 106
Total MCF x 1.03 = 2,020.86 x 106
Total Other x ____ x 106
Total Site BTU's/yr 3,851.80 x 106

Floor area: 58,398 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) 65,958 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) $0.92 $/s.f. yr

Electric Utility Lubbock Power and Light
Meter# 7223, 7226, 5259

Gas Utility Atmos
Meter # 3022

OWNER: Lubbock ISD BUILDING: Hutchinson MS

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	66,843		240	1,709	4,239	961	7,911
FEBRUARY	2011	63,047		231	1,641	4,037	1,023	7,718
MARCH	2011	69,766		245	1,743	4,383	645	5,603
APRIL	2011	85,490		320	2,281	5,688	151	1,182
MAY	2011	90,899		409	2,914	6,287	43	422
JUNE	2011	102,377		377	3,576	8,113	8	144
JULY	2011	85,587		212	2,015	5,738	8	176
AUGUST	2011	119,967		509	4,829	10,637	7	123
SEPTEMBER	2010	113,269		365	3,462	7,254	20	139
OCTOBER	2010	92,948		218	1,555	4,971	155	945
NOVEMBER	2010	69,209		230	1,640	4,242	394	2,717
DECEMBER	2010	74,081		217	1,546	4,308	1,008	6,643
TOTAL		**1,033,483**		**3,573**	**28,911**	**$69,897**	**4,423**	**$33,723**

Annual Total Energy Cost = $103,620 Per Year

Total KWH x 0.003413 = 3,527.28 x 106
Total MCF x 1.03 = 4,555.69 x 106
Total Other x ____ x 106
Total Site BTU's/yr 8,082.97 x 106

Floor area: 123,448 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 65,477 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $0.84 $/s.f. yr

Electric Utility — Lubbock Power and Light
Meter#: 3015, 8940, 7324

Gas Utility — Atmos
Meter #: 3021

OWNER: Lubbock ISD BUILDING: O. L. Slaton MS

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	65,014		213	1,519	4,087	747	6,149
FEBRUARY	2011	72,780		215	1,534	4,395	705	5,322
MARCH	2011	59,805		215	1,535	3,913	356	3,094
APRIL	2011	74,778		273	1,945	5,021	100	785
MAY	2011	76,086		375	2,669	5,616	36	349
JUNE	2011	63,463		307	2,913	5,862	5	87
JULY	2011	46,820		182	1,732	3,891	1	7
AUGUST	2011	91,201		498	4,730	9,391	6	107
SEPTEMBER	2010	111,887		385	3,655	7,524	28	189
OCTOBER	2010	85,175		392	2,793	6,141	167	1,020
NOVEMBER	2010	70,652		259	1,845	4,604	430	2,964
DECEMBER	2010	79,986		206	1,466	4,551	1,087	7,166
TOTAL		**897,647**		**3,520**	**28,336**	**$64,996**	**3,668**	**$27,239**

Annual Total Energy Cost = $92,235 Per Year

Total KWH x 0.003413 = 3,063.67 x 106
Total MCF x 1.03 = 3,778.04 x 106
Total Other x ____ x 106
Total Site BTU's/yr 6,841.71 x 106

Floor area: 119,997 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 57,016 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $0.77 $/s.f. yr

Electric Utility — Lubbock Power and Light
Meter#: 9325, 4627, 7010, 5599

Gas Utility — Atmos
Meter #: 2991

OWNER: Lubbock ISD **BUILDING:** Mackenzie MS

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	58,801		242	1,724	4,050	569	4,682
FEBRUARY	2011	64,055		239	1,699	4,221	540	4,072
MARCH	2011	60,561		245	1,746	4,139	287	2,493
APRIL	2011	83,968		331	2,358	5,813	80	629
MAY	2011	81,489		404	2,875	6,019	42	412
JUNE	2011	66,273		379	3,600	6,717	49	908
JULY	2011	53,952		246	2,339	4,853	14	319
AUGUST	2011	84,965		509	4,830	9,110	10	181
SEPTEMBER	2010	103,681		479	4,545	8,227	41	283
OCTOBER	2010	94,666		442	3,144	6,856	102	620
NOVEMBER	2010	68,997		297	2,115	4,846	204	1,404
DECEMBER	2010	71,045		251	1,785	4,548	625	4,116
TOTAL		892,453		4,064	32,760	$69,399	2,563	$20,119

Annual Total Energy Cost = $89,518 Per Year

Total KWH x 0.003413 = 3,045.94 x 106
Total MCF x 1.03 = 2,639.89 x 106
Total Other x ____ x 106
Total Site BTU's/yr 5,685.83 x 106

Floor area: 118,483 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) 47,989 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) $0.76 $/s.f. yr

