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Texas Comptroller of Public Accounts

Facility Preliminary Energy Assessments and Recommendations

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SECO
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1.0 EXECUTIVE SUMMARY:

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

State Energy Conservation Office

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

In February 2010, **SECO** received a request for technical assistance from Tim Castilaw, Director of Facilities and School Support for **Fort Bend 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 **Fort Bend ISD,** (hereafter known as FBISD) 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. Tom Browning*, 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 **$678,189** may be saved annually if all recommended projects are implemented. The estimated installed cost of these projects should total approximately **$4,579,915**, yielding an average simple payback of **6-3/4** years.

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

SUMMARY:	IMPLEMENTATION COST	ESTIMATED SAVINGS	SIMPLE PAYBACK
HVAC ECRM #1	$1,000,275	$93,972	10-3/4 Years
HVAC ECRM #2	$119,200	$14,700	8-1/4 Years
HVAC ECRM #3	$43,181	$14,394	3 Years
HVAC ECRM #4	$500	$500	1 Year
HVAC ECRM #5	$156,800	$26,133	6 Years
Lighting ECRM #1	$590,340	$98,390	6 Years
Lighting ECRM #2	$484	$1,159	5 Months
Lighting ECRM #3	$600	$435	1-1/2 Years
Lighting ECRM #4	$12,450	$1,554	8 Years
Lighting ECRM #5	$9,934	$1,516	6-1/4 Years
Controls ECRM #1	$1,368,591	$190,025	7-1/4 Years
Controls ECRM #2	$600	$150	4 Years
Controls ECRM #3	$1,274,000	$231,636	5-1/2 Years
Envelope ECRM #1	$500	$125	4 Years
Envelope ECRM #2	$3,000	$500	6 Years
TOTAL PROJECTS	**$ 4,579,915**	**$675,189**	**6-3/4 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 FBISD. We hope to be ongoing partners in assisting you to implement the recommendations listed in this report. Please call us if you have further questions or comments regarding your Energy Management Issues.

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

2.0 ENERGY ASSESSMENT PROCEDURE:

Involvement in this on-site analysis program was initiated through completion of a Preliminary Energy Assessment Service Agreement. This PEASA serves as the agreement to form a "partnership" between the client and the State Energy Conservation Office (SECO) for the purposes of energy costs and consumption reduction within owned and operated facilities. After receipt of the PEASA, an initial visit was conducted by the professional engineering firm contracted by SECO to provide service within that area of the state to review the program elements that SECO provides to school districts and determine which elements could best benefit the district. A summary of the *Partner's* most recent twelve months of utility bills was provided to the engineer for the preliminary assessment of the Energy Performance Indicators. After reviewing the utility bill data analysis and consultation with SECO to determine the program elements to be provided to FBISD, 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 FBISD 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
Dulles HS	129,204	72%	$2.65	59%
Arizona Fleming ES	86,058	15%	$1.96	17%
Drabek ES	105,502	41%	$1.80	8%
Sienna Crossing ES	67,765	-10%	$1.74	4%
Briar Gate ES	53,028	-29%	$1.36	-19%
Elkins HS	53,799	-28%	$1.33	-20%
Mission Bend ES	51,242	-32%	$1.30	-22%
Lake Olympia MS	53,711	-28%	$1.22	-27%
Average Value:	75,039		$1.67	

Fort Bend ISD purchases electricity from Constellation Energy. The transmission and distribution utility is Centerpoint Energy. 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 I

OWNER: **Fort Bend ISD** **BUILDING:** **Dulles 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	2010	620,761	2,659	2,659	20,459	58,556	1,884	$17,255
FEBRUARY	2010	602,420	2,676	2,676	20,452	57,414	1,360	$14,689
MARCH	2010	677,280	2,642	2,642	20,503	62,057	1,568	$16,913
APRIL	2010	776,588	3,185	3,185	20,607	70,257	1,101	$11,921
MAY	2010	914,228	3,443	3,443	24,212	80,315	933	$9,751
JUNE	2009	417,362	2,491	2,491	10,666	36,266	764	$7,581
JULY	2009	928,042	2,380	2,380	19,484	76,412	670	$6,655
AUGUST	2009	956,329	2,848	2,848	21,613	80,277	1,118	$10,299
SEPTEMBER	2009	1,092,229	3,013	3,013	22,866	89,857	916	$8,458
OCTOBER	2009	1,015,883	3,060	3,060	22,918	85,261	1,034	$9,537
NOVEMBER	2009	818,131	2,675	2,675	20,397	70,603	1,685	$15,448
DECEMBER	2009	631,688	2,724	2,724	19,427	58,193	1,311	$12,052
TOTAL		**9,450,941**	**33,796**	**33,796**	**243,604**	**$825,468**	**14,344**	**$140,559**

Annual Total Energy Cost =	$966,027	Per Year	**Energy Use Index:** Total Site BTU's/yr / Total Area (sq.ft.)	129,204	BTU/s.f.yr
Total KWH x 0.003413 =	32,256.06	x 106			
Total MCF x 1.03 =	14,774.32	x 106	**Energy Cost Index:** Total Energy Cost/yr / Total Area (sq.ft.)	$2.65	$/s.f. yr
Total Other x ____		x 106			
Total Site BTU's/yr	47,030.38	x 106			
Floor area:	364,000	s.f.			

Electric Utility	**Account #**	**Meter#**	**Gas Utility**	**Account #**
Constellation	6100	20849	Center Point	8303

OWNER: **Fort Bend ISD** **BUILDING:** **Drabek 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	2010	99,456	461	461	2,811	8,915	1,005	$6,286
FEBRUARY	2010	121,728	422	422	2,708	10,177	658	$4,552
MARCH	2010	116,736	461	461	2,886	10,049	311	$2,252
APRIL	2010	118,272	499	499	3,087	10,344	271	$1,807
MAY	2010	139,392	461	461	2,982	11,535	163	$997
JUNE	2009	116,736	422	422	2,646	9,806	35	$270
JULY	2009	139,392	384	384	2,646	11,197	19	$123
AUGUST	2009	153,984	499	499	3,205	12,651	68	$385
SEPTEMBER	2009	130,560	499	499	3,101	11,110	271	$1,382
OCTOBER	2009	133,248	499	499	3,109	11,286	179	$784
NOVEMBER	2009	125,184	461	461	2,887	10,569	231	$1,333
DECEMBER	2009	113,664	399	399	2,532	9,508	258	$1,566
TOTAL		**1,508,352**	**5,467**	**5,467**	**34,600**	**$127,147**	**3,469**	**$21,737**

Annual Total Energy Cost =	$148,884	Per Year	**Energy Use Index:** Total Site BTU's/yr / Total Area (sq.ft.)	105,502	BTU/s.f.yr
Total KWH x 0.003413 =	5,148.01	x 106			
Total MCF x 1.03 =	3,573.18	x 106	**Energy Cost Index:** Total Energy Cost/yr / Total Area (sq.ft.)	$1.80	$/s.f. yr
Total Other x ____		x 106			
Total Site BTU's/yr	8,721.19	x 106			
Floor area:	82,664	s.f.			