Electric Utility — Lubbock Power and Light
Meter# 2914, 4606, 9459

Gas Utility — Atmos
Meter # 2954

OWNER: Lubbock ISD **BUILDING:** Irons MS

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	76,920		294	2,093	4,964	665	5,475
FEBRUARY	2011	86,280		289	2,059	5,248	657	4,962
MARCH	2011	75,480		295	2,102	4,924	313	2,717
APRIL	2011	92,400		358	2,546	6,181	68	529
MAY	2011	99,840		485	3,452	7,128	22	214
JUNE	2011	82,800		407	3,861	7,579	5	93
JULY	2011	102,120		407	3,861	8,364	13	301
AUGUST	2011	118,560		578	5,489	11,245	13	220
SEPTEMBER	2010	144,360		528	5,011	9,814	25	170
OCTOBER	2010	109,320		500	3,563	7,685	68	412
NOVEMBER	2010	80,040		360	2,563	5,584	181	1,251
DECEMBER	2010	82,680		298	2,119	5,187	731	4,820
TOTAL		1,150,800		4,799	38,719	$83,903	2,761	$21,164

Annual Total Energy Cost = $105,067 Per Year

Total KWH x 0.003413 = 3,927.68 x 106
Total MCF x 1.03 = 2,843.83 x 106
Total Other x ____ x 106
Total Site BTU's/yr 6,771.51 x 106

Floor area: 143,070 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) 47,330 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) $0.73 $/s.f. yr

Electric Utility — Lubbock Power and Light
Meter# 6026

Gas Utility — Atmos
Meter # 2953

OWNER: **Lubbock ISD** **BUILDING:** **Cavazos MS**

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	88,524		333	2,369	5,742	493	4,057
FEBRUARY	2011	89,974		318	2,267	5,679	513	3,871
MARCH	2011	82,934		327	2,332	5,510	237	2,060
APRIL	2011	107,446		416	2,963	7,263	59	464
MAY	2011	108,641		514	3,657	7,723	37	365
JUNE	2011	86,009		429	4,074	8,020	14	267
JULY	2011	88,358		323	3,069	7,025	11	248
AUGUST	2011	126,187		610	5,792	11,991	10	180
SEPTEMBER	2010	120,863		513	4,871	9,030	34	256
OCTOBER	2010	127,036		466	3,319	8,102	69	422
NOVEMBER	2010	93,737		390	2,777	6,366	145	1,001
DECEMBER	2010	91,226		331	2,355	5,817	364	2,402
TOTAL		1,210,935		4,970	39,845	$88,268	1,986	$15,593

Annual Total Energy Cost = $103,861 Per Year

Total KWH x 0.003413 = 4,132.92 x 106
Total MCF x 1.03 = 2,045.58 x 106
Total Other x ____ x 106
Total Site BTU's/yr 6,178.50 x 106

Floor area: 151,471 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) 40,790 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) $0.69 $/s.f. yr

Electric Utility
Lubbock Power and Light

Meter#
6701
8925
6077
1823
9393

Gas Utility
Atmos

Meter #
2990

OWNER: **Lubbock ISD** **BUILDING:** **Williams ES**

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	26,700		110	778	1,822	166	1,365
FEBRUARY	2011	28,980		102	722	1,839	165	1,244
MARCH	2011	24,960		103	735	1,715	101	876
APRIL	2011	29,760		135	954	2,182	17	136
MAY	2011	30,840		170	1,207	2,400	8	77
JUNE	2011	28,560		133	1,264	2,584	2	30
JULY	2010	19,780		170	1,614	2,620	2	35
AUGUST	2010	51,120		212	2,008	4,500	2	39
SEPTEMBER	2010	42,300		180	1,713	3,185	7	48
OCTOBER	2010	33,720		169	1,198	2,523	13	78
NOVEMBER	2010	25,800		116	823	1,839	43	294
DECEMBER	2010	27,720		111	791	1,870	156	1,028
TOTAL		370,240		1,711	13,807	$29,079	682	$5,250

Annual Total Energy Cost = $34,329 Per Year

Total KWH x 0.003413 = 1,263.63 x 106
Total MCF x 1.03 = 702.46 x 106
Total Other x ____ x 106
Total Site BTU's/yr 1,966.09 x 106

Floor area: 49,421 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) 39,782 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) $0.69 $/s.f. yr

Electric Utility
Lubbock Power and Light

Meter#
7220
6399

Gas Utility
Atmos

Meter #
2950

OWNER: Lubbock ISD **BUILDING:** Stewart ES

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	28,260		120	853	1,958	202	1,665
FEBRUARY	2011	31,140		112	800	1,999	204	1,537
MARCH	2011	27,140		109	776	1,835	122	1,059
APRIL	2011	30,740		125	893	2,150	21	166
MAY	2011	33,000		171	1,219	2,485	10	97
JUNE	2011	32,120		130	1,230	2,691	2	43
JULY	2010	24,060		93	883	1,987	2	56
AUGUST	2010	34,060		209	1,980	3,712	4	62
SEPTEMBER	2010	38,640		178	1,689	3,049	9	58
OCTOBER	2010	33,860		161	1,146	2,471	16	95
NOVEMBER	2010	26,120		114	813	1,840	43	299
DECEMBER	2010	28,960		110	784	1,906	189	1,244
TOTAL		**368,100**		**1,632**	**13,066**	**$28,083**	**824**	**$6,381**

Annual Total Energy Cost = $34,464 Per Year

Total KWH x 0.003413 = 1,256.33 x 106
Total MCF x 1.03 = 848.72 x 106
Total Other x ____ x 106
Total Site BTU's/yr 2,105.05 x 106

Floor area: 52,027 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) 40,461 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) $0.66 $/s.f. yr

Electric Utility — Lubbock Power and Light; **Meter#** 7194, 90969

Gas Utility — Atmos; **Meter #** 2970

OWNER: Lubbock ISD **BUILDING:** Bayless ES

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	29,880		136	965	2,111	392	3,226
FEBRUARY	2011	32,880		136	965	2,214	378	2,852
MARCH	2011	28,320		133	948	2,039	230	2,001
APRIL	2011	34,800		146	1,042	2,436	60	467
MAY	2011	36,840		214	1,521	2,918	22	220
JUNE	2011	30,240		192	1,822	3,232	1	17
JULY	2011	20,160		103	979	1,908	0	0
AUGUST	2011	46,800		302	2,870	5,217	5	85
SEPTEMBER	2010	51,960		258	2,448	4,248	12	83
OCTOBER	2010	40,200		226	1,606	3,167	44	267
NOVEMBER	2010	29,760		149	1,059	2,209	134	923
DECEMBER	2010	30,600		133	948	2,116	349	2,302
TOTAL		**412,440**		**2,128**	**17,173**	**$33,815**	**1,627**	**$12,443**

Annual Total Energy Cost = $46,258 Per Year

Total KWH x 0.003413 = 1,407.66 x 106
Total MCF x 1.03 = 1,675.81 x 106
Total Other x ____ x 106
Total Site BTU's/yr 3,083.47 x 106

Floor area: 70,972 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) 43,446 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) $0.65 $/s.f. yr

Electric Utility — Lubbock Power and Light; **Meter#** 5993

Gas Utility — Atmos; **Meter #** 2985

OWNER: Lubbock ISD **BUILDING:** Atkins MS

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	50,981		199	1,414	3,474	736	6,062
FEBRUARY	2011	55,981		190	1,404	3,638	534	4,033
MARCH	2011	47,590		191	1,363	3,300	472	4,097
APRIL	2011	56,020		237	1,690	4,079	108	843
MAY	2011	58,240		338	2,403	4,752	37	363
JUNE	2011	69,111		381	3,610	6,839	9	165
JULY	2011	51,423		269	2,548	4,957	4	92
AUGUST	2011	80,545		476	4,517	8,580	7	116
SEPTEMBER	2010	89,377		370	3,512	6,676	26	177
OCTOBER	2010	65,664		331	2,357	4,984	108	656
NOVEMBER	2010	50,842		207	1,472	3,527	302	2,085
DECEMBER	2010	53,945		190	1,351	3,514	831	5,476
TOTAL		729,719		3,379	27,641	$58,320	3,174	$24,165

Annual Total Energy Cost = $82,485 Per Year

Total KWH x 0.003413 = 2,490.53 x 106
Total MCF x 1.03 = 3,269.22 x 106
Total Other x ____ x 106
Total Site BTU's/yr 5,759.75 x 106

Floor area: 128,940 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 44,670 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $0.64 $/s.f. yr

Electric Utility Lubbock Power and Light
Meter# 7217, 7237, 7392, 4559

Gas Utility Atmos
Meter # 2986

OWNER: Lubbock ISD **BUILDING:** Smylie Wilson MS

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	60,400		212	1,509	3,756	380	3,132
FEBRUARY	2011	60,400		212	1,509	3,756	381	2,874
MARCH	2011	62,400		216	1,538	3,856	219	1,905
APRIL	2011	75,200		268	1,908	4,855	39	304
MAY	2011	82,000		372	2,649	5,654	14	133
JUNE	2011	77,600		284	2,695	6,103	1	13
JULY	2010	69,200		220	2,088	5,103	1	16
AUGUST	2010	99,200		388	3,682	8,425	3	53
SEPTEMBER	2010	102,000		364	3,454	6,849	7	49
OCTOBER	2010	79,200		348	2,478	5,462	48	295
NOVEMBER	2010	60,000		244	1,737	3,990	111	766
DECEMBER	2010	58,800		208	1,481	3,668	467	3,076
TOTAL		886,400		3,336	26,728	$61,477	1,671	$12,616

Annual Total Energy Cost = $74,093 Per Year

Total KWH x 0.003413 = 3,025.28 x 106
Total MCF x 1.03 = 1,721.13 x 106
Total Other x ____ x 106
Total Site BTU's/yr 4,746.41 x 106

Floor area: 114,940 s.f.