Electric Utility	**Account #**	**Meter#**	**Gas Utility**	**Account #**
Constellation	850100	9943	Center Point	934 4974

OWNER: Fort Bend ISD **BUILDING:** Arizona Fleming 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	2010	104,420	579	579	3,712	10,120	205	$2,081
FEBRUARY	2010	106,647	552	552	3,717	10,260	202	$2,237
MARCH	2010	119,946	617	617	3,903	11,262	247	$2,534
APRIL	2010	127,376	679	679	4,157	11,973	206	$1,975
MAY	2010	165,573	708	708	4,425	14,585	128	1296 1/2
JUNE	2009	128,527	445	445	3,926	11,810	50	$618
JULY	2009	139,984	485	485	4,018	12,604	31	$383
AUGUST	2009	160,545	572	572	4,470	14,318	75	$770
SEPTEMBER	2009	149,822	594	594	4,486	13,676	106	$1,097
OCTOBER	2009	131,110	558	558	4,271	12,318	126	$1,297
NOVEMBER	2009	118,320	493	493	3,898	11,158	166	$1,696
DECEMBER	2009	95,499	555	555	3,758	9,618	236	$2,388
TOTAL		**1,547,769**	**6,837**	**6,837**	**48,741**	**$143,702**	**1,778**	**$18,373**

Annual Total Energy Cost =	$162,075	Per Year	**Energy Use Index:** Total Site BTU's/yr / Total Area (sq.ft.)	86,058 BTU/s.f.yr
Total KWH x 0.003413 =	5,282.54	x 106		
Total MCF x 1.03 =	1,831.34	x 106	**Energy Cost Index:**	
Total Other x ____		x 106	Total Energy Cost/yr / Total Area (sq.ft.)	$1.96 $/s.f. yr
Total Site BTU's/yr	7,113.88	x 106		
Floor area:	82,664	s.f.		

Electric Utility	Account #	Meter#	Gas Utility	Account #
Constellation	420100	5503	Center Point	387

OWNER: Fort Bend ISD **BUILDING:** Sienna Crossing 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	2010	96,527	513	513	3,753	9,675	94	$1,133
FEBRUARY	2010	109,185	551	551	3,821	10,520	77	$888
MARCH	2010	122,927	659	659	3,914	11,458	78	$753
APRIL	2010	171,619	699	699	4,185	14,716	50	$514
MAY	2010	141,646	634	634	4,142	12,833	37	$314
JUNE	2009	111,673	569	569	4,099	10,949	23	$204
JULY	2009	118,032	511	511	4,107	11,347	7	$85
AUGUST	2009	134,684	614	614	4,261	12,524	9	$98
SEPTEMBER	2009	109,796	558	558	4,092	10,830	0	$0
OCTOBER	2009	101,057	476	476	4,034	10,235	88	$949
NOVEMBER	2009	111,353	452	452	4,078	10,911	96	$1,033
DECEMBER	2009	106,971	430	430	3,768	10,333	123	$1,312
TOTAL		**1,435,470**	**6,666**	**6,666**	**48,254**	**$136,331**	**682**	**$7,283**

Annual Total Energy Cost =	$143,614	Per Year	**Energy Use Index:** Total Site BTU's/yr / Total Area (sq.ft.)	67,765 BTU/s.f.yr
Total KWH x 0.003413 =	4,899.26	x 106		
Total MCF x 1.03 =	702.46	x 106	**Energy Cost Index:**	
Total Other x ____		x 106	Total Energy Cost/yr / Total Area (sq.ft.)	$1.74 $/s.f. yr
Total Site BTU's/yr	5,601.72	x 106		
Floor area:	82,664	s.f.		

Electric Utility	Account #	Meter#	Gas Utility
Constellation	10100	6293	Si Energy

OWNER: Fort Bend ISD **BUILDING:** Elkins 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	2010	501,988	1,583	1,583	11,414	42,222	47	$497
FEBRUARY	2010	445,641	1,793	1,793	12,417	39,760	52	$589
MARCH	2010	450,012	1,616	1,616	11,556	39,166	58	$642
APRIL	2010	528,034	1,625	1,625	11,461	43,859	38	$393
MAY	2010	529,059	1,875	1,875	12,895	45,362	39	$446
JUNE	2009	241,823	1,258	1,258	5,613	20,446	40	$498
JULY	2009	468,318	1,455	1,455	11,154	39,882	11	$149
AUGUST	2009	483,343	1,630	1,630	12,027	41,677	17	$189
SEPTEMBER	2009	579,400	1,711	1,711	12,552	48,089	21	$230
OCTOBER	2009	500,623	1,678	1,678	12,296	43,018	39	$418
NOVEMBER	2009	444,813	1,611	1,611	11,584	38,880	47	$498
DECEMBER	2009	456,367	1,605	1,605	11,284	39,291	50	$530
TOTAL		5,629,421	19,440	19,440	136,253	$481,652	459	$5,079

Annual Total Energy Cost =	$486,731	Per Year	**Energy Use Index:** Total Site BTU's/yr / Total Area (sq.ft.)	53,799 BTU/s.f.yr
Total KWH x 0.003413 =	19,213.21	x 106		
Total MCF x 1.03 =	472.77	x 106	**Energy Cost Index:** Total Energy Cost/yr / Total Area (sq.ft.)	$1.33 $/s.f. yr
Total Other x ____		x 106		
Total Site BTU's/yr	19,685.98	x 106		
Floor area:	365,915	s.f.		

Electric Utility	Account #	Meter#	Gas Utility	Account #
Constellation	12100	9095	Center Point	8128

OWNER: Fort Bend ISD **BUILDING:** Lake Olympia

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	2010	185,867	785	785	5,666	17,073	363	$3,950
FEBRUARY	2010	162,896	643	643	5,014	15,009	292	$3,514
MARCH	2010	159,234	628	628	4,998	14,767	285	$3,308
APRIL	2010	186,205	829	829	5,850	17,276	222	$2,767
MAY	2010	211,795	849	849	6,011	19,008	146	$1,961
JUNE	2009	109,393	537	537	2,545	9,256	69	$1,155
JULY	2009	189,291	545	545	4,505	16,116	39	$786
AUGUST	2009	225,889	771	771	5,429	19,286	51	$838
SEPTEMBER	2009	252,344	837	837	5,795	21,273	150	$1,840
OCTOBER	2009	260,777	817	817	5,709	21,713	127	$1,608
NOVEMBER	2009	219,420	679	679	5,030	18,495	182	$2,157
DECEMBER	2009	154,225	701	701	4,989	14,454	269	$3,019
TOTAL		2,317,336	8,621	8,621	61,541	$203,726	2,195	$26,903

Annual Total Energy Cost =	$230,629	Per Year	**Energy Use Index:** Total Site BTU's/yr / Total Area (sq.ft.)	53,711 BTU/s.f.yr
Total KWH x 0.003413 =	7,909.07	x 106		
Total MCF x 1.03 =	2,260.34	x 106	**Energy Cost Index:** Total Energy Cost/yr / Total Area (sq.ft.)	$1.22 $/s.f. yr
Total Other x ____		x 106		
Total Site BTU's/yr	10,169.40	x 106		
Floor area:	189,336	s.f.		