Energy Use Index:
Total Site BTU's/yr / Total Area (sq.ft.) = 41,295 BTU/s.f.yr

Energy Cost Index:
Total Energy Cost/yr / Total Area (sq.ft.) = $0.64 $/s.f. yr

Electric Utility Lubbock Power and Light
Meter# 5986

Gas Utility Atmos
Meter # 2975

4.0 RATE SCHEDULE ANALYSIS:

ELECTRICITY PROVIDER:

ELECTRIC PROVIDER: Lubbock Power and Light

Electric Rate: Large School Service

I. RATE:

Service Availability Charge	=	$24.70 per meter
Energy Charge	=	$0.003840 per kWh
Fuel/Power/Transmission Cost Adjustment	=	Varies per Month
Summer Demand Charge	=	$9.49 per kW
Winter Demand Charge	=	$7.12 per kW

Average Savings for consumption = $0.003840/kWh + Variable Fuel/Power/Transmission Adjustment Factors = $0.040936/kWh

Average determined from billing cycle Total all Electric Costs – Cost of Demand / kWh consumed for the schools listed above for the analyzed billing cycle

Average Savings for Summer Demand = $ 9.49/kW

Average Savings for Winter Demand = $ 7.12/kW

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 facilities in the analyzed billing cycle: $255,249

Total quantity purchased during the analyzed billing cycle: 33,412 MCF

Average cost per MCF = Cost of natural gas / quantity purchased = $255,249 / 33,412 MCF

Average cost per MCF = $7.64

5.0 CAMPUS DESCRIPTIONS:

Lubbock ISD consists of 50 educational campuses (5 High Schools, 10 Middle Schools, and 35 Elementary Schools). This energy survey focused on eleven 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
Lubbock HS	1931	261,528	Central System, RTUs	MZAHU, SZAHU	T8, T12	Digital Air Control
Roscoe Wilson ES	1942,1989	58,398	RTUs	RTUs	T12	Alerton
Hutchinson MS	1948,1965,1989	123,448	RTUs	RTUs	T12, T8	Honeywell
Slaton MS	1948	119,997	RTUs	RTUs	T12	Honeywell
Mackenzie MS	1963	118,483	RTUs	RTUs	T12	Honeywell
Irons MS	1989	143,070	RTUs	RTUs	T12	Alerton
Cavazos MS	1992	151,471	RTUs	RTUs	T12	Honeywell
Williams ES	1975	49,421	RTUs	RTUs	T12, T8	Honeywell
Bayless ES	1956	70,972	RTUs	RTUs	T12, T8	Alerton
Atkins MS	1957	128,940	RTUs	RTUs	T12	Honeywell
Smylie Wilson MS	1957	114,940	RTUs	RTUs	T12	Honeywell

6.0 ENERGY RECOMMENDATIONS:

HVAC ECRM 1: REPLACE CENTRAL SYSTEM COMPONENTS LUBBOCK HIGH SCHOOL

The central system at Lubbock High School utilizes two steam boilers, two R-11 chillers, two wood/fiberglass combination single cell cooling towers and a plate and frame heat exchanger to allow for free-cooling when weather conditions allow. All of this equipment has surpassed its useful life expectancy. They are scheduled to be replaced with bond money that the voters have already approved.

Steam boilers

The existing Hurst steam boilers produce 5,175 pounds of steam per hour. *We recommend the district proceed with a boiler project to replace the current steam system with a system of modular hot water boilers that can be staged to adjust to actual load conditions at the time.* The new system will require a primary and secondary hot water pumping system to maintain minimum flow requirements through the on-line boilers while distributing water throughout the facility.

Chiller

The chillers (York YTC1C1B2CJF) were manufactured in 1992. They utilize R-11 refrigerant and due to their reported long run-times (Sodexo staff reports that at least one of these chillers operates 24/7), they have reached the end of their useful life expectancy. *We recommend the chillers be replaced with new magnetic chillers.* Magnetic chillers have greatly improved part load operating efficiencies (IPLV efficiencies) over the existing equipment. We also recommend that the condition requiring the chiller to operate 24/7 be remedied so that the central system can be turned off according to the student occupancy hours. Frequently, the condition forcing the chiller to operate around the clock is the area housing the computer servers for the campus network must be conditioned at all times to protect the equipment. Installing independent DX conditioning equipment for these spaces will allow the equipment to remain protected and the central system can be turned off.

Cooling Tower

The existing wood components have deteriorated and the water does not flow down the tower fill as designed which prohibits the tower from rejecting as much heat to the atmosphere as a properly operating system could accomplish. *We recommend replacing these two cooling tower cells with two new, stainless steel cooling tower units.*

Plate Heat Exchanger

The existing plate heat exchanger is insufficiently sized to allow free-cooling processes to occur when the ambient weather conditions allow the chillers to be turned off to comfortably condition the building. *We recommend the capacity of the heat exchanger be increased to allow free cooling to occur when it is available.*

Estimated Cost: $511,000 Estimated Savings: $45,000 Estimated Payback: 11-1/2 Years

HVAC ECRM 2: REPLACE 1992 YORK AIR HANDLER UNITS AT LUBBOCK HIGH SCHOOL

It was noted that Lubbock High School has two 1992 York air handler units serving the building, one of which operates 24/7. The units are located in the mechanical room basement. The units need to be replaced but the district reports that the last time they were retrofit, a major excavation project was required in order to get the old units out and the new units into the building. *We recommend LISD install new modular air handler units that will enable them to be installed without having to excavate any of the grounds surrounding the main mechanical room*. The existing equipment can be cut into pieces small enough to be taken out through the existing doorways and the new units ship in pieces small enough to fit through standard doorways and are assembled in place. The cost for the convenience of modular units is slightly higher than typical air handler units, but the minimal increase in equipment cost would be more than offset by the elimination of the need to excavate the site adjacent to the building.

Estimated Cost: $44,000 Estimated Savings: $ 4,400 Estimated Payback: 10 Years

HVAC ECRM 3: INSTALL DESIGNATED SPLIT SYSTEMS FOR OFFICE/ADMIN AREAS

The central HVAC system at Lubbock High School is currently required to operate for any occupancy and any activity at the school. This includes after school hour and summer office and administrative activity. *We recommend the district consider installing redundant DX cooling systems for the office and administration areas so that the central system can be turned off when there are not students occupying the building.* The DX system would only operate when conditioning is necessary, but the central system is not required to operate; the central system will continue to condition these areas during normal student occupied hours. The cost to install DX conditioning equipment can be estimated at approximately $2,700 per ton, which includes provisions for roof curbs, extension of gas piping and ductwork transitions necessary to install additional units in the existing building.

HVAC ECRM 4: INSTALL ECONOMIZERS AT LUBBOCK HIGH SCHOOL

At Lubbock High School we noted the absence of outside air intake dampers on the new Carrier RTUs. District personnel informed us that Lubbock High School did at one point utilize enthalpy control economizers but discontinued their use because of numerous problems and equipment malfunctions. *We recommend the district install new dry bulb economizers that only take into account the outside temperature when determining the amount of outside air allowed to enter the building. This recommendation is a health-related renovation designed to meet Indoor Air Quality Standards.* The cost estimate below will retrofit one existing rooftop unit.

Estimated Cost: $1,000 Estimated Savings: $250 Estimated Payback: 4 Years

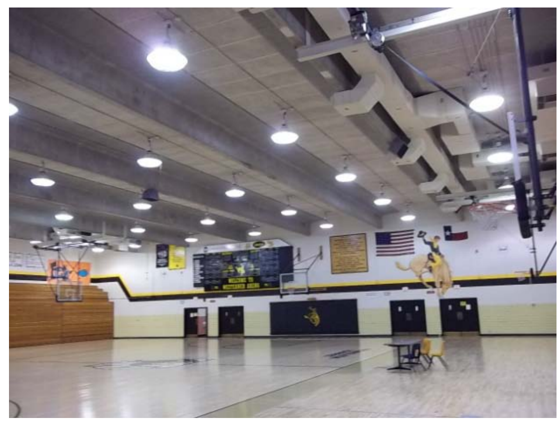
HVAC ECRM 5: REPLACE HOT WATER HEATERS WITH ON-DEMAND WATER HEATERS

Throughout much of the district, Lubbock ISD has been replacing traditional tank stored domestic hot water systems with instantaneous or on-demand, hot water generators. It was noted that Lubbock High School currently operates three of the traditional systems; *we recommend the district replace these units with the new systems.* These new units will enable the district to eliminate unnecessary energy consumed for hot water production on weekends, holidays, or any time the building occupants are not calling for domestic hot water.

Estimated Cost: $4,000 Estimated Savings: $650 Estimated Payback: 6 Years

Lighting ECRM 1: RETROFIT METAL HALIDES TO T5 LINEAR FLUORESCENT

At the eleven campuses surveyed for this report, we discovered various gymnasiums and weight rooms utilizing 400-watt metal halide fixtures. One characteristic of metal halides is their inherently long re-strike. This characteristic indicates that if the fixtures are ever turned off, it can take up to 15 minutes for them to come back on. This long re-strike encourages staff to leave the lights on throughout the day, even if the space is not occupied. *We recommend replacing the 400 watt metal halides with 6-lamp T5 high-bay fixtures to improve overall light levels in the space and to allow the fixtures to be turned off during unoccupied periods of the day.*



At Lubbock High School we counted 48 – 400 watt metal halide fixtures at the main gym, 16 additional fixtures at the small gym, and 35 metal halide fixtures at the new gym. The cost estimate below includes provisions to retrofit all 99 of these metal halide fixtures.

Estimated Cost: $34,650 Estimated Savings: $5,775 Estimated Payback: 6 Years

Lighting ECRM 2: RETROFIT ALL REMAINING T12 LIGHTING

Many of the LISD campuses were noted to utilize T12 components in their linear fluorescent lighting fixtures. T12 components produce approximately 18% less light and consume about 20% more energy than the T8 lamps and electronic ballasts that may be retrofit into the existing linear fluorescent fixtures. Additionally, the T12 components are no longer produced by lighting equipment manufacturers. While still available, the ability to acquire replacement parts for T12 fixtures will become more difficult over time. *Therefore we recommend the district retrofit the T12 fixtures at each facility with T8 lamps and electronic ballasts.*

Cavazos Middle School was noted to exclusively be utilizing T12 lighting. The estimate below is to retrofit all T12 lighting at Cavazos Middle School.

Estimated Cost: $94,650 Estimated Savings: $15,775 Estimated Payback: 6 Years

Building Envelope ECRM 1: REPLACE SINGLE PANE WINDOWS

At Slaton Middle School, Mackenzie Middle School, Smylie Wilson Middle School, Bayless Elementary School, and Atkins Middle School, we noticed older, single pane windows that are in need of replacement. These windows are less effective at minimizing heat gain in the cooling season and heat loss during the heating season than modern insulated dual pane units. *We recommend the district replace all single pane windows with tinted, double pane windows.*

The scope of work included in the cost estimate is to replace the single pane windows at Bayless Elementary. This estimate includes all labor and materials.