Electric Utility	Account #	Meter#	Gas Utility	Account #
Constellation	9100	407879	Center Point	1071

OWNER: **Fort Bend ISD** **BUILDING:** **Briargate 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	2010	99,360	435	435	2,677	8,774	All Electric Facility	
FEBRUARY	2010	98,208	392	392	2,545	8,570		
MARCH	2010	87,552	452	452	2,717	8,089		
APRIL	2010	96,480	484	484	2,918	8,839		
MAY	2010	120,096	455	455	2,870	10,239		
JUNE	2009	99,072	403	403	2,602	8,679		
JULY	2009	96,192	397	397	2,579	8,480		
AUGUST	2009	131,616	510	510	3,166	11,239		
SEPTEMBER	2009	137,664	524	524	3,257	11,702		
OCTOBER	2009	122,112	510	510	3,115	10,609		
NOVEMBER	2009	113,472	435	435	2,711	9,674		
DECEMBER	2009	98,208	435	435	2,675	8,703		
TOTAL		**1,300,032**	**5,432**	**5,432**	**33,832**	**$113,597**		

Annual Total Energy Cost =	$113,597	Per Year	**Energy Use Index:** Total Site BTU's/yr / Total Area (sq.ft.)	53,028	BTU/s.f.yr
Total KWH x 0.003413 =	4,437.01	x 106			
Total MCF x 1.03 =	0.00	x 106	**Energy Cost Index:** Total Energy Cost/yr / Total Area (sq.ft.)	$1.36	$/s.f. yr
Total Other x ____		x 106			
Total Site BTU's/yr	4,437.01	x 106			
Floor area:	83,673	s.f.			

Electric Utility	**Account #**	**Meter#**
Constellation	5100	9125

OWNER: **Fort Bend ISD** **BUILDING:** **Mission Bend 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	2010	115,200	432	432	2,826	9,896	All Electric Facility	
FEBRUARY	2010	99,936	432	432	2,763	8,894		
MARCH	2010	92,448	432	432	2,731	8,403		
APRIL	2010	107,136	475	475	2,917	9,491		
MAY	2010	131,040	504	504	3,166	11,207		
JUNE	2009	107,136	432	432	2,749	9,321		
JULY	2009	115,488	432	432	2,784	9,868		
AUGUST	2009	154,080	504	504	3,231	12,682		
SEPTEMBER	2009	118,656	432	432	2,807	10,085		
OCTOBER	2009	101,088	432	432	2,732	8,936		
NOVEMBER	2009	110,592	432	432	2,770	9,556		
DECEMBER	2009	99,360	461	461	2,760	8,858		
TOTAL		**1,352,160**	**5,400**	**5,400**	**34,236**	**$117,197**		

Annual Total Energy Cost =	$117,197	Per Year	**Energy Use Index:** Total Site BTU's/yr / Total Area (sq.ft.)	51,242	BTU/s.f.yr
Total KWH x 0.003413 =	4,614.92	x 106			
Total MCF x 1.03 =	0.00	x 106	**Energy Cost Index:** Total Energy Cost/yr / Total Area (sq.ft.)	$1.30	$/s.f. yr
Total Other x ____		x 106			
Total Site BTU's/yr	4,614.92	x 106			
Floor area:	90,061	s.f.			

Electric Utility	**Account #**	**Meter#**
Constellation	330100	6897

4.0 RATE SCHEDULE ANALYSIS:

ELECTRICITY PROVIDER:

RETAIL ELECTRIC PROVIDER: Constellation Energy Contract price: $0.08824 per kWh

TRANSMISSION AND DISTRIBUTION UTILITY: Centerpoint Energy

Electric Rate: Secondary Service > 10 kVA

I.	TRANSMISSION AND DISTRIBUTION CHARGES:		
	Customer Charge	=	$5.27 per meter
	Metering Charge	=	$31.86 per IDR meter
	Transmission System Charge	=	$1.1026898 per 4CP kW
	Distribution System Charge	=	$3.11813449 per Billing kVA
II.	SYSTEM BENEFIT FUND	=	$0.000657 per kWh
III.	TRANSITION CHARGES		
	Transition Charge 1	=	$0.35099783/kVA
	Transition Charge 2	=	$0.00259398/kWh
	Transition Charge 3	=	$0.00096498/kWh
IV.	NUCLEAR DECOMMISSIONING CHARGE	=	$0.0089154 per Billing kVA
V.	TRANSMISSION COST RECOVERY FACTOR	=	$0.034696312/NCP kVA
VI.	ADFIT Credit	=	$-0.06112798
VII.	SYSTEM RESTORATION CHARGE	=	$0.14889371
VIII.	TAXES		
	Reimbursement of Misc. Gross Receipts Tax/Fee	=	1.997%
	Reimbursement of UDC PUC Gross Receipts	=	0.167%
IX.	UTILITY SERVICE DISCRE-UCS CREDIT	=	$-0.01227765
X.	GROSS RECEIPTS TAX	=	.1997% Of All T&D Charges

Average Savings for consumption = $0.0824/kWh + $0.000657/kWh + $0.00259398/kWh + $0.00096498 = $0.08986694/kWh
Average Savings for demand = $1.1026898 + $3.11813449 + $0.35099783 +$0.0089154 + $0.034696312 + $0.14889371 = $ 4.76/kVA**

** This number is a generalization of average cost per kW because the rate schedule from Centerpoint utilizes three (3) different types of demand for the calculation of the utility bill:

1. NCP kVA: Peak demand during 15 minute interval of current billing cycle
2. 4CP kVA: Average demands of June, July, August and September of previous calendar year; usually only applied to IDR metered accounts
3. Billing kVA: Ratchet demand representing higher of two calculations: 80% of peak demand in last 11 months or current NCP kVA

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: $219,934

Total quantity purchased during the analyzed billing cycle: 22,927 MCF

Average cost per MCF = Cost of natural gas / quantity purchased = $219,934 / 22,927 MCF

Average cost per MCF = $9.59

5.0 CAMPUS DESCRIPTIONS:

Fort Bend ISD consists of 70 educational campuses (11 High Schools, 14 Middle Schools and 45 Elementary Schools) which are located in Fort Bend County; in and throughout the cities of Sugar Land, Meadows Place, Missouri City, Arcola, Houston and Pearland. The district was formed as a result of a merger of Missouri City and Sugar Land ISDs in 1959. The energy survey focused on eight 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
Dulles HS	1964 / 1998	364,000	Water Cooled Chiller/ HW Boiler	MZAHU with hot water reheat	80% T12 20% T8	DDC Automated Logic
Arizona Fleming ES	1994	87,144	Air cooled chillers / natural gas boilers	MZAHU with hot water reheat	Combination T12 and T8	Automated Logic tied to Pneumatic
Drabek ES	2001	82,664	Water cooled chillers / natural gas boilers	MZAHU with hot water reheat	T8	DDC Automated Logic
Sienna Crossing ES	1998	96,295	Air cooled chillers / natural gas boiler	MZAHU with hot water reheat	T8 Siemens Lighting Controllers	DDC - Automated Logic and Trane
Lake Olympia MS	1992	189,336	Water Cooled Chillers / natural gas boiler	SZAHU with hot water reheat	Combination T12 and T8	Automated Logic tied to Pneumatic
Briargate ES	1977	83,673	Central – SZAHU with elec re-heat	SZAHU with electric reheat	T12	Automated Logic tied to Pneumatic
Elkins HS	1992	365,915	Central – MZAHU with elec re-heat	MZAHU with electric reheat	T12	Automated Logic tied to Pneumatic
Mission Bend ES	1980	90,061	Air-cooled chillers / natural gas boiler	SZAHU with terminal electric reheat	T8 - Occ Sensors in CRs	Automated Logic tied to Pneumatic

Note: SZAHU = Single-Zone Air Handling Unit; MZAHU = Multi-Zone Air Handling Unit

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:

HVAC ECRM 1: RENOVATION OF AGED HVAC EQUIPMENT

It was noted during the survey that several pieces of equipment have reached the end of their useful life expectancy. We recommend this equipment be included in subsequent maintenance budgets to be replaced as planned equipment upgrades in order to avoid the higher cost of emergency replacement when they inevitably fail.

Drabek Elementary School

This 82,664 square foot facility is currently conditioned with a Tecogen 170-ton natural gas fired chiller and a Carrier 170-ton water cooled chiller. The Tecogen chiller is in poor condition and the operation of the unit should be minimized to preserve its useful life. *We recommend the district install a 10 ton Rooftop Unit (RTU) to serve the Administration, a 7-1/2 ton RTU for the Library and a 4-ton unit for the Computer Lab to improve overall comfort levels in these spaces and relieve pressure from the Tecogen chiller.* The DX unit will allow these areas to remain conditioned after normal occupancy hours without requiring the operation of either chiller system. The conventional water-cooled chiller should adopt the lead chiller role and the Tecogen can be relegated to a backup role in the system. There will be a marginal to moderate amount of ductwork conversion as the RTUs are integrated with the existing central system ductwork in these areas; these costs have been estimated and included in the cost summary below.

Estimated Cost: $25,000 Estimated Savings: $2,778 Estimated Payback: 9 Years

Briargate Elementary School

This 1977 built facility has two each McQuay ALR110E air cooled reciprocating chillers (see picture to right of one chiller); one of these chillers had been out of commission for about a month previous to the survey. The chillers are old and operating with little efficiency when they are operating. We recommend replacing these chillers with new units.

Estimated Cost: $198,000 Estimated Savings: $16,500 Estimated Payback: 12 Years

The gymnasium at Briargate has a 1995 20-ton split system with electric heat that has reached the end of its estimated 15-20 year useful life expectancy. The air handler is located above the gymnasium ceiling. We recommend the district budget to replace this unit in the next few years.

Estimated Cost: $41,000 Estimated Savings: $4,550 Estimated Payback: 9 Years

Dulles High School

Dulles High School was originally constructed in 1964 and has had several renovation and additions since that time. *The Old Band Hall has an aged 50-ton chiller that needs to be replaced.* Construction in the area at the time of the survey prevented access to the unit, but maintenance staff estimated the unit to be 40 years old, confirming that the unit needs to be replaced. *The Choir area has an inoperable 45-ton air cooled R-22 chiller that also needs to be replaced.*

Estimated Cost: $106,875 *Estimated Savings: $8,887* *Estimated Payback: 12 Years*

The Uniform Storage area has a 5-ton split system that does not currently have humidity control. The uniforms are an investment by the district that should be protected from damage that can occur with mold and mildew. *We recommend the unit be replaced with a new 5-ton split system and the storage area be controlled by a humidistat as well as a thermostat.*

Estimated Cost: $10,250 *Estimated Savings: $1,281* *Estimated Payback: 8 Years*

Dulles High School has several rooftop units that were originally installed between 1994 and 1998. These units are reaching the end of their useful life expectancy of 15-20 years. *We recommend these units be budgeted for replacement within the next 5 years to avoid emergency replacement costs that would be incurred if the units are allowed to fail on their own schedule.*

One of the units has electric heat despite the fact that natural gas is available in the area. FBISD pays $9.59, on average, for each MCF of natural gas consumed at the schools. Each MCF of natural gas contains approximately 1,030,000 British Thermal Units (BTUs) of energy, but due to efficiency losses in the combustion processes required to convert energy from natural gas, only 80% of those BTUs are available to be used (modern equipment is considerably more efficient than 80% in this conversion, but for the purposes of this calculation, we will use 80%, conservatively). Therefore only 80% of 1,030,000, or 824,000 BTUs, are available per MCF of natural gas. This indicates that FBISD pays 1.16417×10^{-5} per BTU for natural gas. Electricity costs the district $0.0899/kWh, on average. Each kWh of electricity represents 3,413 BTUh; therefore the district pays 2.63308×10^{-5} per BTU of electricity. Comparing the cost of natural gas to electricity, we utilize the following formula:

Cost of electricity per BTU / Cost of natural gas per BTU =

$0.0000263308 / $0.0000116417 = 2.26

Therefore, for an equivalent amount of energy, electricity costs the district 2-1/4 times more than the energy obtained from natural gas. *We recommend the district utilize natural gas for space and domestic water heating processes whenever possible.*

The rooftop units determined to need replacement are listed in the following table:

Year of Manufacture	Quantity	Model	Electrical (compressor)	Heat (MBH Natural Gas unless otherwise noted)
?	1	York D1SS090	460/3/19	10kW electric ht
1998	2	Trane YCD180	460/3/26	250 in / 203 out
1995	1	Lennox LGA180	460/3/27	260 in
1997	1	Trane YCD480	460/3/75	400 in / 324 out
1997	1	Trane YCD360	460/3/64	350 in / 284 out
1994	4	Carrier 48HJD012	460/3/25	180 in / 148 out
1994	2	Carrier 48TJD016	460/3/34	231 in / 185 out
1994	1	Carrier 48HJ008	460/3/20	125 in / 102 out
1994	3	Carrier 48TJD024	460/3/45	270 in / 216 out
1994	1	Carrier HJD014	460/3/30	225 in / 184 out
1994	1	Carrier 48HJD009	460/3/20	125 in / 102 out

The table represents 288 total tons of nominal cooling capacity rooftop units to be replaced.

Estimated Cost: $590,400 Estimated Savings: $56,758 Estimated Payback: 10-1/2 Years

HVAC ECRM 2: REPLACEMENT OF BOILER AT DRABEK ES

It was noted during the survey, that the Sellers boiler at Drabek Elementary is oversized for the heating load requirements at the school. We recommend replacing the existing boiler (approximately 80-82% efficient) with two new modular condensing boilers (approximately 96-98% efficient) that can be staged to match the heating load requirements.