Estimated Cost: $ 49,000 Estimated Savings: $4,100 Estimated Payback: 12 Years

Controls ECRM 1: REPLACE EXISTING PNEUMATIC CONTROLS

At Roscoe Wilson Elementary it was noted that the HVAC system is still utilizing a hybrid control system with a pneumatic system under the control of a JCI front end computer timeclock. *We recommend LISD replace the pneumatic controls with a full control DDC system. The DDC system will provide improved comfort and eliminate the need and expense to maintain the pneumatic air system. We also recommend the district install electronic modulating valves to control the boiler and chiller and tie these electronic valves into the new DDC system.*

Estimated Cost: $87,600 Estimated Savings: $10,000 Estimated Payback: 9 Years

Controls ECRM 2: INSTALL VENDING MACHINE CONTROLS

There were many vending machines around the district that were operating without vending machine controls. We recommend installing unit controls that monitor local activity with an occupancy sensor mounted on top of the unit. When no activity is detected in the area, the controls turn off advertising lighting and cycle the compressor. The maximum temperature to which the vending product is allowed to elevate is programmable based on the district's desires. The cost estimate below includes provisions to renovate the 16 machines identified during the survey at the 11 campuses.

Estimated Cost: $2,880 Estimated Savings: $1920 Estimated Payback: 1-1/2 Years

7.0 MAINTENANCE AND OPERATION RECOMMENDATIONS

HVAC

- Insulate hot water piping
- Relocate thermostat unit
- Ensure kitchen exhaust hoods have makeup air

Lighting

- Turn off all light fixtures not required during daytime
- Turn off lights in unoccupied spaces
- Ensure exterior lights are off during the daytime
- De-lamp 4-lamp corridor fixtures
- Remove desk and floor lamps
- Continue practice of replacing incandescent exit lamps with LED lamps

Behavioral Modification

- Implement a defined energy management policy
- Use kilns only during demand offpeak periods
- Remove redundant appliances at breakrooms

Building Envelope

- Ensure exterior doors close securely
- Replace damaged or missing weatherstripping
- Do not allow exterior doors to be propped open

Plumbing

- Replace existing aerators with low flow water restrictors on all compatible faucets
- Lower domestic hot water temperature

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
It was noted during the survey that the hot water piping at several of the schools was not insulated. The majority of the energy losses in a hot water system occur in the hot water piping. At North Heights we noted 40’ of uninsulated pipe, 12’ at Mackenzie, and 17’ at Hutchinson. *We recommend the district inspect and insulate all hot water piping with damaged or missing hot water pipe insulation.*

HVAC M&O #2
During our survey we noted several wall mounted thermostat units that were located directly above or near an electrical appliance. The heat being rejected from the equipment will be detected by this thermostat causing the HVAC system to run more hours than necessary in an attempt to satisfy the false reading. *We recommend moving the appliances away from the thermostat so it can accurately sample the room temperature.*

This condition was discovered at the Teacher Workroom and Home EC rooms at Slaton Middle School, at the Hutchinson Middle School Teachers Lounge, and at the Smylie Wilson Teacher Workroom (see picture to the right).

HVAC M&O #3
While surveying the kitchen areas, it was noted that some kitchen exhaust hoods are not effectively bringing in makeup air and as a result, are exhausting the conditioned kitchen air out of the building. *We recommend LISD inspect all kitchen exhaust hoods and ensure the makeup air is creating an adequate air curtain that will minimize conditioned air loss through the exhaust system.*

Lighting M&O #1 and 2
Some areas of the buildings noted in Section 6.0 of the report had light fixtures left operating in unoccupied spaces. The least expensive remedy to this issue is to train staff to turn off fixtures in unoccupied spaces. If the behavioral modification training does not yield the desired results, the district might consider installing automatic lighting controls to prevent light fixtures from operating in unoccupied spaces. Examples of condition were found in the Atkins Middle School Gymnasium, the Williams Elementary School Library, and the Irons Middle School Cafeteria.

Lighting M&O #3

It was noted during the survey that there were some exterior light fixtures operating during the daytime. The picture to the right demonstrates two exterior lights at Lubbock High School. *We recommend the timeclock or photocell that controls these fixtures be inspected to ensure proper control of all exterior lighting.*

Lighting M&O #4

At Mackenzie Middle School and Hutchinson Middle School, we noted corridor fluorescent lighting fixtures currently utilizing 4-lamps per light fixture. *We recommend LISD de-lamp all 4-lamp corridor light fixtures to 2-lamps per fixture*. 2-lamps per fixture will continue to provide adequate lighting in all corridors and provide immediate energy savings.

Lighting M&O #5

At multiple classrooms throughout the district we found desk lamps and floor lamps being used in addition to the fluorescent lighting already serving the space. *We recommend the district consider having these types of lamps, especially those operating with incandescent lamps, be added to the list of equipment prohibited from being used in individual classrooms.*

Lighting M&O #6

One of the easiest and quickest payback energy efficiency projects available to school districts is a conversion of their incandescent exit fixtures to LED. Schools have two choices to make this conversion: complete replacement of the exit fixture, or replacement of the incandescent lamp with LED exit lamps within the original fixture housing. LISD has chosen to implement option #2 in many of the campuses.