Estimated Cost: $119,200 Estimated Savings: $14,700 Estimated Payback: 8-1/4 Years

HVAC ECRM 3: TEST AND BALANCE

Several facilities were noted to have the manual throttling valves at the air handlers at least partially closed with Variable Frequency Drives (VFDs) installed in the system. There are generally two reasons that a manual valve may be closed in a water distribution system including VFDs. One is that the Belimo control valve in the piping with the manual control valve may have flow limitations for it to work properly and the water piping is oversized and allowing too much flow for the Belimo to work correctly. The other is that the valves were closed as part of a test and balance exercise and never returned to full open position. Having the manual valves in a partially closed position introduces an artificially high differential pressure measurement within the equipment room and an artificially low differential pressure reading in the main branch piping. The artificially low reading forces the secondary chilled water pumps to operate at higher power consumption than if the differential pressure was accurately sampled. Therefore, we recommend the district perform a test and balance of the water-side system at Drabek and Mission Bend Elementary Schools, as well as Dulles High School. Adjusting the valve positions correctly will allow the VFDs to adjust chilled and hot water pumps to adjust their power requirements to actual load conditions and will result in pump savings for the facility.

Estimated Cost: $43,181 Estimated Savings: $14,394 Estimated Payback: 3 Years

HVAC ECRM 4: TIMERS FOR DOMESTIC WATER HEATERS

Some of the water heaters around the district were noted to be electric. Programmable timers can be installed with these units that will limit the operation of the water heater to scheduled occupancy hours and eliminate operation during holidays and on weekends. This condition was noted at Drabek, Briargate and Mission Bend Elementaries. Pricing is reflective of Drabek Elementary only.

Estimated Cost: $500 Estimated Savings: $500 Estimated Payback: 1 Year

HVAC ECRM 5: CONVERT 3-WAY VALVES TO 2-WAY; INSTALL/REPLACE VFDs

Variable Volume water distribution systems utilize differential pressure sensors to evaluate the load requirements of a chilled or hot water heating system. The pressure in the supply side piping and return side piping is compared to determine how much water is required by the spaces to maintain comfort. All systems require a three-way valve at the terminal unit on the supply side of the loop so that a satisfied condition in the end of the loop will not shut water off from the return side of the loop. However, when three-way valves are included at intermediate space units, they serve as a bypass and the pressure reading in the supply piping does not accurately reflect that the spaces may have reached setpoint and are throttling back on load. Therefore the VFD cannot determine the load is satisfied and throttle back for pump and fan energy savings. *We recommend the district replace the three-way valves incorporated in the middle of the supply loops to two-way valves.*

There were several VFDs in the schools that were locked in bypass because the drives were not functioning properly and they should be replaced. In other cases, there were never any VFDs incorporated in to systems that could easily be retrofit to variable volume systems and realize

energy savings. Some or all of these conditions were noted at Drabek, Mission Bend, Briargate, Sienna Crossing and Dulles.

Estimated Cost: $156,800 Estimated Savings: $26,133 Estimated Payback: 7-1/4 Years

Lighting ECRM 1: RETROFIT OF T12 LIGHTING TO T8:

Elkins and Dulles High Schools, as well as Briargate, Lake Olympia and Arizona Fleming Elementary Schools, 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. Senate Bill 300 requires Texas school districts to install the most efficient lamps and ballasts possible in their existing fixtures. *Therefore we recommend the district retrofit the fixtures at these facilities with T8 lamps and electronic ballasts.*

Estimated Cost: $590,340 Estimated Savings: $98,400 Estimated Payback: 6 years

Lighting ECRM 2: DAYLIGHTING/DE-LAMPING OPPORTUNITIES:

Daylighting is the practice of incorporating natural daylight into spaces to reduce the reliance on artificial light fixtures. These same areas require artificial light fixtures at night when the natural light contribution has ceased. Unfortunately, many times the artificial fixtures in these areas are switched on throughout the day because of poor staff training or because the lighting design did not incorporate appropriate lighting controls to promote the operation of the daylighting strategies. As a result, there are often energy saving opportunities available to school districts with minor lighting control modifications or staff training. One of the schools demonstrating these opportunities is Elkins High School. The lobby has 25-30' ceilings and the walls are filled with transom windows. There are 7 wall sconces and five 400-watt metal halide fixtures in the lobby area that are switched on during the day, when the natural daylight contribution is all that is required for proper illumination. We recommend training staff not to turn these fixtures on during the day, or if necessary, make proper switching scheme modifications to allow the fixtures to be left off during the day.

In other situations, such as the cafeteria at Sienna Crossing, the 4-lamp fixtures are left operating throughout the school day, even during unoccupied periods. At times, unoccupied periods can still have student traffic in the space as students move from one area of the building to another; these safety light levels can be easily matched with just 2-lamps operating in each fixture. *We recommend the district just operate 2-lamps in each of the cafeteria fixtures during unoccupied periods.*

The corridors at Sienna Crossing utilize 2-lamp fixtures at 6 feet on center spacing. Light levels in the corridors were measured to be 30-47 footcandles. The Illumination Engineering Society of North America (IESNA) develops recommendations for appropriate light levels in various spaces in school buildings. Their recommendation for school corridors is 5-10 footcandles. We recommend the district consider removing every other fixture in the corridors at Sienna

Crossing. Light levels will fall to 15-20 footcandles, which still exceeds IESNA recommendations, yet benefit energy savings with one-half of the existing fixtures in the corridors.

The corridors at Mission Bend ES have 50 each 3-lamp fixtures to light the corridor. As per the recommendation for Sienna Crossing, these fixtures can be de-lamped to 2-lamp fixtures by removing the center lamp and still provide adequate light levels in the corridors.

Estimated Cost: $500 Estimated Savings: $1,150 Estimated Payback: 6 months

Lighting ECRM 3: OCCUPANCY SENSOR INSTALLATION

There were several areas of the facilities that were noted to have artificial light fixtures operating during unoccupied periods. The first line of defense for the district to eliminate unnecessary fixture operation is to conduct staff training to turn lights off as the last occupant leaves the room. Studies have shown that linear fluorescent fixtures, the type of fixture most often found in classrooms, offers energy savings 23 seconds after they have been turned off when considering the startup current required to turn the fixtures back on when the occupants return. If the training is unsuccessful in changing the behavior of the occupants, then automatic means of turning off the lights, most commonly occupancy sensors, can be employed to perform the task. One such location that this strategy is available is the gymnasium at Arizona Fleming. There are 15 4-lamp T8 fluorescent light fixtures in this space that were noted to be on during unoccupied periods; we recommend installing occupancy sensors to ensure the lights are off when nobody is in the space.

Estimated Cost: $600 Estimated Savings: $435 Estimated Payback: 17 months

Lighting ECRM 4: METAL HALIDE FIXTURE RETROFIT TO T5

The Elkins HS cafeteria has 25 each 250-watt metal halide fixtures that were producing 18 footcandles on the tabletops at the time of the survey. IESNA recommendations for school cafeterias are 30-35 footcandles. One characteristic of metal halide fixtures is their inherently long re-strike. This means that if the fixtures are ever turned off, it can take up to 15 minutes for them to come back on. This long re-strike encourages staff to leave the lights on throughout the day, even if the space is not occupied. *We recommend replacing the metal halides with 4-lamp T8 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.* Similarly, the gymnasium utilizes 400-watt metal halides. *We recommend replacing these fixtures with T5 high bay fluorescent fixtures.*

Estimated Cost: $12,450 Estimated Savings: $1,554 Estimated Payback: 8 Years

Lighting ECRM 5: REPLACE INCANDESCENT EXIT FIXTURES WITH LED FIXTURES

Elkins High School and Lake Olympia Elementary School were noted to have numerous incandescent exit fixtures in the buildings. Most incandescent exit fixtures have two each 15-watt lamps and consume 30 watts per fixture, 8,760 hours per year. Therefore, each fixture

consumes 263 kWh per year. LED exit fixtures consume less than 5 watts per fixture and reduce electrical consumption to 44 kWh per year.

Estimated Cost: $9,934 Estimated Savings: $1,516 Estimated Payback: 6-1/4 Years

Controls ECRM 1: REPLACE PNEUMATIC CONTROLS WITH DDC EMS

Several schools were noted to operate with a combination of electronic energy management systems and pneumatic thermostats and controls. These schools were Drabek, Mission Bend, Briargate, Sienna Crossing Elementaries, and Dulles High School. We recommend retrofitting the existing energy management systems to full DDC (Direct Digital Control) systems. To achieve the full benefit of these new DDC systems, we recommend the district involve three steps:

Controls ECRM 1a: Replace pneumatic controls with DDC systems

Pneumatic controls require operation of an air compressor and are inherently cost intensive systems to maintain. Some of the pneumatic controllers were noted to be disabled and may or may not have been appropriately capped off when they were disabled. Converting the systems to DDC will allow the air compressor to be abandoned and, if appropriately commissioned, will result in significant energy savings for the district.

Controls ECRM 1b: Minimize system run schedules.

Currently, the district is universally programmed to allow HVAC systems to operate from 5:00am through 8:00pm, 15 hours per day. Many of the facilities are only occupied from 7:30am to 3:45pm. There are significant energy savings available by limiting the HVAC system operation to times coinciding with occupancy schedules. For Elementary and Middle Schools, we recommend limiting operation of the systems to 7:30am to 4:00pm; for High Schools, we recommend limiting operation to 7:30am to 6:00pm. There are custodial and extracurricular activities that occur outside these hours, but in most cases, the residual heating or cooling should be adequate to provide at least minimal comfort for these occupants during these extended hours.

Controls ECRM 1c: Install damper controllers on Outside Air dampers

The largest reason the units are currently programmed to startup at 5:00am, is the observation that the systems take an extended period of time to reach setpoint in time for the first occupant to arrive at the building. A significant cause for this slow startup is the lack of controls on the outside air dampers; they remain open during startup and operation during unoccupied periods. This allows larger than necessary latent and sensible cooling loads on the system during these times. Keeping the dampers closed during startup and after-hour operation will result in more efficient and less energy intensive system operation that will reach setpoint more rapidly. Cost summary information incorporates all three phases for Controls ECRM 1.

Estimated Cost: $1,368,591 Estimated Savings: $190,025 Estimated Payback: 7-1/4 Years

Controls ECRM 2: INSTALL IP ADDRESSABLE THERMOSTATS AT FLEMING PORTABLES

It was noted during the survey that the Arizona Fleming portables are not under any HVAC system control beyond the conventional thermostats currently installed with the system. We recommend installing IP Addressable Programmable Thermostats in these buildings. These devices will allow the district personnel with appropriate password credentials to monitor and program these units at any district network computer and will limit operation of the HVAC equipment to scheduled occupancy hours.

Estimated Cost: $600 Estimated Savings: $150 Estimated Payback: 4 Years

Controls ECRM 3: RETROCOMMISSION EXISTING BUILDING ENERGY MANAGEMENT SYSTEM

Dulles High School demonstrated evidence to the surveyor that the Sequence of Equipment Operations may not be operating as efficiently as possible. In particular, it appeared that the facility is operating with unnecessary simultaneous heating and cooling cycles. Changes to the original sequence of operations can occur in many ways, but most often involves the incorporation of hard and soft equipment overrides in the control system by district maintenance and energy management staff. These changes occur when staff members need to put overrides in the system in order to account for special events at the facility or to perform maintenance on the equipment. After the precipitating event is concluded, the override is not always removed from the system. Similarly, some problems in the HVAC system, like a faulty temperature sensor, can be masked by re-programming the settings for the device in software. These changes may or may not be restored after the faulty equipment is or is not repaired. After a given period of time, the only tool available to the district to identify and correct these types of issues is a retro-commissioning of the energy management system. This process works to identify changes implemented in the system and uncover the reason why the change was implemented. If the precipitating cause for the change can be repaired, the override can be removed and the facility can return to correct operational sequences. Retro-commissioning the system can eliminate unnecessary simultaneous heating and cooling. The estimated cost includes retro-commissioning all of the district's 70 campuses through projects coordinated with Centerpoint Energy's Retro-commissioning Program. In this program, Centerpoint will pay a percentage of the retro-commissioning costs and the program will only allow the district to incur a minimal capital investment to execute the changes discovered in the study.

Estimated Cost: $1,274,000 Estimated Savings: $231,636 Estimated Payback: 5-1/2 Years

Envelope ECRM 1: Replace 4x4 window in Sienna Crossing Corridor

Near the Lobby Corridor, it was noted that large water stains were present on the carpet. The source of the water was traced back to a window located just inches above the finished floor that leaks water whenever it rains. The staff had performed a good job preventing mold and mildew from becoming established at the carpet, but the maintenance expense and the risk for an indoor air quality issue to develop warrants the replacement of the window.

Estimated Cost: $500 Estimated Savings: $125 Estimated Payback: 4 Years

Envelope ECRM 2: Replace Skylights at Lake Olympia ES

At Lake Olympia ES, there are three 16x4 skylights intended to allow natural daylight to fill the corridor space and reduce the dependence on artificial light fixtures. The skylight material has severely yellowed so little natural light comes through the units. We recommend replacing these units to allow natural daylight to illuminate the space.

Estimated Cost: $3,000 Estimated Savings: $500 Estimated Payback: 6 Years

7.0 MAINTENANCE AND OPERATION RECOMMENDATIONS

HVAC

- Comb fins on damaged condensing units
- Install hail guards to protect fins in future
- Keep electric boiler off during peak electrical load conditions
- Verify elec heat stages at low load conditions
- Increase frequency of filter replacement
- Clean Lake Olympia Cooling Tower
- Repair Dulles Cooling Tower

Lighting

- Turn off all light fixtures not required during daytime
- Turn off lights in unoccupied spaces

Controls

- Relocate EMS sensors to improve temperature sampling
- Install timer for booster heater at Briargate

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

At FBISD, the HVAC M&O opportunities revolve around combing the condenser fins [combs available for less than $10]. The installation of coil guards prevents future fin combing, which is ultimately a combination of deferred labor savings for eliminating the need for maintenance personnel to perform the task and energy savings resulting from the units maintaining optimum operating efficiency. We recommend installing hail guards on the units to prevent future coil fin damage.