There were however, still a number of fixtures suspected to be utilizing the incandescent lamps. These fixtures typically utilize two 15-watt incandescent lamps and consume 263 kWh per year. LED exit fixtures utilize LED lamps and consume just 18 kWh per year. We recommend the district continue the current practice of replacing the incandescent lamps with LED lamps.

Behavioral Modification M&O #1

During our walkthrough, we noticed many energy saving opportunities for LISD that should be incorporated into the district-wide energy management policy. Below are some conditions noted during the survey that we recommend be considered by LISD for their energy policy.

- All teachers must remove from their classrooms any personal heaters, microwaves, mini-fridges, aquariums, floor lamps, and any other electrical appliances not approved by the designated LISD administrative staff.
- Limiting thermostat controls at each classroom so that teachers must walk to the thermostat and press the button each time they need an additional 30 minutes of air conditioning after the system shuts off at the end of the day, rather than allowing them to call for multiple hours at a time by pressing the button repeatedly.
- Raising the maximum cooling temperature setpoint from 70°F to 73°F
- Lowering the maximum heating temperature setpoint from 74°F to 70°F.

While these are only a few points we recommend be included in a LISD energy management policy, the most important factor of any successful policy is having a defined set of requirements and the support of all the administrative staff at LISD.

Behavioral Modification M&O #2

During our survey it was noted that several campus art departments had kilns. When a kiln is used, it requires a large amount of demand in order to operate. Because LISD is charged for their peak demand, *we recommend the district observe the practice of load shedding by only allowing kilns to be used in the early morning or after student occupied hours*. This will ensure the demand used by the kilns is not contributing to the school's peak demand which is usually set in the heat of the afternoon while the building is fully occupied.

Behavioral Modification M&O #3

During our walkthrough it was noted that many teacher lounges had redundant appliances. At Hutchinson Middle School we found three microwaves and two toaster ovens. Because operating multiple microwaves and toaster ovens at any time of day when peak demand is being set would require the school to pay an increased demand fee for an entire month, *we recommend the district remove all redundant appliances from the teacher lounges.*

Envelope M&O #1 and 2

During our survey we noted several sets of exterior doors that were unable to close securely. This condition leads to similar problems as damaged or missing weatherstripping as conditioned air can escape the building and contaminants can enter the facility. *We recommend ensuring all doors close* *securely and damaged or missing weatherstripping be replaced.* The door issues were specifically noted at Slaton Middle School; weatherstripping issues were noted throughout the surveyed campuses.

<u>*Envelope M&O #3*</u>

There were doors propped open at Mackenzie Middle School and Smylie Wilson Middle School (pictured to the right) with the HVAC operating and no obvious activity requiring the doors to be propped open. *We recommend the district not prop open doors when the HVAC system is operating.*

<u>*Plumbing M&O #1*</u>

It was noted that many restroom water faucets are in need of low flow restrictors. All bathroom faucets that currently have an aerator can easily be retrofit with the flow restrictors for a relatively low cost. Older faucets without an aerator will need to be replaced in order to conserve water consumption.

<u>*Plumbing M&O #2*</u>

Throughout the district we discovered many schools with a domestic hot water temperature setpoint of 140°F. *We recommend the district experiment with lower domestic water loop temperatures until the domestic hot water fixture discharge temperatures is 120°F.*

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. $5,000 maintenance expense next 5 years				
4. $10,000 maintenance expense next 5 years				
5. Savings decreases 3% per year after year 5				
Cash Flow	**Project Cost**	**Project Savings**	**Maintenance Expense**	**Net Cash Flow**
Time 0	($828,780)		0	($828,780)
Year 1		$ 87,870.00	0	$87,870
Year 2		$ 87,870.00	0	$87,870
Year 3		$ 87,870.00	0	$87,870
Year 4		$ 87,870.00	0	$87,870
Year 5		$ 87,870.00	0	$87,870
Year 6		$ 85,233.90	($5,000)	$80,234
Year 7		$ 82,597.80	($5,000)	$77,598
Year 8		$ 79,961.70	($5,000)	$74,962
Year 9		$ 77,325.60	($5,000)	$72,326
Year 10		$ 74,689.50	($5,000)	$69,690
Year 11		$ 72,053.40	($10,000)	$62,053
Year 12		$ 69,417.30	($10,000)	$59,417
Year 13		$ 66,781.20	($10,000)	$56,781
Year 14		$ 64,145.10	($10,000)	$54,145
Year 15		$ 61,509.00	($10,000)	$51,509
			Internal Rate of Return	**4.17%**

More information regarding financial programs available to LISD 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

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 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