Mission Bend ES has a 120kW electric boiler. Natural gas is not available at the facility, but the EMS can be programmed to limit the impact of the boiler on the demand-side of the utility bill by eliminating boiler operation during peak demand times of the day. At these times, the rooms should be close to setpoint so eliminating the boiler operation during peak times should not result in uncomfortable conditions in the spaces.

Briargate ES also has electric heat at the HVAC system. We recommend the district verify that the staged electric heat is programmed correctly and that too many stages are not operating during low load heating conditions.

It was also noted during the survey, that some of the HVAC filters have not been changed with regularity. We recommend the district replace each HVAC filter with a pleated filter every 60-90 days.

The cooling tower at Lake Olympia was noted to have scale established on the media. *We recommend power washing the tower to improve the efficiency of the tower.*

Similarly, the cooling tower at Dulles was noted to require maintenance. Only one cell was operative at the time of the survey; the unit was noted to be losing significant amounts of water.

Lighting M&O

Some areas of the buildings noted in Section 6.0 of the report had light fixtures that were not required to be operating during the day or were fixtures left operating in unoccupied spaces. The least expensive remedy to these issues is to train staff to not turn on fixtures not needed during daytime hours and to turn off fixtures in unoccupied spaces. Failure of the behavioral modification training will require the district to invest capital into automatic controls for the fixtures.

Controls M&O

There were sensors noted in many locations that were not conducive to appropriate temperature sampling. One such sensor is the unit pictured to the right, which has been blocked by the bulletin board posting. Another sensor was noted to be installed immediately over a computer (subject to heat from the computer). We recommend the district relocate these sensors to improve the accuracy of the temperature sampling in the space.

The booster heater at Briargate (54 kW) can be prevented from operating during historical high peak demand times with a timer. Demand charges can have significant financial penalties for periods much longer than just the month the peak demand is unfortunately high. As can be seen in the Rate Schedule Analysis (Section 4.0), an unfortunate high demand month can trigger a higher ratcheted demand, or if the unfortunate month is June through September, will also affect the 4CP demand calculation. The ratcheted demand can affect the utility bill for up to 11 months; the 4CP will be used as an average of last year's June through September bills for the full subsequent calendar year.

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 5% per year after year 5				
Cash Flow	**Project Cost**	**Project Savings**	**Maintenance Expense**	**Net Cash Flow**
Time 0	($4,579,915)		0	($4,579,915)
Year 1		$ 675,189.00	0	$675,189
Year 2		$ 675,189.00	0	$675,189
Year 3		$ 675,189.00	0	$675,189
Year 4		$ 675,189.00	0	$675,189
Year 5		$ 675,189.00	0	$675,189
Year 6		$ 641,429.55	($5,000)	$636,430
Year 7		$ 607,670.10	($5,000)	$602,670
Year 8		$ 573,910.65	($5,000)	$568,911
Year 9		$ 540,151.20	($5,000)	$535,151
Year 10		$ 506,391.75	($5,000)	$501,392
Year 11		$ 472,632.30	($10,000)	$462,632
Year 12		$ 438,872.85	($10,000)	$428,873
Year 13		$ 405,113.40	($10,000)	$395,113
Year 14		$ 371,353.95	($10,000)	$361,354
Year 15		$ 337,594.50	($10,000)	$327,595
			Internal Rate of Return	**9.66%**

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

APPENDIX I: SUMMARY OF FUNDING AND PROCUREMENT OPTIONS

9.0 GENERAL COMMENTS

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

APPENDICES

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

SUMMARY OF FUNDING OPTIONS FOR CAPITAL EXPENDITURE PROJECTS

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

LoanSTAR Program:

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

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

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

Loans on Commercial Market:

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

Leasing Corporations:

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

Bond Issue:

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

SUMMARY OF PROCUREMENT OPTIONS FOR CAPITAL EXPENDITURE PROJECTS

State Purchasing:

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

Design/Bid/Build (Competitive Bidding):

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

Design/Build:

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

Purchasing Standardization Method:

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

Performance Contracting:

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

Solution Center

How to Finance Your Energy Program

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

Selecting a Cost/Benefit Analysis Method

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

Simple Payback Analysis

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

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

Simple Payback

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

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

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

Life-Cycle Cost Analysis

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

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

continued

Financing Mechanisms

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

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

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

Internal Funds

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

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

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

Debt Financing

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

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

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

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

Lease and Lease-Purchase Agreements

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

Energy Performance Contracts

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

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

Types of Leasing Agreements

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

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

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

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

How to Finance Your Energy Program *continued*

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

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

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

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

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

Rebuild America
U.S. Dept. of Energy

APPENDIX II - ELECTRIC UTILITY RATE SCHEDULE

6.1.1.1.3 SECONDARY SERVICE GREATER THAN 10 KVA

AVAILABILITY

This schedule is applicable to Delivery Service for non-residential purposes at secondary voltage with demand greater than 10 kVA when such Delivery Service is to one Point of Delivery and measured through one Meter.

TYPE OF SERVICE

Delivery Service will be single or three-phase, 60 hertz, at a standard secondary voltage. Delivery Service will be metered using Company's standard Meter provided for this type of Delivery Service. Any Meter other than the standard Meter will be provided at an additional charge and/or will be provided by a Meter Owner other than the Company pursuant to Applicable Legal Authorities. Where Delivery Service of the type desired is not available at the Point of Delivery, additional charges and special contract arrangements may be required prior to Delivery Service being furnished, pursuant to Section 6.1.2.2, Construction Services, in this Tariff.

MONTHLY RATE

I. Transmission and Distribution Charges:

	Standard Class	Subclass Exception	
Customer Charge	$5.27	$0.00	per Retail Customer per Month
Metering Charge			
Non-IDR Metered	$31.86	$17.07	per Retail Customer per Month
IDR Metered	$116.89	$116.89	per Retail Customer per Month
Transmission System Charge			
Non-IDR Metered	$1.1027	$1.1027	per NCP kVA
IDR Metered	$1.4709	$1.4709	per 4CP kVA
Distribution System Charge	$3.118137	$3.118137	per Billing kVA

The following charges are applicable to both the Standard Class and the Subclass Exception

II.	**System Benefit Fund:**	See Rider SBF
III.	**Transition Charge:**	See Schedules TC, TC2, TC3 and SRC
IV.	**Nuclear Decommissioning Charge:**	See Rider NDC
V.	**Transmission Cost Recovery Factor:**	See Rider TCRF

VI.	**Excess Mitigation Credit:**		Not Applicable
VII.	**State Colleges and Universities Discount:**		See Rider SCUD
VIII.	**Competition Transition Charge:**		See Rider CTC
IX.	**Competitive Metering Credit:**		See Rider CMC
X.	**Other Charges or Credits:**		
	A. Municipal Account Franchise Credit (see application and explanation below)	$(.002207)	per kWh
	B. Rate Case Expenses Surcharge		See Rider RCE
	C. Rider UCOS Retail Credit		See Rider RURC
	D. Advanced Metering System Surcharge		See Rider AMS
	E. Accumulated Deferred Federal Income Tax Credit		See Rider ADFITC

COMPANY SPECIFIC APPLICATIONS

DETERMINATION OF BILLING DEMAND FOR TRANSMISSION SYSTEM CHARGES

Determination of NCP kVA The NCP kVA applicable under the Monthly Rate section shall be the kVA supplied during the 15 minute period of maximum use during the billing month.

Determination of 4 CP kVA The 4 CP kVA applicable under the Monthly Rate section shall be the average of the Retail Customer's integrated 15 minute demands at the time of the monthly ERCOT system 15 minute peak demand for the months of June, July, August and September of the previous calendar year. The Retail Customer's average 4CP demand will be updated effective on January 1 of each calendar year and remain fixed throughout the calendar year. Retail Customers without previous

history on which to determine their 4 CP kVA will be billed at the applicable NCP rate under the "Transmission System Charge" using the Retail Customer's NCP kVA.

DETERMINATION OF BILLING DEMAND FOR DISTRIBUTION SYSTEM CHARGES

Determination of Billing kVA The Billing kVA applicable to the Distribution System Charge shall be the higher of the NCP kVA for the current billing month or 80% of the highest monthly NCP kVA established in the 11 months preceding the current billing month (80% ratchet). The 80% ratchet shall not apply to seasonal agricultural Retail Customers.

OTHER PROVISIONS

Secondary Service Greater Than 10 kVA. This Rate Schedule is applicable only to Retail Customers whose peak demand for the current month is greater than 10 kVA, as measured in the fifteen minute period of highest demand, or whose peak demand exceeded 10 kVA in any of the previous eleven months, and that otherwise qualify under this Rate. This Rate Schedule is applicable to Delivery Service provided for Electric Power and Energy supplied by Retail Customer's REP for Temporary service subject to provisions of Section 6.1.2.2, Construction Services. The Electric Power and Energy delivered may not be re-metered or sub-metered by the Retail Customer for resale except pursuant to lawful sub-metering regulations of Applicable Legal Authorities. Retail Customer's previous metered usage under this or any other Rate Schedule will be used, as needed, in determining the billing determinants under the Monthly Rate section.

Subclass Exception. The Subclass Exception is applicable only to Retail Customers who otherwise qualify for the Secondary Service Greater Than 10 kVA rate schedule and either: (1) whose highest NCP kVa for the most recent 12 months is equal to or less than 50 kVA; or (2) whose highest NCP kVa for the most recent 12 months is greater than 50 kVA but less than or equal to 400 kVA and whose load factor was less than or equal to 10% for each of the most recent 12 months. The most recent 12 months ends with and includes the current month. The monthly load factor is determined as follows:

load factor = billing kWh for the month/ (NCP kVA X number of days in billing period X 24)

Service Voltages. Company's standard service voltages are described in 6.2.2, Standard Voltages and in the Company's Service Standards.

Municipal Account Franchise Credit. A credit equal to the amount of franchise fees included in the Transmission and Distribution Charges will be applied to municipal accounts receiving service within the incorporated limits of such municipality which imposes a municipal franchise fee upon the Company based on the kWh delivered within that municipality and who have signed an appropriate Franchise Agreement.

Adjustment To The Charges Applied To Retail Customer's Demand Measurement If data to determine the Retail Customer's *Demand Measurement* becomes no longer available, the Company will determine a *Conversion Factor* which will be used as an adjustment to all per unit charges that will then be applied to the *New Demand Measurement*. *Demand Measurement* shall include the Billing kVA, the 4 CP kVA, NCP kVA or any other demand measurement required for billing under this Rate Schedule or any applicable rider(s) or any other applicable schedule(s). *New Demand Measurement* shall be the billing determinants which replace the *Demand Measurement*. The *Conversion Factor* will apply to unit prices per kVA such that when applied to the *New Demand Measurement*, the revenue derived by the Company under demand based charges shall be unaffected by such lack of data.

This adjustment may become necessary because of changes in metering capabilities, such as, Meters that record and /or measure kW with no ability to determine kVA or Meters which meter data in intervals other than 15 minutes. This adjustment also may become necessary due to changes in rules, laws, procedures or other directives which might dictate or recommend that Electric Power and Energy, electric power related transactions, wire charges, nonbypassable charges and/or other transactions measure demand in a way that is inconsistent with the definitions and procedures stated in the Company's Tariff. This adjustment is applicable not only in the instances enumerated above but also for any and all other changes in *Demand Measurement* which would prevent the Company from obtaining the necessary data to determine the kVA quantities defined in this Rate Schedule, applicable Riders and other applicable schedules.

The Conversion Factor shall render the Company revenue neutral to any change in *Demand Measurement* as described above.

NOTICE
This Rate Schedule is subject to the Company's Tariff and Applicable Legal Authorities.

APPENDIX IV - PRELIMINARY ENERGY ASSESSMENT SERVICE AGREEMENT

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 _Fort Bend 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: BW Copeland Date: 8/5/2010

Name (Mr./~~Ms./Dr.~~)__Ben W. Copeland Title: __Chief Auxiliary Services Officer

Organization: __Fort Bend ISD Phone: __281-634-1042__

Street Address: ___16431 Lexington Blvd Fax: __281-634-1705

Mailing Address: __16431 Lexington Blvd, Sugar Land, TX 77479__ E-Mail:_benjamin.copeland@fortbendisd.com_

County: ____Fort Bend

Contact Information:

Name (Mr./~~Ms./Dr.~~):__Tim Castilaw Title: _Executive Director of Facilities and School Support__

Phone: __281-634-1871 Fax: 281-634-5554

E-Mail:__timothy.castilaw@fortbendisd.com County: __Fort Bend

Please sign and mail or fax to: Juline Ferris, Schools and Education Program Administrator, State Energy Conservation Office, 111 E. 17th Street, Austin, Texas 78774. Phone: 512-936-9283. **Fax 512-475-2559.**

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

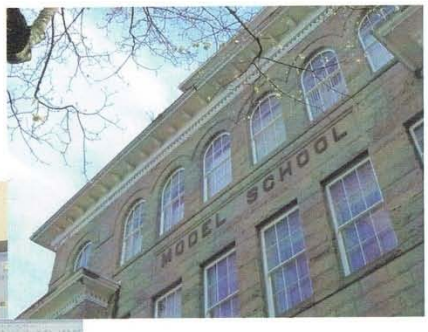
APPENDIX V - TEXAS ENERGY MANAGERS ASSOCIATION (TEMA)

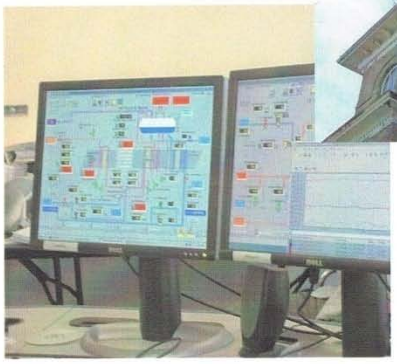
ANNOUNCING!

TEMA

TEXAS ENERGY MANAGERS ASSOCIATION

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





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

WWW.TEXASEMA.ORG

Check the website for Membership and Association information.

SECO
State Energy Conservation Office

APPENDIX VI - UTILITY CHARTS ON CD