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APPENDIX II - ELECTRIC UTILITY RATE SCHEDULE

LARGE SCHOOL SERVICE

Rate 15

APPLICABLE:	To all public and private school facilities supplied at secondary voltage for school purposes when all service is supplied 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 and whose load exceeds 10 kW of demand in any month. Meters on this rate with loads that drop to 10 kW of demand or below will be eligible to be reassigned to Rate 21 (Small Municipal and School Service) only after 12 consecutive months where loads have not exceeded 10 kW of demand. Not applicable to temporary, breakdown, standby, supplementary, resale or shared service, or to service for which a specific rate schedule is provided.	
TERRITORY:	Lubbock, Texas	
RATE:	Service Availability Charge:	$24.70 per month
	Energy Charge:	$0.003840 per kWh
	Summer Demand Charge: Winter Demand Charge:	$9.49 per kW $7.12 per kW
WINTER MONTHS: **SUMMER MONTHS:**	The billing months of October through May The billing months of June through September	
DEMAND:	Lubbock Power and Light will furnish at its expense the necessary metering equipment to measure the customer's kW demand for the 30-minute period of greatest use during the month. In the absence of a demand meter, the customer's demand will be billed using the monthly kilowatt-hours and an average load factor of 41.30 percent. 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.	

FUEL / POWER / TRANSMISSION COST ADJUSTMENT FACTORS:	The charge per kilowatt-hour of the above rate shall be increased by the applicable recovery factor per kilowatt hour as provided in the current Lubbock Power and Light "Fuel / Power / Transmission Cost Adjustment Factors".
DISCOUNT FACTOR:	The charge of the above rate may be reduced in accordance with the current Lubbock Power & Light Discount Factor.
FRANCHISE FEE EQUIVALENT:	The charge of the above rate may be increased (i) for competitive purposes, by an amount no greater than the equivalent franchise fee established by the City Council of the City of Lubbock for any competing electric utility; or (ii) by an amount equal to any franchise fee obligation applicable to Lubbock Power & Light as established by the City Council of the City of Lubbock.
TAX:	Billings under this schedule may be increased by an amount equal to the sum of the applicable federal, state and local taxes, fees, or charges levied, assessed and/or payable by Lubbock Power & Light for utility services rendered, or on the right or privilege or rendering the service, or on any object or event incidental to the rendition of the service.
POWER FACTOR:	Applicable to customers on this rate schedule with a peak demand of 200 kW or greater. At all times, customer will maintain at Lubbock Power & Light's point of delivery, a power factor of not less than 90% lagging. In the event a low voltage condition due to lagging power factor exists in a degree sufficient to impair Lubbock Power & Light's service, customer shall install suitable capacitors or other equipment necessary to raise the over-all power factor at the point of delivery to a satisfactory value. Where such power factor correction equipment is used, customer shall install a relay, switch or other regulating equipment for purposes of disconnecting or controlling the power factor correction equipment in order to prevent excessive voltage conditions on Lubbock Power & Light's system.
TERMS OF PAYMENT:	Payment due on receipt. A late charge of 5% will be added to all bills not paid within 21 days after bill date. If the 21st day falls on a weekend or an official City of Lubbock recognized holiday, the late charge will not be applied until the next business day.
CHARACTER OF SERVICE:	AC. 60 hertz. Single-phase or three-phase, at one available standard voltage.

TERMS & CONDITIONS:	Service supplied under this rate is subject to the terms and conditions set forth in LP&L's General Terms and Conditions of the Rate Schedule as approved by the City Council of the City of Lubbock and on file with the City Secretary of the City of Lubbock.
EFFECTIVE DATE:	For all electric meters read by LP&L on or after October 29, 2010

APPENDIX IV - PRELIMINARY ENERGY ASSESSMENT SERVICE AGREEMENT

OFFICE OF THE COMPTROLLER ★ TEXAS ★

SECO State Energy Conservation Office

Public Schools, Colleges and Non-Profit Hospitals

Preliminary Energy Assessment
Service Agreement

Investing in our public schools, colleges and non-profit hospitals through improved energy efficiency in public buildings is a win-win opportunity for our communities and the state. Energy-efficient buildings reduce energy costs, increase available capital, spur economic growth, and improve working and living environments. The Preliminary Energy Assessment Service provides a viable strategy to achieve these goals.

Description of the Service

The State Energy Conservation Office (SECO) will analyze electric, gas and other utility data and work with ______________________________, 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: September 26, 2011

Name (Mr./Ms./Dr.) Dr. Berhl Robertson　　Title: Chief Administrative Officer

Organization: Lubbock Independent School District　　Phone: 806-766-1092

Street Address: 1628 19th Street, Lubbock, TX 79401　　Fax: 806-766-1210

Mailing Address: ____________________　　E-Mail: ____________________

____________________　　County: Lubbock

Contact Information:

Name (Mr./Ms./Dr.) Mr. Bill Craft　　Title: Executive Director Facilities

Phone: 806-766-1056　　Fax: 806-766-1056

E-Mail: bcraft@lubbockisd.org　　County: Lubbock

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

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

APPENDIX V - TEXAS ENERGY MANAGERS ASSOCIATION (TEMA)

ANNOUNCING!

TEMA

TEXAS ENERGY MANAGERS ASSOCIATION

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

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

WWW.TEXASEMA.ORG

Check the website for Membership and Association information.

Texas Energy Managers Association

SECO
State Energy Conservation Office

APPENDIX VI - UTILITY CHARTS ON CD